



Teradata Database

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# SQL Data Definition Language

## Syntax and Examples

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## Purpose

*SQL Data Definition Language Syntax and Examples* describes the syntax of Teradata Database SQL language statements used to perform the following actions:

- Define or restructure the database (Data Definition Language)
- Assign or revoke access to the data (Data Control Language)
- Analyze queries and query workloads
- Use data definition tools to assist SQL programming

*SQL Data Definition Language Syntax and Examples* also provides examples of how to use these statements.

This preface describes the organization of *SQL Data Definition Language Syntax and Examples* and identifies information you should know before using it. This book should be used in conjunction with the other volumes of the SQL book set.

## Audience

System administrators, database administrators, and security administrators are the principal audience for this manual. Teradata field engineers and other technical personnel responsible for designing and maintaining the Teradata Database may also find this manual useful.

## Supported Software Release

This book supports Teradata® Database 13.0.

## Prerequisites

If you are not familiar with the Teradata Database, you will find it useful to read the *Introduction to Teradata* and *SQL Fundamentals* before reading this document.

Additional information about developing applications using embedded SQL is found in *Teradata Preprocessor2 for Embedded SQL Programmer Guide*.

You should be familiar with basic relational database management theory and technology. This manual is not an SQL primer.

## Changes To This Book

Release	Description
Teradata Database 13.0 October 2010	Updated the following statements: <ul style="list-style-type: none"><li>• ALTER TABLE</li><li>• CREATE TABLE</li><li>• DROP STATISTICS</li><li>• HELP MACRO</li><li>• HELP TABLE</li><li>• HELP VIEW</li></ul>
Teradata Database 13.0 March 2010	Updated the following statements: <ul style="list-style-type: none"><li>• COLLECT STATISTICS (Optimizer Form)</li><li>• CREATE TABLE</li></ul>
Teradata Database 13.0 August 2009	Provided correct system maximum for replication groups.
Teradata Database 13.0 April 2009	<ul style="list-style-type: none"><li>• Split the Teradata Database 12.0 <i>SQL Reference: Data Definition Language</i> manual into two parts: one covering syntax and examples and the other covering detailed information about the statements.</li><li>• Added the following new statements:<ul style="list-style-type: none"><li>• CREATE GLOP SET</li><li>• CREATE REPLICATION RULESET</li><li>• DROP GLOP SET</li><li>• DROP REPLICATION RULESET</li><li>• REPLACE REPLICATION RULESET</li><li>• SET SESSION SUBSCRIBER</li><li>• SHOW QUERY LOGGING</li></ul></li></ul>

Release	Description
	<ul style="list-style-type: none"> <li>Updated the following statements: <ul style="list-style-type: none"> <li>ALTER TABLE</li> <li>BEGIN LOGGING</li> <li>BEGIN QUERY LOGGING</li> <li>COLLECT STATISTICS (Optimizer Form)</li> <li>COMMENT</li> <li>CREATE AUTHORIZATION/REPLACE AUTHORIZATION</li> <li>CREATE FUNCTION/REPLACE FUNCTION</li> <li>CREATE FUNCTION (Table Form)</li> <li>CREATE JOIN INDEX</li> <li>CREATE MACRO/REPLACE MACRO</li> <li>CREATE METHOD</li> <li>CREATE PROCEDURE/REPLACE PROCEDURE (both forms)</li> <li>CREATE RECURSIVE VIEW/REPLACE RECURSIVE VIEW</li> <li>CREATE REPLICATION GROUP</li> <li>CREATE TABLE</li> <li>CREATE TRIGGER/REPLACE TRIGGER</li> <li>CREATE TYPE (Distinct and Structured Forms)</li> <li>CREATE VIEW/REPLACE VIEW</li> <li>DROP TABLE</li> <li>DROP USER</li> <li>END LOGGING</li> <li>END QUERY LOGGING</li> <li>HELP SESSION</li> <li>SET QUERY_BAND</li> <li>SET ROLE</li> </ul> </li> </ul>
Teradata Database 12.0 September 2007	<ul style="list-style-type: none"> <li>Added the following new statements: <ul style="list-style-type: none"> <li>CREATE ERROR TABLE</li> <li>DIAGNOSTIC COSTPRINT</li> <li>DIAGNOSTIC DUMP COSTS</li> <li>DIAGNOSTIC HELP COSTS</li> <li>DIAGNOSTIC SET COSTS</li> <li>DROP ERROR TABLE</li> <li>HELP ERROR TABLE</li> <li>INITIATE PARTITION ANALYSIS</li> <li>LOGGING ONLINE ARCHIVE OFF</li> <li>LOGGING ONLINE ARCHIVE ON</li> <li>SET QUERY_BAND</li> <li>SHOW ERROR TABLE</li> </ul> </li> </ul>

Release	Description
	<ul style="list-style-type: none"> <li>Updated the following statements: <ul style="list-style-type: none"> <li>ALTER PROCEDURE (External Form)</li> <li>ALTER TABLE</li> <li>ALTER TYPE</li> <li>COLLECT STATISTICS (Optimizer Form)</li> <li>CREATE FUNCTION (Table Form)</li> <li>CREATE HASH INDEX</li> <li>CREATE INDEX</li> <li>CREATE JOIN INDEX</li> <li>CREATE MACRO</li> <li>CREATE PROCEDURE (both forms)</li> <li>CREATE TABLE</li> <li>CREATE TABLE (Queue Table Form)</li> <li>CREATE TRIGGER/REPLACE TRIGGER</li> <li>CREATE VIEW</li> <li>DELETE DATABASE</li> <li>DROP DATABASE</li> <li>DROP PROCEDURE</li> <li>DROP TABLE</li> <li>DUMP EXPLAIN</li> <li>GRANT (SQL Form)</li> <li>HELP COLUMN</li> <li>HELP FUNCTION</li> <li>HELP PROCEDURE</li> <li>HELP SESSION</li> <li>HELP STATISTICS (Optimizer Form)</li> <li>HELP STATISTICS (QCD Form)</li> <li>INITIATE INDEX ANALYSIS</li> <li>INSERT EXPLAIN</li> <li>MODIFY PROFILE</li> </ul> </li> </ul>

## Additional Information

URL	Description
<a href="http://www.info.teradata.com/">www.info.teradata.com/</a>	<p>Use the Teradata Information Products Publishing Library site to:</p> <ul style="list-style-type: none"> <li>View or download a manual: <ol style="list-style-type: none"> <li>Under <b>Online Publications</b>, select <b>General Search</b>.</li> <li>Enter your search criteria and click <b>Search</b>.</li> </ol> </li> <li>Download a documentation CD-ROM: <ol style="list-style-type: none"> <li>Under <b>Online Publications</b>, select <b>General Search</b>.</li> <li>In the <b>Title or Keyword</b> field, enter <i>CD-ROM</i>, and click <b>Search</b>.</li> </ol> </li> <li>Order printed manuals: <p>Under <b>Print &amp; CD Publications</b>, select <b>How to Order</b>.</p> </li> </ul>

URL	Description
<a href="http://www.teradata.com">www.teradata.com</a>	The Teradata home page provides links to numerous sources of information about Teradata. Links include: <ul style="list-style-type: none"><li>• Executive reports, case studies of customer experiences with Teradata, and thought leadership</li><li>• Technical information, solutions, and expert advice</li><li>• Press releases, mentions and media resources</li></ul>
<a href="http://www.teradata.com/t/TEN/">www.teradata.com/t/TEN/</a>	Teradata Customer Education designs, develops and delivers education that builds skills and capabilities for our customers, enabling them to maximize their Teradata investment.
<a href="http://www.teradataatyourservice.com">www.teradataatyourservice.com</a>	Use Teradata @ Your Service to access Orange Books, technical alerts, and knowledge repositories, view and join forums, and download software patches.
<a href="http://developer.teradata.com/">developer.teradata.com/</a>	Teradata Developer Exchange provides articles on using Teradata products, technical discussion forums, and code downloads.

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## References to Microsoft Windows and Linux

This book refers to “Microsoft Windows” and “Linux.” For Teradata Database 13.0, these references mean:

- “Windows” is Microsoft Windows Server 2003 64-bit.
- “Linux” is SUSE Linux Enterprise Server 9 and SUSE Linux Enterprise Server 10.





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## CHAPTER 1 **ALTER FUNCTION - COMMENT**

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DDL statements define, modify, and remove database object definitions.

This chapter documents the syntax for, and provides examples of, the Teradata Database DDL statements from ALTER FUNCTION to COMMENT (Comment Placing Form).

# ALTER FUNCTION

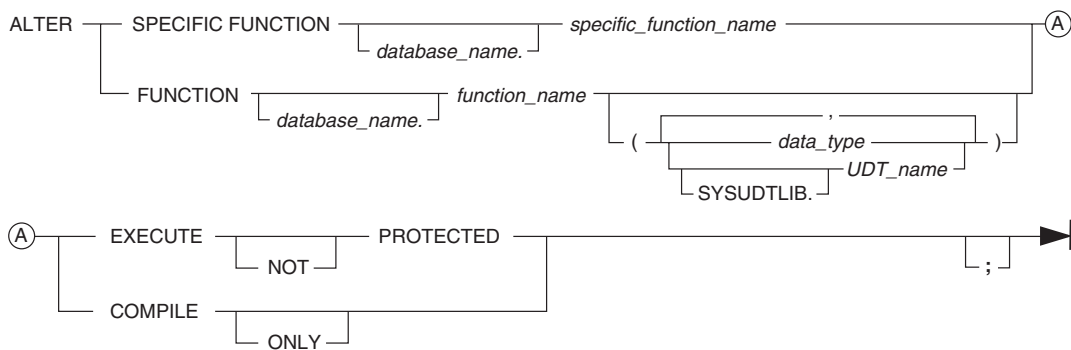
## Purpose

Performs either or both of the following functions:

- Controls whether an existing function can run in protected mode as a separate process or in unprotected mode as part of the database.  
Note that Java UDFs must always run in protected mode, so you cannot use this statement to change their protection mode.
- Recompiles C or C++ functions or relinks Java functions and redistributes them.

Use the REPLACE FUNCTION statement to alter other characteristics of an existing function (see [“CREATE FUNCTION/ REPLACE FUNCTION” on page 138](#)).

## Syntax



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where:

Syntax element ...	Specifies ...
SPECIFIC FUNCTION	that the following character string is the specific function name for the function to be altered.
<i>database_name</i>	the containing database for <i>specific_function_name</i> , if something other than the current database.
<i>specific_function_name</i>	the specific function name for the function to be altered.
FUNCTION	that the following character string is the function name for the function to be altered.
<i>database_name</i>	the containing database for <i>function_name</i> , if something other than the current database.
<i>function_name</i>	the function name for the function to be altered.



Syntax element ...	Specifies ...						
<i>data_type</i>	an optional data type specification for the parameters passed to <i>function_name</i> .  If you do not specify a data type list, then the specified function must be the only one with that name in the database.						
[SYSUDTLIB.] <i>UDT_name</i>	the name of any UDT included in the list of data types for <i>function_name</i> .						
EXECUTE PROTECTED	to change the execution mode for the specified function from unprotected mode to protected mode (see the ALTER FUNCTION topic “When to Specify Unprotected Mode” in <i>SQL Data Definition Language Detailed Topics</i> for details).						
EXECUTE NOT PROTECTED	to change the execution mode for the specified function from protected mode to unprotected mode (see the ALTER FUNCTION topic “When to Specify Unprotected Mode” in <i>SQL Data Definition Language Detailed Topics</i> for details).  This option is not valid for Java UDFs.						
COMPILE [ONLY]	<table border="1"> <thead> <tr> <th>FOR this type of function ...</th><th>THIS option does the following ...</th></tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> <li>C</li> <li>C++</li> </ul> </td><td> <ol style="list-style-type: none"> <li>1 Recompiles the code source for the specified function</li> <li>2 Generates the object code</li> <li>3 Recreates the .so or .dll</li> <li>4 Distributes the .so or .dll file to all nodes of the system</li> </ol> </td></tr> <tr> <td>Java</td><td> <ol style="list-style-type: none"> <li>1 Recompiles the code source for the specified function</li> <li>2 Generates the object code</li> <li>3 Distributes the related JAR files for the function</li> </ol> </td></tr> </tbody> </table> <p>The existing function object is replaced by the recompiled version. The COMPILE ONLY option is not valid for Java UDFs.</p>	FOR this type of function ...	THIS option does the following ...	<ul style="list-style-type: none"> <li>C</li> <li>C++</li> </ul>	<ol style="list-style-type: none"> <li>1 Recompiles the code source for the specified function</li> <li>2 Generates the object code</li> <li>3 Recreates the .so or .dll</li> <li>4 Distributes the .so or .dll file to all nodes of the system</li> </ol>	Java	<ol style="list-style-type: none"> <li>1 Recompiles the code source for the specified function</li> <li>2 Generates the object code</li> <li>3 Distributes the related JAR files for the function</li> </ol>
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<ul style="list-style-type: none"> <li>C</li> <li>C++</li> </ul>	<ol style="list-style-type: none"> <li>1 Recompiles the code source for the specified function</li> <li>2 Generates the object code</li> <li>3 Recreates the .so or .dll</li> <li>4 Distributes the .so or .dll file to all nodes of the system</li> </ol>						
Java	<ol style="list-style-type: none"> <li>1 Recompiles the code source for the specified function</li> <li>2 Generates the object code</li> <li>3 Distributes the related JAR files for the function</li> </ol>						

## ANSI Compliance

ALTER FUNCTION is a Teradata extension to the ANSI SQL-2003 standard.

## Required Privileges

To alter a function definition, you must have the ALTER FUNCTION privilege on that function.

## Privileges Granted Automatically

None.

## Example 1

Suppose you have created and successfully debugged a UDF named *TransXML* and you now want to set its protection mode to EXECUTE NOT PROTECTED. The following request does that, assuming there is no other UDF in the database named *TransXML*:

```
ALTER FUNCTION TransXML EXECUTE NOT PROTECTED;
```

## Example 2

An existing UDF named *XPathValue* that must be recompiled for some reason. *XPathValue* had previously been set to run in unprotected mode. Recall that recompiling a UDF always resets its protection mode back to protected, so you must follow any recompilation with another ALTER FUNCTION request to set its protection mode back to unprotected.

The following set of requests recompiles *XPathValue* and then sets its protection mode back to unprotected:

```
ALTER FUNCTION XPathValue COMPILE;  
  
ALTER FUNCTION XPathValue EXECUTE NOT PROTECTED;
```

## Related Topics

See the following statements for more information about user-defined functions:

- [“CREATE FUNCTION/ REPLACE FUNCTION” on page 138](#)
- [“CREATE GLOBAL TEMPORARY TRACE TABLE” on page 186](#)
- [“DROP AUTHORIZATION” on page 553](#)
- [“RENAME FUNCTION” on page 634](#)
- [“SET SESSION FUNCTION TRACE” on page 676](#)
- [“HELP FUNCTION” on page 715](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)

Also see *SQL External Routine Programming*.

# ALTER METHOD

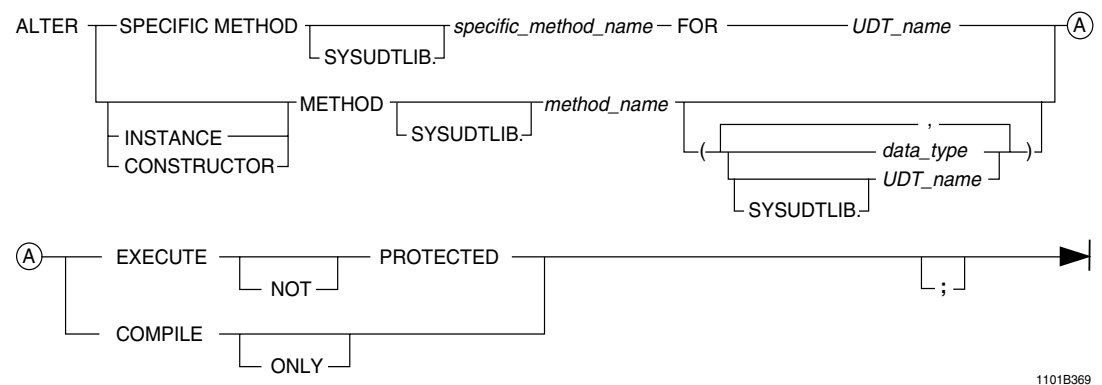
## Purpose

Performs either or both of the following functions:

- Controls whether an existing method can run in protected mode as a separate process or in non-protected mode as part of the database.
- Recompiles or relinks the method and redistributes it.

Use the REPLACE METHOD statement to alter other characteristics of an existing method (see [“REPLACE METHOD” on page 640](#)).

## Syntax



1101B369

where:

Syntax element ...	Specifies ...
SPECIFIC METHOD	that the following character string is the specific method name for the method to be altered.
[SYSUDTLIB.] <i>specific_method_name</i>	the specific function name for the method to be altered. There must already be a method with the same specific method name in the database SYSUDTLIB database. If not, the statement aborts and the system returns an error to the requestor.
INSTANCE METHOD	that the method named as <i>method_name</i> is an instance method. This is the default.
CONSTRUCTOR METHOD	that the method named as <i>method_name</i> is a constructor method.

Syntax element ...	Specifies ...
[SYSUDTLIB.] <i>method_name</i>	the name ( <i>not</i> the specific method name) for the method to be altered.  There must already be a method associated with the specified UDT name that has the same signature. If not, the statement aborts and the system returns an error to the requestor.
<i>data_type</i>	an optional data type specification for the parameters passed to <i>method_name</i> .  If you do not specify a data type list, then the specified method must be the only one with that name in the SYSUDTLIB database.
EXECUTE PROTECTED	to change the execution mode for the specified method from unprotected mode to protected mode (see the ALTER PROCEDURE (External Form) topic “When to Specify Unprotected Mode” in <i>SQL Data Definition Language Detailed Topics</i> for details).
EXECUTE NOT PROTECTED	to change the execution mode for the specified method from protected mode to unprotected mode (see the ALTER PROCEDURE (External Form) topic “When to Specify Unprotected Mode” in <i>SQL Data Definition Language Detailed Topics</i> for details).
COMPILE [ONLY]	to recompile the code source for the specified method, generate the object code, recreate the .so or .dll, and distribute it to all nodes of the system.  The existing method object is replaced by the recompiled version.

## ANSI Compliance

ALTER METHOD is a Teradata extension to the ANSI SQL-2003 standard.

## Required Privileges

To alter a method definition, you must have the UDTMETHOD privilege on the database SYSUDTLIB.

## Privileges Granted Automatically

None.

## Example 1: Changing the Protection Mode

The following ALTER METHOD statement changes the protection mode for the method named *polygon\_mbr()* from protected to not protected:

```
ALTER METHOD polygon_mbr() FOR SYSUDTLIB.polygon
EXECUTE NOT PROTECTED;
```

## Example 2: Recompiling a Method Object

The following ALTER METHOD statement recompiles the specific method object named *SYSUDTLIB.polygon\_mbr*:

```
ALTER SPECIFIC METHOD SYSUDTLIB.polygon_mbr COMPILE;
```

## Related Topics

The following SQL statements, book chapters, and manuals are related to ALTER METHOD:

- [“ALTER TYPE” on page 71](#)
- [“ALTER FUNCTION” on page 16](#)
- [“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120](#)
- [“CREATE METHOD” on page 259](#)
- [“CREATE ORDERING/ REPLACE ORDERING” on page 272](#)
- [“CREATE TRANSFORM/ REPLACE TRANSFORM” on page 484](#)
- [“CREATE TYPE \(Distinct Form\)” on page 507](#)
- [“CREATE TYPE \(Structured Form\)” on page 515](#)
- [“DROP AUTHORIZATION” on page 553](#)
- [“DROP CAST” on page 554](#)
- [“DROP ORDERING” on page 577](#)
- [“DROP TRANSFORM” on page 591](#)
- [“DROP TYPE” on page 592](#)
- [“HELP” on page 684](#)
- [“HELP FUNCTION” on page 715](#)
- [“HELP METHOD” on page 735](#)
- [“HELP TRANSFORM” on page 775](#)
- [“HELP TYPE” on page 779](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)

See *SQL Data Control Language* for information about the UDTTYPE, UDTMETHOD, UDTUSAGE, and EXECUTE FUNCTION privileges, particularly as described for the “GRANT (SQL Form)” in the topics “UDT-Related Privileges” and “EXECUTE FUNCTION Privilege.”

Also see *SQL External Routine Programming* for information about how to write user-defined external routines.

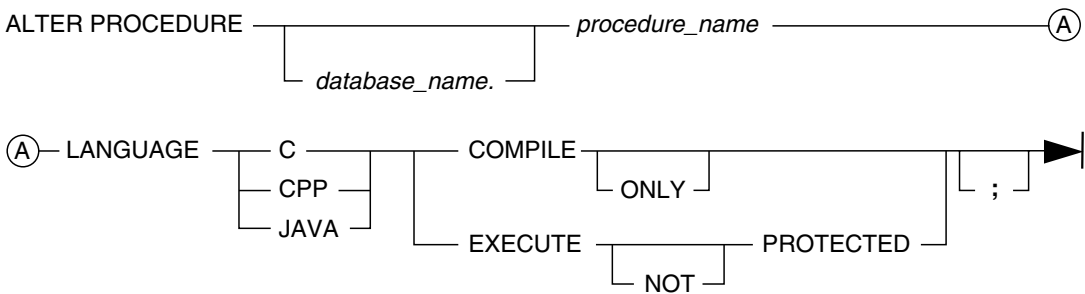
# ALTER PROCEDURE (External Form)

## Purpose

Recompiles an existing external stored procedure and allows changes in the following compile-time attributes of the procedure:

- Generate a new library for the recompiled procedure or not.
- Toggle the protection mode between protected and unprotected states.

## Syntax



1101B284

where:

Syntax element ...	Specifies ...
<i>database_name</i>	the name of a qualifying database containing the external stored procedure to be altered.  If <i>database_name</i> is not specified, the default database for the session is assumed.
<i>procedure_name</i>	the name of the external stored procedure to be altered. You can alter only one stored procedure at a time.
LANGUAGE C	that the external procedure is written in the C programming language.
LANGUAGE CPP	that the external procedure is written in the C++ programming language.
LANGUAGE JAVA	that the external stored procedure is written in the Java programming language.  Java external stored procedures can only be executed on 64-bit Linux and Windows systems. You cannot execute a Java external stored procedure on a UNIX system.

Syntax element ...	Specifies ...						
COMPILE [ONLY]	<p>that the external procedure is to be recompiled.</p> <table> <tr> <th>IF you specify ...</th><th>THEN the system recompiles the procedure ...</th></tr> <tr> <td>COMPILE</td><td> <p>and generates a new library for it.</p> <p>For Java external procedures, the JAR file referenced in the EXTERNAL NAME clause is redistributed to all affected nodes on the system. This is useful for the case of a missing JAR file on a given node.</p> </td></tr> <tr> <td>COMPILE ONLY</td><td> <p>but does <i>not</i> generate a new library.</p> <p>This option is not valid for Java external procedures,</p> </td></tr> </table>	IF you specify ...	THEN the system recompiles the procedure ...	COMPILE	<p>and generates a new library for it.</p> <p>For Java external procedures, the JAR file referenced in the EXTERNAL NAME clause is redistributed to all affected nodes on the system. This is useful for the case of a missing JAR file on a given node.</p>	COMPILE ONLY	<p>but does <i>not</i> generate a new library.</p> <p>This option is not valid for Java external procedures,</p>
IF you specify ...	THEN the system recompiles the procedure ...						
COMPILE	<p>and generates a new library for it.</p> <p>For Java external procedures, the JAR file referenced in the EXTERNAL NAME clause is redistributed to all affected nodes on the system. This is useful for the case of a missing JAR file on a given node.</p>						
COMPILE ONLY	<p>but does <i>not</i> generate a new library.</p> <p>This option is not valid for Java external procedures,</p>						
EXECUTE PROTECTED	<p>to change the execution mode for the specified external procedure from unprotected mode to protected mode.</p> <p>The EXECUTE PROTECTED option causes the external procedure to execute as a separate process (see the ALTER PROCEDURE (External Form) topic “When to Specify Unprotected Mode” in <i>SQL Data Definition Language Detailed Topics</i> for details).</p> <p>An external stored procedure linked with CLIV2 can only execute in protected mode.</p> <p>A Java external stored procedure can only execute in protected mode.</p>						
EXECUTE NOT PROTECTED	<p>to change the execution mode for the specified external procedure from protected mode to unprotected mode (see the ALTER PROCEDURE (External Form) topic “When to Specify Unprotected Mode” in <i>SQL Data Definition Language Detailed Topics</i> for details).</p> <p>The EXECUTE NOT PROTECTED option causes the external procedure to execute directly on the Teradata Database.</p>						

## ANSI Compliance

ALTER PROCEDURE (External Form) is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

To alter an external stored procedure, you must have the ALTER EXTERNAL PROCEDURE privilege on that procedure or on the database containing the procedure.

## Privileges Granted Automatically

None.

## Invocation Restrictions

Valid for external stored procedures only.

Not valid inside a stored procedure body.

### Example 1

This example changes the protection mode of the C-language external stored procedure named *my\_xsp* from protected to not protected.

```
ALTER PROCEDURE my_xsp LANGUAGE C EXECUTE NOT PROTECTED;
```

### Example 2

This example recompiles the C-language external stored procedure named *my\_xsp*.

```
ALTER PROCEDURE my_xsp LANGUAGE C COMPILE;
```

## Related Topics

See the following manual and statements for related information:

- *SQL Stored Procedures and Embedded SQL*
- [“CREATE PROCEDURE \(External Form\)/ REPLACE PROCEDURE \(External Form\)” on page 276](#)
- [“DROP MACRO/ DROP PROCEDURE/ DROP TABLE/ DROP TRIGGER/ DROP VIEW” on page 574](#)



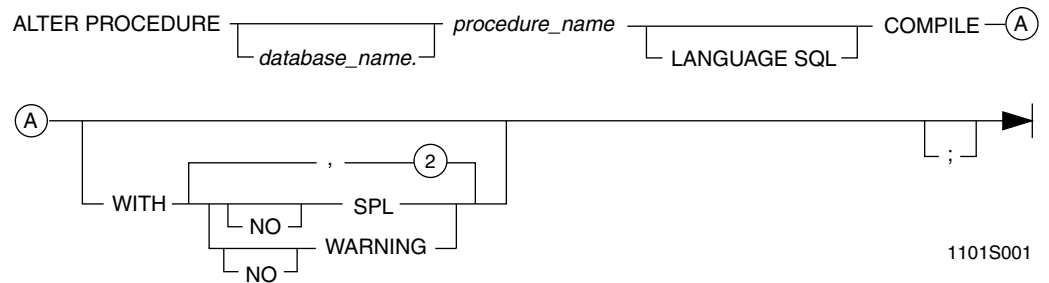
# ALTER PROCEDURE (SQL Form)

## Purpose

Recompiles an existing SQL stored procedure and allows changes in the following compile-time attributes of the procedure:

- SPL option
- Warnings option

## Syntax



where:

Syntax Element ...	Specifies ...
<i>database_name</i>	the name of a qualifying database containing the stored procedure to be altered. If <i>database_name</i> is not specified, the default database for the current session is assumed.
<i>procedure_name</i>	the name of the stored procedure to be recompiled. You can recompile only one stored procedure at a time.
LANGUAGE SQL	that the stored procedure body is written in the SQL language. This clause is optional.

Syntax Element ...	Specifies ...
<b>Alter Procedure Options</b> Optional specifications are stored in the data dictionary with the stored procedure definition. You can list the options in any order. Each option can be specified at most once.	
SPL	that the SQL source text of the stored procedure should be stored in the dictionary.
NO SPL	that the SQL source text of the stored procedure should <i>not</i> be stored in the dictionary.
WARNING	that compilation warnings are returned during alteration of the stored procedure.
NO WARNING	that compilation warnings are <i>not</i> returned during alteration of the stored procedure.

## ANSI Compliance

ALTER PROCEDURE (SQL Form) is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

To alter an SQL stored procedure, you must have either ALTER PROCEDURE or DROP PROCEDURE privilege on that procedure or on the database containing the procedure.

## Privileges Granted Automatically

None.

## Example 1

This example illustrates the use of ALTER PROCEDURE to recompile a stored procedure created in Teradata Database V2R4.1 with changed options. The example shows that the original character set of a stored procedure is not changed by ALTER PROCEDURE.

- 1 Verify the current attributes of the procedure using HELP PROCEDURE.

```
HELP PROCEDURE spAP2 ATTR;
```

The system returns the following report:

Transaction Semantics TERADATA	Character Set EBCDIC
Platform UNIX MP-RAS	Collation ASCII
Default Character DataType UNICODE	Version Number 01
SPL Text Y	Warning Option Y
Default Database testsp	

The Version Number 01 indicates that the stored procedure was created in Teradata Database V2R4.1.

- 2 Using BTEQ, change the session character set from EBCDIC to ASCII:  

```
.SET SESSION charset 'ASCII'
```
- 3 Perform ALTER PROCEDURE with the NO SPL and NO WARNING options specified.  

```
ALTER PROCEDURE spAP2 COMPILE WITH NO SPL, NO WARNING;
```
- 4 Check the procedure attributes again, after completion of the alteration.

Transaction Semantics TERADATA	Character Set EBCDIC
Platform UNIX MP-RAS	Collation ASCII
Default Character DataType UNICODE	Version Number 03
SPL Text N	Warning Option N
Default Database testsp	

Note that the compile-time options are changed as specified, but the character set of the procedure has not changed. Version Number 03 indicates that the stored procedure has been upgraded to Teradata Database V2R5.0.

- 5 End of procedure.

## Example 2: Failure Case

In this example, ALTER PROCEDURE is performed on a stored procedure originally compiled with NO SPL option. ALTER PROCEDURE fails because the source text of the stored procedure is not available for recompiling. The procedure was originally compiled with NO SPL option; as a result, the source text has not been stored in the database.

- 1 Compile the stored procedure *spAP2*.  

```
.COMPILE FILE spAP2.spl WITH NOSPL
```
- 2 Verify its attributes.

```
HELP PROCEDURE spAP2 ATTR;
```

The system returns the following report:

Transaction Semantics TERADATA	Character Set ASCII
Platform UNIX MP-RAS	Collation ASCII
Default Character DataType UNICODE	Version Number 03
SPL Text N	Print Mode N
Default Database testsp	

- 3 Perform the ALTER PROCEDURE request.  

```
ALTER PROCEDURE spAP2 COMPILE;
```
- The system returns the following report:
- ```
ALTER PROCEDURE spAP2 COMPILE;
```

```
*** Failure 5535 No SPL source text available for stored
procedure 'spAP2'.
```

Because the execution of the ALTER PROCEDURE statement fails, the existing version of the stored procedure *spAP2* is retained.

- 4 End of procedure.

### Example 3: Suppressing Compilation Warnings

This example shows how compilation warnings can be suppressed using the NO WARNING option of the ALTER PROCEDURE statement by using the following procedure:

- 1 Create a new stored procedure *spAP3*.
- 2 Compile the stored procedure *spAP3*:

```
REPLACE PROCEDURE testsp.spAP3 ()
BEGIN
    DECLARE var1 INTEGER DEFAULT 10;

    SELECT ErrorCode INTO :var1
    FROM dbc.errormsgs
    WHERE ErrorCode = 5526;
    SET var1 = var1 + 1;
END;
BTEQ> .COMPILE FILE spAP3.spl
```

The system returns the following report:

```
*** Procedure has been created 4 Errors/Warnings.
*** Warning: 5527 Stored Procedure Created with Warnings.
*** Total elapsed time was 2 seconds.
    .COMPILE FILE spAP3.spl
    $
*** SQL Warning 5802 Statement is not ANSI.
Warnings reported during compilation
-----
SPL5000:W(L1), W(5802):Statement is not ANSI.
SPL5000:W(L3), W(5802):Statement is not ANSI.
SPL5000:W(L5), W(5802):Statement is not ANSI.
SPL5000:W(L6), W(5802):Statement is not ANSI.
-----
```

- 3 Recompile the procedure with NO WARNING option

```
ALTER PROCEDURE spAP3 COMPILE WITH NO WARNING;
```

When this statement is successfully performed, the procedure *spAP3* is recompiled, but no compilation warnings are displayed.

- 4 End of procedure.

## Example 4: Impact of Session Mode

This example illustrates the behavior of ALTER PROCEDURE when the session mode is changed.

The procedure used to do this is as follows:

- 1 Compile the stored procedure *spAP3* in a Teradata session mode session.

```
BTEQ> .COMPILE FILE spAP3.spl
```

- 2 Change the session mode.

```
.LOGOFF  
.SET SESSION TRANS ANSI  
.LOGON testsp, password
```

- 3 Perform ALTER PROCEDURE.

```
ALTER PROCEDURE ap3 COMPILE;
```

The statement fails with the following message:

```
*** Failure 5510 Invalid session mode for procedure execution.  
Statement# 1, Info =0
```

Since the execution of ALTER PROCEDURE failed, the existing version of the stored procedure *spAP3* is retained.

- 4 End of procedure.

## Related Topics

See the following manual and statements for related information:

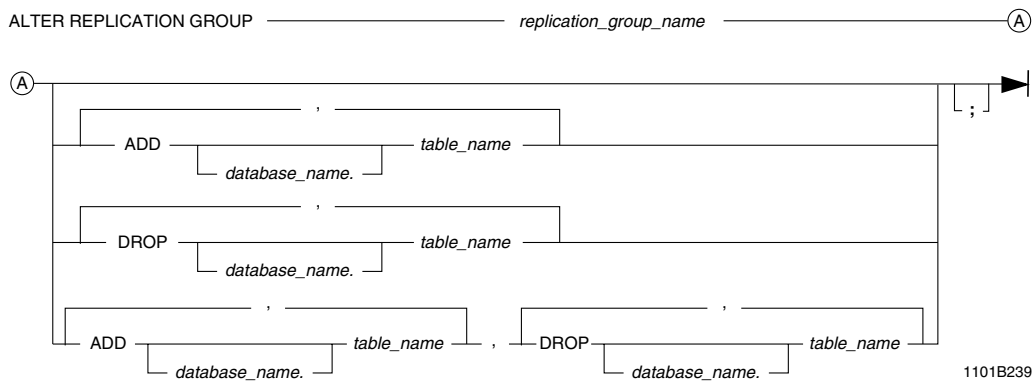
- *SQL Stored Procedures and Embedded SQL*
- [“DROP MACRO/ DROP PROCEDURE/ DROP TABLE/ DROP TRIGGER/ DROP VIEW” on page 574](#)
- [“CREATE PROCEDURE \(External Form\)/ REPLACE PROCEDURE \(External Form\)” on page 276](#)

# ALTER REPLICATION GROUP

## Purpose

Changes the definition of an existing replication group by adding tables to, or dropping tables from, the specified group.

## Syntax



where:

| Syntax element ...     | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| database_name          | the name of the database that contains replication_group_name.<br>This specification is optional if replication_group_name is contained within the current database.                                                                                                                                                                                                                                                                                                                                                          |
| replication_group_name | the name of the replication group whose definition is to be changed.<br>This name must be unique on the system.<br>The specified replication group must already be defined. If it is not, the system aborts the request and returns an error to the requestor.                                                                                                                                                                                                                                                                |
| ADD                    | that the set of table names that follows this keyword is to be added to the specified replication group definition.<br>Any table you specify must observe the following rules: <ul style="list-style-type: none"><li>It must be a base table that is already defined in the system.</li><li>It cannot belong to another replication group.</li></ul> If you specify both ADD and DROP clauses in the same ALTER REPLICATION GROUP statement, you must specify all the ADD clauses before you specify any of the DROP clauses. |

| Syntax element ... | Specifies ...                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DROP               | that the set of table names that follows this keyword is to be dropped from the specified replication group definition.<br><br>Any table you specify must be an existing member of the replication group.<br><br>If you specify both ADD and DROP clauses in the same ALTER REPLICATION GROUP statement, you must specify all the ADD clauses before you specify any of the DROP clauses. |
| <i>table_name</i>  | the name of a table to be added to, or dropped from, the replication group definition.                                                                                                                                                                                                                                                                                                    |

## ANSI Compliance

ALTER REPLICATION GROUP is a Teradata extension to the ANSI SQL-2003 standard.

## Required Privileges

You must have the REPLCONTROL privilege to alter the definition of a replication group.

## Privileges Granted Automatically

None.

## Example 1: Adding Tables To and Dropping Tables From a Replication Group

The following example alters a replication group named *receivables\_group* by adding a table named *payables.invoices* and dropping a table named *payables.purchorder*:

```
ALTER REPLICATION GROUP receivables_group
ADD payables.invoices,
DROP payables.purchorder;
```

The security token for *receivables\_group* is *not* changed as the result of this request.

## Example 2: Changing the Security Token for a Replication Group

The following example changes the security token for a replication group named *receivables\_group*:

```
ALTER REPLICATION GROUP receivables_group;
```

## Related Topics

See the following resources for further information about replication services:

- [“CREATE REPLICATION GROUP” on page 371](#)
- [“DROP REPLICATION GROUP” on page 580](#)
- [“SET SESSION OVERRIDE REPLICATION” on page 678](#)
- [“HELP REPLICATION GROUP” on page 740](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)
- *SQL Data Definition Language Detailed Topics*
- *Database Administration*
- *Teradata Replication Solutions*



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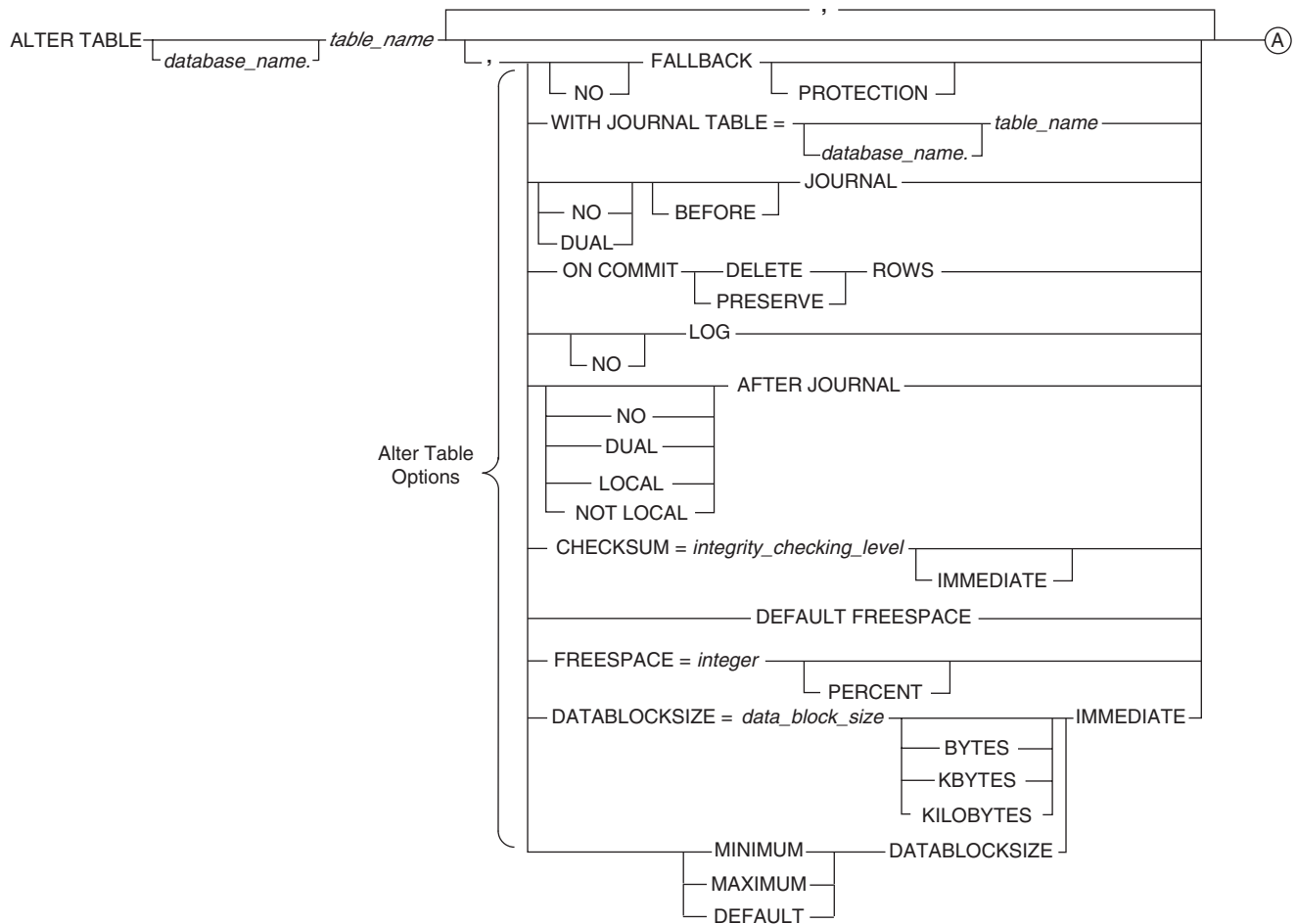
# ALTER TABLE

## Purpose

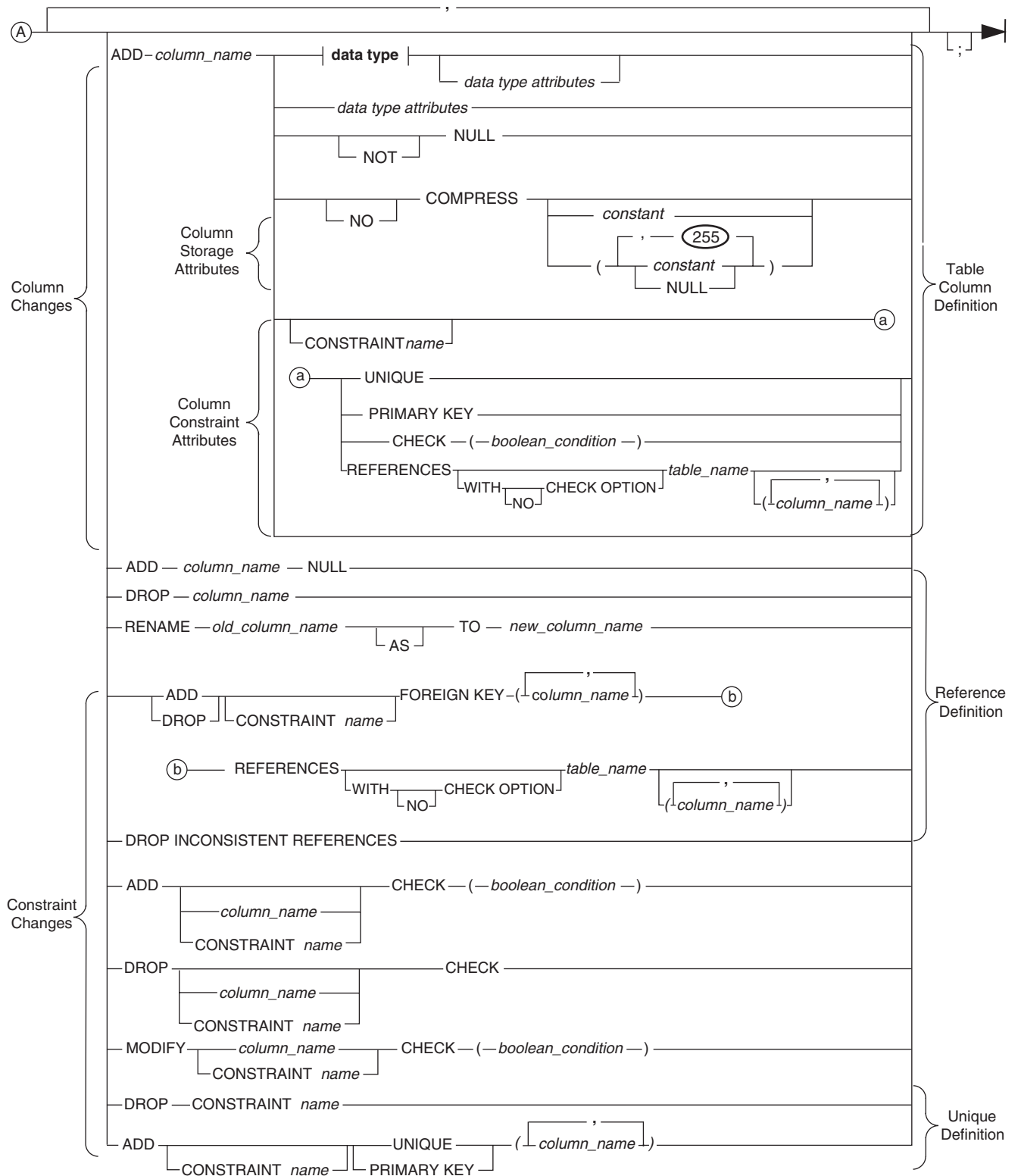
Performs the following functions:

- Adds
  - new attributes for one or more columns of a table or global temporary table definition.
  - one or more new columns to an existing table or global temporary table definition.
- Drops one or more columns from a table or global temporary table definition.
- Adds or drops the FALLBACK option for a table.
- Adds or modifies the JOURNAL option for a table.
- Changes the
  - column-level and table-level constraints.
  - referential constraints.
  - DATABLOCKSIZE or percent FREESPACE for a table or global temporary table definition.
  - LOG and ON COMMIT options for a global temporary table.
  - name of a column.
  - properties of the primary index for a table.
  - partitioning properties of the primary index for a table or noncompressed join index, including modifications to the partitioning expression defined for use by a partitioned primary index.
  - disk I/O integrity option for a table.
  - compression attributes for the columns of a table
- Regenerates table headers and optionally validates and corrects the partitioning of PPI table rows.

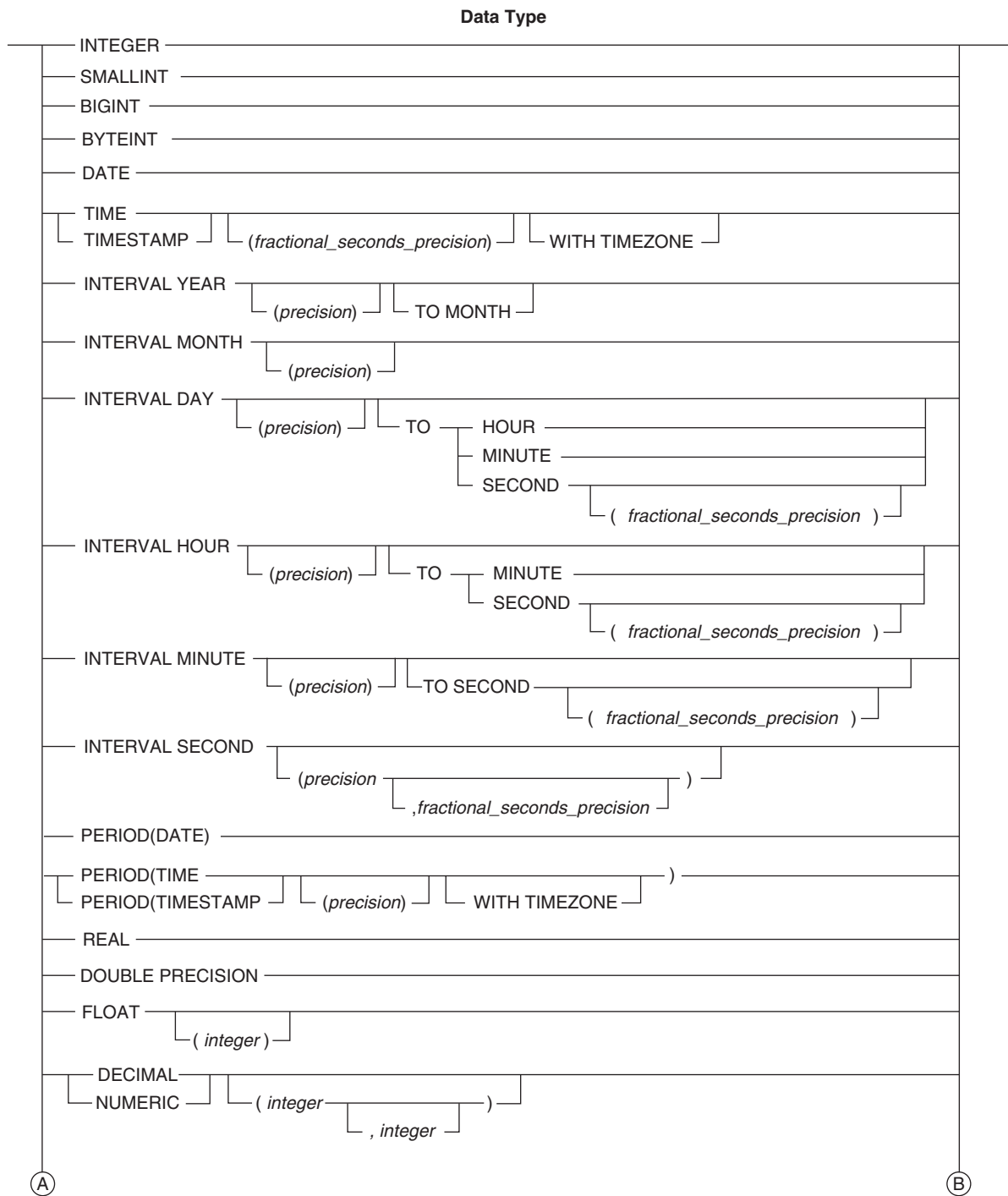
## Basic Table Parameters Modification Syntax



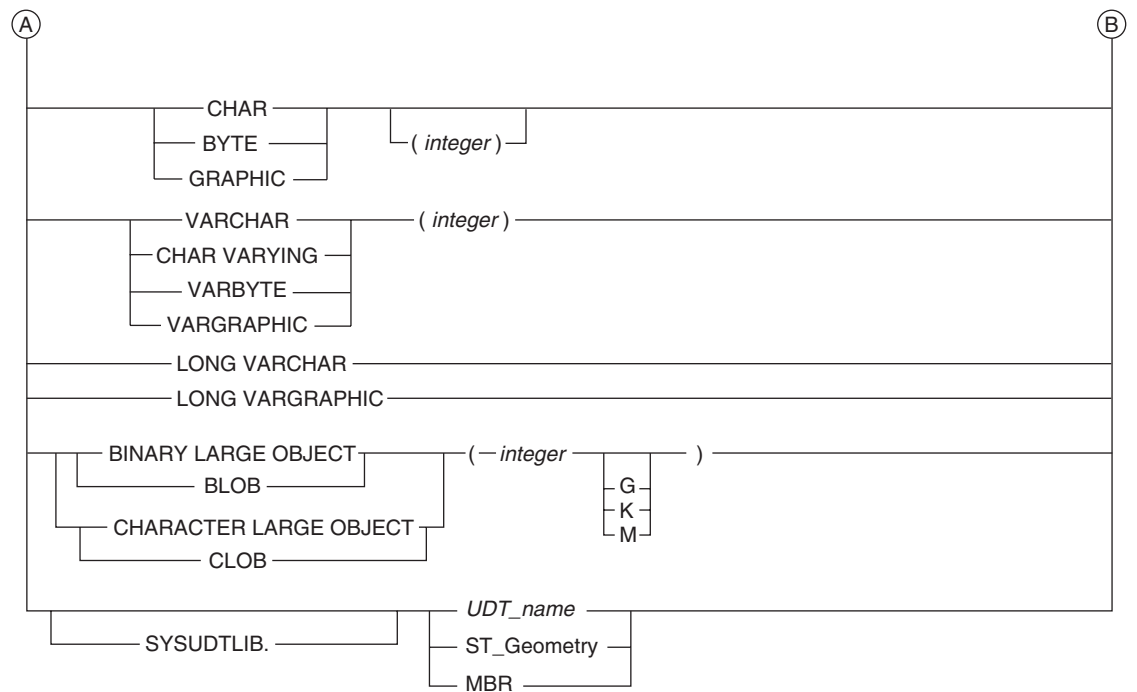
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1101H034

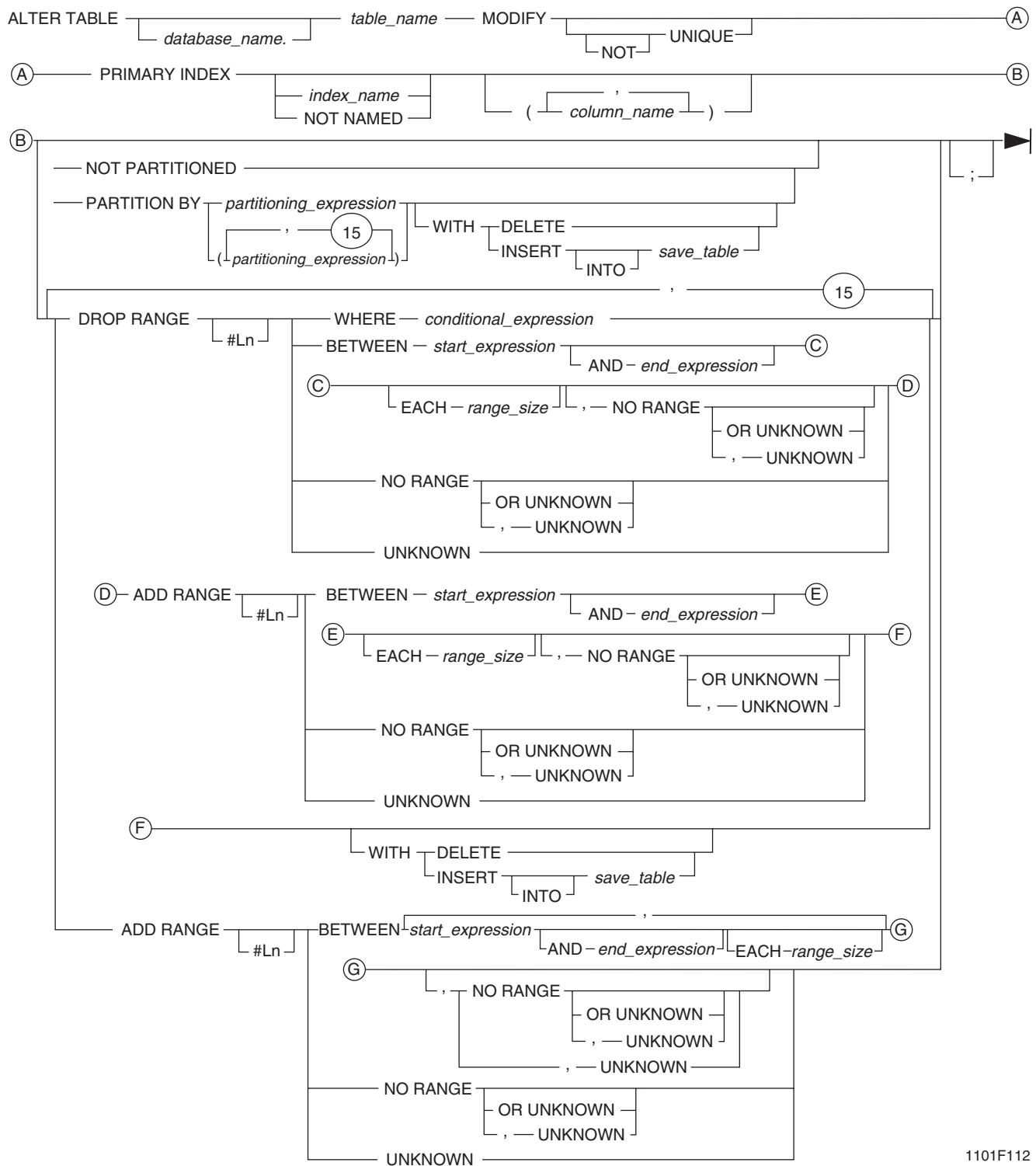


1101A535



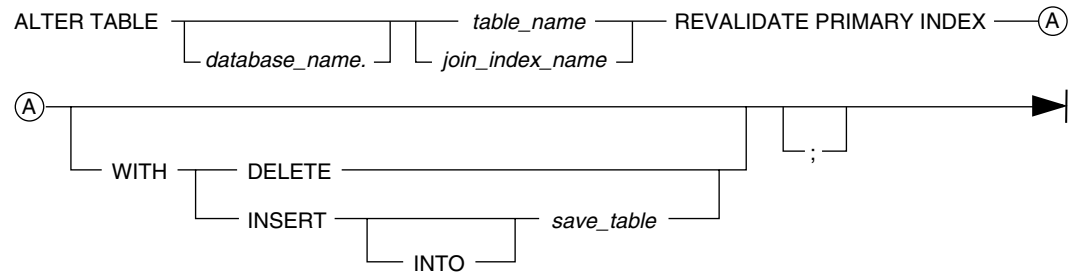
1101A536

## Primary Index Modification Syntax



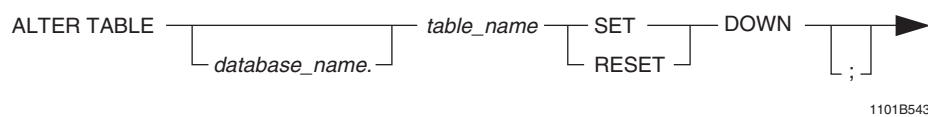
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## Partitioned Primary Index Revalidation Syntax



1101A432

## Set Down/Reset Down Syntax



1101B543

where:

| Syntax Element ...                                                                                                                                                                                                                                                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>  <br><i>user_name.table_name</i>                                                                                                                                                                                                                   | the name of the table to be altered.<br><br>If <i>database_name</i> or <i>user_name</i> is not specified, the default database for the current session or the current user is assumed.                                                                                                                                                                                                                                                   |
| <b>Alter Table Options</b><br><br>The Alter Table options are a Teradata extension to ANSI SQL. The options can be listed in any order. You cannot modify or revalidate a primary index in the same ALTER TABLE statement you perform to modify basic table parameters. |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| FALLBACK<br>PROTECTION<br><br>NO FALLBACK<br>PROTECTION                                                                                                                                                                                                                 | to add or remove duplicate copy protection for the table.<br><br>If fallback is being added, a duplicate copy of the table is created and stored. If fallback is being removed, the existing duplicate copy is deleted. The FALLBACK keyword used alone implies PROTECTION.                                                                                                                                                              |
| WITH JOURNAL TABLE<br>= <i>database_name</i>  <br><i>user_name.table_name</i>                                                                                                                                                                                           | a definition for the journal table for the data table being altered. The journal table <i>table_name</i> need not reside in the same database or user as the data table.<br><br>If a database or user is not specified, the default database for the current session or the current user is assumed.<br><br>If a database or user is specified, it must exist and <i>table_name</i> must have been defined as its default journal table. |

| Syntax Element ...                                                                       | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| JOURNAL<br>NO BEFORE JOURNAL<br>DUAL BEFORE JOURNAL                                      | <p>the number of before change images to be maintained for the table.</p> <p>If the JOURNAL keyword is specified without NO or DUAL, then a single copy of the image is maintained unless FALLBACK is in effect or is also specified.</p> <p>If journaling is requested for a table that uses fallback protection, DUAL images are maintained automatically.</p> <p>You cannot add or modify journal options for a NoPI table.</p>                                                                                                       |
| ON COMMIT DELETE ROWS<br>ON COMMIT PRESERVE ROWS                                         | <p>the action to take with the contents of a global temporary table when a transaction ends.</p> <p>DELETE ROWS clears the temporary table of all rows.</p> <p>PRESERVE ROWS retains the rows in the table after the transaction is committed.</p> <p>You cannot change the ON COMMIT properties of a global temporary table if any materialized instance of the table exists anywhere in the Teradata Database.</p>                                                                                                                     |
| LOG<br>NO LOG                                                                            | <p>the transaction journaling option for a global temporary table.</p> <p>LOG maintains a transaction journal for the temporary table during the time is materialized; NO LOG specifies that no transaction journal is to be kept.</p> <p>You cannot change the LOG/NO LOG properties of a global temporary table if any materialized instances of the table exist anywhere in the Teradata Database.</p>                                                                                                                                |
| NO AFTER JOURNAL<br>DUAL AFTER JOURNAL<br>LOCAL AFTER JOURNAL<br>NOT LOCAL AFTER JOURNAL | <p>the type of image to be maintained for the table; any existing images are not affected until the table is updated.</p> <p>The NO and DUAL options specify the number of after-change images to be maintained for the table.</p> <p>NOT LOCAL and LOCAL specify whether single after-image journal rows for non-fallback data tables are written on the same virtual AMP (LOCAL) as the changed data rows, or on another virtual AMP in the cluster (NOT LOCAL).</p> <p>You cannot add or modify journal options for a NoPI table.</p> |
| BEFORE JOURNAL<br>AFTER JOURNAL                                                          | <p>the type of image to be maintained for the table. The default for this option is established by a CREATE DATABASE, CREATE USER, or MODIFY USER statement for the database in which the table is to be created.</p> <p>You cannot add or modify journal options for a NoPI table.</p> <p>See “CREATE TABLE” in <i>SQL Data Definition Language Detailed Topics</i> for a listing of the journaling that results from the available journal and image type specifications.</p>                                                          |
| DEFAULT FREESPACE                                                                        | <p>to reset the value for FREESPACE PERCENT to the system default defined for this table by DBSControl.</p> <p>This specification does not have an immediate effect on existing cylinders, but the new attribute value controls any new allocation of cylinder blocks using this revised free space percentage.</p>                                                                                                                                                                                                                      |



| Syntax Element ...                              | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                  |     |     |         |                                                                                                                                                                                          |     |   |        |    |      |    |      |                                             |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------------|-----|-----|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---|--------|----|------|----|------|---------------------------------------------|
| <p><code>FREESPACE = integer PERCENT</code></p> | <p>a new percent of free space to remain on a cylinder after a loading operation completes.</p> <p>If the value specified does not fall within the valid range (0 - 75), then an error is returned. See “FREESPACE” in the CREATE TABLE section of <i>SQL Data Definition Language Detailed Topics</i> for additional information.</p> <p>This specification does not have an immediate effect on existing cylinders, but the new attribute value controls any new allocation of cylinder blocks using this revised free space percentage.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                  |     |     |         |                                                                                                                                                                                          |     |   |        |    |      |    |      |                                             |
| <p><code>integrity_checking_level</code></p>    | <p>a table-specific disk I/O integrity checksum level.</p> <p>The checksum level setting applies to primary data rows, fallback data rows, and all secondary index rows for the table.</p> <p>If you are changing the checksum level for this table to the system-wide default value, then specify DEFAULT.</p> <p>You can change the percentage of sampling for the system-wide default values for LOW, MEDIUM, and HIGH using the Checksum Level Definitions fields in the DBSControl utility (see <i>Utilities</i>). The values provided here for those checksum percentages are the defaults specified by the installation or upgrade.</p> <p>You cannot change the sampling percentage for the following:</p> <ul style="list-style-type: none"> <li>• The system-wide default values ALL and NONE.</li> <li>• Dictionary tables.</li> </ul> <p>The following table describes the default values for the various checksum levels:</p> <table> <tr> <th>Level</th><th>Checksum Sample Count Percentage</th></tr> <tr> <td>ALL</td><td>100</td></tr> <tr> <td>DEFAULT</td><td>Percentage specified for this table type (see <i>Database Design</i>) in the Checksum Levels fields of the Disk I/O Integrity Fields in the DBSControl utility (see <i>Utilities</i>).</td></tr> <tr> <td>LOW</td><td>2</td></tr> <tr> <td>MEDIUM</td><td>33</td></tr> <tr> <td>HIGH</td><td>67</td></tr> <tr> <td>NONE</td><td>Disable checksum disk I/O integrity checks.</td></tr> </table> | Level | Checksum Sample Count Percentage | ALL | 100 | DEFAULT | Percentage specified for this table type (see <i>Database Design</i> ) in the Checksum Levels fields of the Disk I/O Integrity Fields in the DBSControl utility (see <i>Utilities</i> ). | LOW | 2 | MEDIUM | 33 | HIGH | 67 | NONE | Disable checksum disk I/O integrity checks. |
| Level                                           | Checksum Sample Count Percentage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                  |     |     |         |                                                                                                                                                                                          |     |   |        |    |      |    |      |                                             |
| ALL                                             | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                  |     |     |         |                                                                                                                                                                                          |     |   |        |    |      |    |      |                                             |
| DEFAULT                                         | Percentage specified for this table type (see <i>Database Design</i> ) in the Checksum Levels fields of the Disk I/O Integrity Fields in the DBSControl utility (see <i>Utilities</i> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                  |     |     |         |                                                                                                                                                                                          |     |   |        |    |      |    |      |                                             |
| LOW                                             | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                  |     |     |         |                                                                                                                                                                                          |     |   |        |    |      |    |      |                                             |
| MEDIUM                                          | 33                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                  |     |     |         |                                                                                                                                                                                          |     |   |        |    |      |    |      |                                             |
| HIGH                                            | 67                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                  |     |     |         |                                                                                                                                                                                          |     |   |        |    |      |    |      |                                             |
| NONE                                            | Disable checksum disk I/O integrity checks.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                  |     |     |         |                                                                                                                                                                                          |     |   |        |    |      |    |      |                                             |
| <p>IMMEDIATE</p>                                | <p>that the checksums for all data blocks and cylinder indexes for this table are to updated immediately.</p> <p>If you do not specify this option, then data blocks and cylinder indexes are updated the next time they are updated and written.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                  |     |     |         |                                                                                                                                                                                          |     |   |        |    |      |    |      |                                             |

| Syntax Element ...                                                                                                                                                                                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                |          |           |                                                                                                                                             |               |                                                                                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p style="text-align: center;"><b>Data Block Size Option</b></p> <p>You cannot modify or revalidate a primary index in the same ALTER TABLE statement you perform to modify basic table parameters.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                |          |           |                                                                                                                                             |               |                                                                                                                                                                                  |
| DATABLOCKSIZE=<br><i>data_block_size</i><br>[BYTES/KBYTES/<br>KILOBYTES]                                                                                                                                | <p>the maximum data block size for blocks that contain multiple rows as the value <i>data_block_size</i>. The calculation is made in the same manner as the CREATE TABLE statement.</p> <p>The value can be expressed either as a decimal or integer number or using exponential notation. For example, you can write one thousand as either 1000 or 1E3.</p> <p>BYTES can be abbreviated as BYTE. KILOBYTES can be abbreviated as KBYTE. This specification is optional.</p> <p>The maximum data block size value is 127.5 Kbytes.</p> <p>See <i>Utilities</i> for more detailed information about setting default data block sizes.</p> <p>For details about data block size, see “DATABLOCKSIZE” in the “CREATE TABLE” section of <i>SQL Data Definition Language Detailed Topics</i>.</p> |                                |          |           |                                                                                                                                             |               |                                                                                                                                                                                  |
| IMMEDIATE                                                                                                                                                                                               | <p>whether to repack data blocks into the newly specified size immediately or to wait until an affected block is accessed.</p> <table border="1"> <thead> <tr> <th>IF the IMMEDIATE option is ...</th><th>THEN ...</th></tr> </thead> <tbody> <tr> <td>specified</td><td>the attribute value is changed, but, in addition, the rows in all existing data blocks are repacked into data blocks of the specified size.</td></tr> <tr> <td>not specified</td><td>existing data blocks are left unmodified. In both cases, the new attribute value will determine the maximum size of multiple-row data blocks subsequently modified or allocated.</td></tr> </tbody> </table> <p>See the ALTER TABLE topic “IMMEDIATE DATABLOCKSIZE” in <i>SQL Data Definition Language Detailed Topics</i>.</p> | IF the IMMEDIATE option is ... | THEN ... | specified | the attribute value is changed, but, in addition, the rows in all existing data blocks are repacked into data blocks of the specified size. | not specified | existing data blocks are left unmodified. In both cases, the new attribute value will determine the maximum size of multiple-row data blocks subsequently modified or allocated. |
| IF the IMMEDIATE option is ...                                                                                                                                                                          | THEN ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                |          |           |                                                                                                                                             |               |                                                                                                                                                                                  |
| specified                                                                                                                                                                                               | the attribute value is changed, but, in addition, the rows in all existing data blocks are repacked into data blocks of the specified size.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                |          |           |                                                                                                                                             |               |                                                                                                                                                                                  |
| not specified                                                                                                                                                                                           | existing data blocks are left unmodified. In both cases, the new attribute value will determine the maximum size of multiple-row data blocks subsequently modified or allocated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                |          |           |                                                                                                                                             |               |                                                                                                                                                                                  |
| MINIMUM<br>DATABLOCKSIZE                                                                                                                                                                                | <p>the smallest possible DATABLOCKSIZE setting for the table.</p> <p>The value can be expressed either as a decimal or integer number or using exponential notation. For example, you can write <i>one thousand</i> as either 1000 or 1E3.</p> <p>MINIMUM DATABLOCKSIZE sets the maximum data block size for blocks that contain multiple rows to the minimum legal value of either 6144 or 7168 bytes (12 or 14 sectors), depending on the cylinder size set for your system.</p> <p>See “DATABLOCKSIZE” in the “CREATE TABLE” section of <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                           |                                |          |           |                                                                                                                                             |               |                                                                                                                                                                                  |

| Syntax Element ...                                                                                                                                                                                     | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MAXIMUM<br>DATABLOCKSIZE                                                                                                                                                                               | <p>the largest possible DATABLOCKSIZE setting for the table.</p> <p>The value can be expressed either as a decimal or integer number or using exponential notation. For example, you can write <i>one thousand</i> as either 1000 or 1E3.</p> <p>MAXIMUM DATABLOCKSIZE sets the maximum data block size for blocks that contain multiple rows to the maximum legal value of 130,560 bytes (255 sectors).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| DEFAULT<br>DATABLOCKSIZE                                                                                                                                                                               | <p>the default DATABLOCKSIZE setting for the table.</p> <p>The value can be expressed either as a decimal or integer number or using exponential notation. For example, you can write <i>one thousand</i> as either 1000 or 1E3.</p> <p>See <i>Utilities</i> for information about setting system-wide default data block sizes.</p> <p>For details about data block sizes, see “DATABLOCKSIZE” in the “CREATE TABLE” section of <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <p style="text-align: center;"><b>Column Change Options</b></p> <p>You cannot modify or revalidate a primary index in the same ALTER TABLE statement you perform to modify basic table parameters.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| ADD <i>column_name</i><br><i>data_type</i><br><i>data_type_attributes</i><br><i>column_storage_attributes</i><br><i>column_constraint_attributes</i>                                                   | <p>to add or change the specified column and its specified attributes.</p> <p>ADD and DROP cannot both be specified on the same column in the same ALTER TABLE statement.</p> <p>The ADD keyword either changes the definition of an existing column or adds a new column to the table. If the named column already exists, ADD indicates that its attributes are to be changed.</p> <p><i>column_name</i> specifies the name of a column whose attributes are to be changed or that is to be added.</p> <p>You must always specify a data type for a newly added column.</p> <p>If you do not specify explicit formatting, a new column assumes the default format for the data type, which can be specified by a custom data formatting specification (SDF) defined by the <i>tdlocaledef</i> utility (see <i>Utilities</i>). Explicit formatting applies both to the parsing and to the retrieval of character strings.</p> <p>You cannot add an identity column to an existing table, nor can you add the identity column attribute to an existing column.</p> <p>Data types and data type attributes are the subject of <i>SQL Data Types and Literals</i>. Column storage and constraints attributes are described in “Column and Table Constraints” in that volume.</p> <p>You can add compression to a set of existing columns whether or not the table is empty or filled with data.</p> |

| Syntax Element ...                | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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| COMPRESS                          | <p>a specified set of distinct values in a column that is to be compressed to zero space.</p> <p>See <i>Database Design</i> for a detailed description of value compression.</p> <p>See <i>SQL Data Types and Literals</i> for more information about the COMPRESS attribute.</p>                                                                                                                                                                                                               |
| NULL                              | <p>that nulls are compressed.</p> <p>The following rules apply:</p> <ul style="list-style-type: none"> <li>You cannot specify NULL if the column is defined as NOT NULL.</li> <li>UDTs and variable length data types such as VARCHAR, VARBYTE, and VARGRAPHIC cannot be compressed.</li> <li>You can only specify NULL once per column.</li> </ul>                                                                                                                                             |
| <i>constant</i>                   | <p>that the specified value set is compressed.</p> <p>You cannot compress nulls if the column is defined as NOT NULL.</p> <p>Using COMPRESS on fixed-length character data can save space depending on the percentage of rows for which the compressed value is assigned.</p> <p>See <i>SQL Data Types and Literals</i> for information about limits for this value.</p>                                                                                                                        |
| NO COMPRESS                       | <p>that the specified column is not compressible.</p> <p>This is the default.</p> <p>If you specify NO COMPRESS for an existing column defined with compression, then the compression attribute is dropped for the column.</p>                                                                                                                                                                                                                                                                  |
| ADD <i>column_name</i> NULL       | <p>to change an existing column <i>column_name</i> from being NOT NULL to being nullable.</p> <p>This option is a Teradata extension to the ANSI standard.</p>                                                                                                                                                                                                                                                                                                                                  |
| DROP <i>column_name</i>           | <p>that the named column is to be removed from the table.</p> <p>You can drop an identity column from an existing table, but you cannot drop just the identity column attribute and retain the column.</p> <p>You <i>cannot</i> drop the QITS column from a queue table.</p>                                                                                                                                                                                                                    |
| RENAME<br><i>old_column_name</i>  | <p>the name of a column that is to be renamed as <i>new_column_name</i>.</p> <p>Note that you can rename a column and then add a new column to the same table using the old name for the renamed column. Of course if you do this, you must rename the old column before creating a new column that uses the previous name for the renamed column (see <a href="#">“Example 16: Renaming a Column, Then Adding a New Column Using the Previous Name of the Renamed Column”</a> on page 54).</p> |
| [AS] TO<br><i>new_column_name</i> | <p>the new name for the column named in <i>old_column_name</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                             |

| Syntax Element ...                                                                                                                                                                                         | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| <p style="text-align: center;"><b>Constraint Change Options</b></p> <p>You cannot modify or revalidate a primary index in the same ALTER TABLE statement you perform to modify basic table parameters.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| ADD/DROP<br>CONSTRAINT <i>name</i><br>FOREIGN KEY<br>( <i>column_name_list</i> )<br>REFERENCES<br><i>table_name</i> <i>column_name</i>                                                                     | <p>to add or drop a named constraint.</p> <p>You cannot add either of the following constraints to a queue table definition:</p> <ul style="list-style-type: none"> <li>REFERENCES</li> <li>FOREIGN KEY ... REFERENCES</li> </ul>                                                                                                                                                                                                                                                     |
| WITH CHECK OPTION                                                                                                                                                                                          | <p>that the constraint added or dropped is a standard referential integrity constraint for which the integrity of the relationship is checked only when the entire transaction of which it is a component completes.</p> <p>If any of the rows in the transaction is found to violate the Referential Integrity rule, then the entire transaction is rolled back.</p> <p>This clause is a Teradata extension to the ANSI SQL:2008 standard.</p>                                       |
| WITH NO CHECK OPTION                                                                                                                                                                                       | <p>that the constraint added or dropped is not to be used to validate referential integrity.</p> <p>This clause can only be specified with a table-level FOREIGN KEY ... REFERENCES ... constraint or a column-level REFERENCES ... constraint.</p> <p>This clause is a Teradata extension to the ANSI SQL:2008 standard.</p>                                                                                                                                                         |
| DROP INCONSISTENT REFERENCES                                                                                                                                                                               | <p>to delete all inconsistent references defined on the table.</p> <p>DROP INCONSISTENT REFERENCES is commonly used after a restore, when an ALTER TABLE DROP FOREIGN KEY might not work.</p> <p>This clause is a Teradata extension to the ANSI SQL:2008 standard.</p>                                                                                                                                                                                                               |
| ADD CHECK<br>( <i>boolean_condition</i> )<br>ADD <i>column_name</i><br>CHECK<br>( <i>boolean_condition</i> )<br>ADD CONSTRAINT <i>name</i><br>CHECK<br>( <i>boolean_condition</i> )                        | <p>to add or modify a constraint condition.</p> <p>You cannot add CHECK constraints on LOBs nor can you add CHECK constraints that reference LOBs.</p> <p>When a constraint is added or modified, all existing rows of the table are scanned to validate that the current values conform to the specified search condition. If not, an error is returned and no change is made to the table definition.</p> <p>This clause is a Teradata extension to the ANSI SQL:2008 standard.</p> |
| DROP CHECK<br>DROP <i>column_name</i><br>CHECK<br>DROP CONSTRAINT<br><i>name</i> CHECK                                                                                                                     | <p>to drop all unnamed column-level CHECK constraints on <i>column_name</i>.</p> <p>DROP CHECK drops the unnamed table-level constraints on the table.</p> <p>DROP <i>column_name</i> CHECK drops column-level constraints on the specified column.</p> <p>DROP CONSTRAINT <i>name</i> CHECK or DROP CONSTRAINT <i>name</i> drop a named table-level CHECK constraint on the table.</p>                                                                                               |

| Syntax Element ...                                                                                                                                                                                                                                                                                                                               | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MODIFY <i>column_name</i><br>CHECK<br>( <i>boolean_condition</i> )<br><br>MODIFY CONSTRAINT<br><i>name</i> CHECK<br>( <i>boolean_condition</i> )                                                                                                                                                                                                 | <p>to modify a check constraint, whether named or unnamed.</p> <p>MODIFY CONSTRAINT <i>name</i> CHECK (<i>boolean_condition</i>) is valid only if a constraint with <i>name</i> already exists in the table.</p> <p>This also includes the named constraints defined as part of the column definition since those constraints are handled as named table-level constraints. MODIFY <i>column_name</i> CHECK is allowed only if <i>column_name</i> already has a defined constraint.</p> <p>Existing rows of the table are scanned to validate that the current values conform to the specified search condition. If not, an error is returned and no change is made to the table definition.</p> |
| DROP CONSTRAINT<br><i>name</i>                                                                                                                                                                                                                                                                                                                   | to drop a table-level named constraint on the stated table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| ADD <i>column_name</i><br>[CONSTRAINT <i>name</i> ]<br>UNIQUE<br><br>ADD <i>column_name</i><br>[CONSTRAINT <i>name</i> ]<br>PRIMARY KEY                                                                                                                                                                                                          | <p>to add a uniqueness constraint on one or more columns of the table.</p> <p>The columns listed for uniqueness must all be defined to be NOT NULL.</p> <p>You cannot add uniqueness constraints on LOBs.</p> <p>Supported uniqueness constraints are the following:</p> <ul style="list-style-type: none"> <li>• UNIQUE</li> <li>• PRIMARY KEY</li> </ul> <p>Existing rows are scanned to validate that the proposed uniqueness constraint is not violated.</p> <p>If uniqueness is violated, an error is reported and no change is made.</p> <p>The system implicitly creates a unique secondary index on any column set specified as UNIQUE or PRIMARY KEY.</p>                               |
| <p align="center"><b>MODIFY PRIMARY INDEX Option</b></p> <p>You cannot modify basic table parameters or revalidate a primary index in the same ALTER TABLE statement you perform to modify a primary index.</p> <p>You cannot modify a NoPI table to add a primary index nor can you modify a primary-indexed table to make it a NoPI table.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| MODIFY [[NOT]<br>UNIQUE] PRIMARY<br>INDEX ( <i>column_name</i> )                                                                                                                                                                                                                                                                                 | <p>to change the uniqueness property of the primary index for the table.</p> <p>If the primary index is composite, then <i>column_name</i> indicates a comma-separated list of all the index columns.</p> <p>To change a nonunique primary index to a unique primary index, specify MODIFY UNIQUE PRIMARY INDEX.</p> <p>To change a unique primary index to a nonunique primary index, specify MODIFY NOT UNIQUE PRIMARY INDEX.</p>                                                                                                                                                                                                                                                              |

| Syntax Element ...                                                | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>index_name</i><br>NOT NAMED                                    | <p>to change whether the primary index for the table is named or unnamed or to change the name of a named primary index.</p> <p>To name an unnamed primary index or change the existing name of a primary index to something else, specify MODIFY ... PRIMARY INDEX <i>index_name</i>.</p> <p>To drop the name of a named index, specify MODIFY ... PRIMARY INDEX NOT NAMED.</p>                                                                                                                                                                                                                                                                                                                                                               |
| NOT PARTITIONED<br>PARTITION BY<br><i>partitioning_expression</i> | <p>to change whether the primary index for the table is partitioned or not or to change the partitioning expression for an existing partitioned primary index.</p> <p>You cannot specify LOB partitioning columns.</p> <p>To change a partitioned primary index to a nonpartitioned primary index, specify NOT PARTITIONED.</p> <p>To change a nonpartitioned primary index to a partitioned primary index, or to change the partitioning expression for an existing partitioned primary index, specify PARTITION BY and then specify a valid set of partitioning expressions.</p> <p>You cannot modify the partitioning of a NoPI table because it has no primary index to partition.</p>                                                     |
| WITH DELETE                                                       | <p>to delete any row whose partition number evaluates to a value outside the valid range of 1 - 65,535, inclusive.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| WITH INSERT [INTO]<br><i>save_table</i>                           | <p>to insert any row whose partition number evaluates to a value outside the valid range of 1 - 65,535, inclusive, into the table named by <i>save_table</i>.</p> <p><i>save_table</i> and the table being altered must be different tables.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| DROP RANGE[#Ln]<br>WHERE<br><i>conditional_expression</i>         | <p>to use a conditional expression to drop a range set from the RANGE_N function on which the partitioning expression for the table is based.</p> <p>#Ln represents a partition level number where <i>n</i> is an integer between 1 and 15, inclusive.</p> <p>You can only drop ranges if the partitioning expression for the table is derived exclusively from a RANGE_N function.</p> <p>You must base <i>conditional_expression</i> on the system-derived PARTITION column or PARTITION#Ln column set, where the value for <i>n</i> depends on the level being modified and whether one or multiple levels are changed.</p> <p>See <i>SQL Functions, Operators, Expressions, and Predicates</i> for details about the RANGE_N function.</p> |

| Syntax Element ...                                                                                                                                                                              | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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| DROP RANGE[#Ln]<br>BETWEEN <i>start_expression</i><br>AND <i>end_expression</i><br>EACH <i>range_size</i> [NO<br>RANGE [OR<br>UNKNOWN]]<br>[NO RANGE [OR<br>UNKNOWN]],<br>UNKNOWN]]<br>UNKNOWN] | <p>to drop a set of ranges from the RANGE_N function on which the partitioning expression for the table is based.</p> <p>#Ln represents a partition level number where <i>n</i> is an integer between 1 and 15, inclusive.</p> <p>The expressions <i>start_expression</i> and <i>end_expression</i> are defined using the RANGE_N function (see <i>SQL Functions, Operators, Expressions, and Predicates</i> for details).</p> <p>The expressions must not have a BLOB, CLOB, or BIGINT data type.</p> <p>Each <i>range_size</i> variable must be a constant expression.</p> <p>You can also drop NO RANGE OR UNKNOWN and UNKNOWN specifications from the definition for a RANGE_N function.</p> <p>You can only drop ranges if the partitioning expression for the table is derived exclusively from a RANGE_N function.</p> <p>Ranges must be specified in ascending order.</p> |
| ADD RANGE[#Ln]<br>BETWEEN <i>start_expression</i><br>AND <i>end_expression</i><br>EACH <i>range_size</i> [NO<br>RANGE [OR<br>UNKNOWN]]<br>[NO RANGE [OR<br>UNKNOWN]],<br>UNKNOWN]]<br>UNKNOWN]  | <p>to add a set of ranges to the RANGE_N function on which the partitioning expression for the table is based.</p> <p>#Ln represents a partition level number where <i>n</i> is an integer between 1 and 15, inclusive.</p> <p>The expressions <i>start_expression</i> and <i>end_expression</i> are defined using the RANGE_N function (see <i>SQL Functions, Operators, Expressions, and Predicates</i> for details).</p> <p>The expressions must not have a BLOB, CLOB, or BIGINT data type.</p> <p>Each <i>range_size</i> variable must be a constant expression.</p> <p>You can also add NO RANGE OR UNKNOWN and UNKNOWN specifications to the definition for a RANGE_N function.</p> <p>You can only add ranges if the partitioning expression for the table is derived exclusively from a RANGE_N function.</p> <p>Ranges must be specified in ascending order.</p>        |
| WITH DELETE                                                                                                                                                                                     | <p>to delete any row whose partition number is null or evaluates to a value outside the valid range of 1 - 65,535, inclusive.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| WITH INSERT [INTO]<br><i>save_table</i>                                                                                                                                                         | <p>to insert any row whose partition number is null or evaluates to a value outside the valid range of 1 - 65,535, inclusive, into the table named by <i>save_table</i>.</p> <p><i>save_table</i> and the table being altered must be distinct.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |



| Syntax Element ...                                                                                                                                                                                                                                                                                                                                                                                                 | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| <b>REVALIDATE PRIMARY INDEX Option</b><br>You cannot modify either the basic table parameters or the primary index in the same ALTER TABLE statement you perform to revalidate a primary index. See the ALTER TABLE topics: “General Rules for the Primary Index Options Clause” and “Rules For Altering the Partitioning Expression For a Primary Index” in <i>SQL Data Definition Language Detailed Topics</i> . |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| REVALIDATE PRIMARY INDEX                                                                                                                                                                                                                                                                                                                                                                                           | to regenerate the table headers for a specified table or noncompressed join index with a partitioned primary index.<br><br>You can optionally verify row partitioning and correct any errors that are found during the verification process by specifying either the WITH DELETE or WITH INSERT [INTO] <i>save_table</i> options.                                                                                                                   |
| WITH DELETE                                                                                                                                                                                                                                                                                                                                                                                                        | to delete any row encountered during revalidation whose partition number evaluates to a value outside the valid range of 1 - 65,535, inclusive.<br><br>This option is not valid for revalidating the primary index of a join index.                                                                                                                                                                                                                 |
| WITH INSERT [INTO] <i>save_table</i>                                                                                                                                                                                                                                                                                                                                                                               | to insert any row encountered during revalidation whose partition number evaluates to a value outside the valid range of 1 - 65,535, inclusive, into the table named by <i>save_table</i> .<br><br><i>save_table</i> and the table being altered must be distinct. You cannot insert rows with nonvalid partitions into a regular Teradata Database base table.<br><br>This option is not valid for revalidating the primary index of a join index. |
| <b>DOWN TABLE Option</b><br>Teradata Database attempts to avoid database crashes whenever possible by converting them to a transaction abort and a snapshot dump for a selected set of normally fatal file system error events.<br><br>The system marks a table as down if its maximum number of permissible down regions is exceeded on its data subtable on any AMP in the system.                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| SET DOWN                                                                                                                                                                                                                                                                                                                                                                                                           | To set the down status flag on all AMPs in the system, making the specified table inaccessible for executing DML requests.                                                                                                                                                                                                                                                                                                                          |
| RESET DOWN                                                                                                                                                                                                                                                                                                                                                                                                         | To remove the down status flag from all AMPs in the system and makes the specified table accessible for all DML requests.                                                                                                                                                                                                                                                                                                                           |

## ANSI Compliance

ALTER TABLE is ANSI SQL:2008-compliant with extensions.

## Required Privileges

To alter a table, you must have DROP TABLE privilege on that table or on the database containing the table.

When you perform either of the following ALTER TABLE forms, you must also have the INDEX privilege on the table:

- ALTER TABLE ... ADD UNIQUE (*column\_list*)
- ALTER TABLE ... ADD PRIMARY KEY (*column\_list*)

When you perform either of the following ALTER TABLE forms, you must also have the INSERT privilege on *save\_table*:

- ALTER TABLE MODIFY PRIMARY INDEX
- ALTER TABLE REVALIDATE PRIMARY INDEX

You must have either of the following privileges to add a UDT column to a table or to drop a UDT column from a table:

- UDTUSAGE privilege on the specified UDT.
- At least one of the following privileges on the *SYSUDTLIB* database:
  - UDTUSAGE
  - UDTTYPE
  - UDTMETHOD

## Privileges Granted Automatically

ALTER TABLE ... ADD CONSTRAINT, where the added constraint is a referential integrity constraint, grants the following privileges automatically to the requestor adding the RI constraint:

- DELETE on the error table for the constraint
- DROP TABLE on the error table for the constraint
- INSERT on the error table for the constraint
- SELECT on the error table for the constraint
- UPDATE on the error table for the constraint

No privileges are granted automatically for any other ALTER TABLE option.

## Example 1: Add Columns to a Table

Use the following to add the columns *street* and *city* to the *employee* table:

```
ALTER TABLE Employee
  ADD street VARCHAR(30),
  ADD city   VARCHAR(20);
```

## Example 2: Add Fallback to a Table

Use the following to implement fallback protection for the *employee* table:

```
ALTER TABLE employee,  
    FALLBACK;
```

## Example 3: Add a Single Before-Image Journal and Dual After-Image Journal

If a table named *newemp* is set for no journaling, but the database has a defined journal, the following statement could be used to add a single before-image journal and a dual after-image journal:

```
ALTER TABLE newemp,  
    BEFORE JOURNAL, DUAL AFTER JOURNAL;
```

## Example 4: Change a Single Before-Image Journal to a Dual Before-Image Journal and Drop Two Columns

The following request changes the single before image journal to a dual image journal and also drops two columns:

```
ALTER TABLE newemp,  
    DUAL BEFORE JOURNAL  
    DROP phone,  
    DROP pref;
```

## Example 5: Add a TITLE Phrase

The following example changes the attributes of the *deptno* column in the *department* table to include a TITLE phrase:

```
ALTER TABLE personnel.department  
    ADD deptno TITLE 'Depart';
```

## Example 6: Add the Null Attribute to Columns

The following statements add the NULL qualifier to columns *training\_skill* and *column\_2*:

```
ALTER TABLE personnel  
    ADD training_skill NULL;  
  
ALTER TABLE abc  
    ADD column_2 NULL;
```

## Example 7: Composite Changes: NULL to NOT NULL

A composite change to a column implies changing more than one attribute of that column in one statement. NULL columns can be changed to NOT NULL, along with other attribute changes, in one statement. The following example changes both the case and NULL attribute of *column\_2*. An error is returned if *abc* contains any rows with nulls in *column\_2*.

```
ALTER TABLE abc  
    ADD column_2 CASESPECIFIC NOT NULL;
```

## Example 8: Composite Changes: NOT NULL to NULL

Composite changes to columns that involve changing the NOT NULL attribute to NULL are not valid. For example, the following *cannot* be done:

```
ALTER TABLE abc  
  ADD column_2 TITLE 'newname' NULL;
```

To make these changes, you must perform two separate ALTER TABLE statements:

```
ALTER TABLE abc ADD column_2 TITLE 'newname';  
ALTER TABLE abc ADD column_2 NULL;
```

## Example 9: DATABLOCKSIZE

The following ALTER TABLE statement changes the maximum data block size of 130,560 bytes (255 sectors) and repacks existing data into blocks of that size:

```
ALTER TABLE employee,  
  DATABLOCKSIZE = 130560 BYTES IMMEDIATE;
```

## Example 10: FREESPACE

The following ALTER TABLE statement changes the freespace to 5 percent:

```
ALTER TABLE employee,  
  FREESPACE = 5 PERCENT;
```

## Example 11: CHECKSUM

The following ALTER TABLE statement changes the disk I/O integrity checksum value to the system default:

```
ALTER TABLE employee,  
  CHECKSUM = DEFAULT;
```

## Example 12: CHECKSUM

The following ALTER TABLE statement changes the disk I/O integrity checksum value to HIGH and updates the existing checksums immediately:

```
ALTER TABLE employee,  
  CHECKSUM = HIGH IMMEDIATE;
```

## Example 13: Changing The Compression Value For An Existing Compressed Column

Suppose a company that does business only in Santa Monica decides to expand, and while previously the city name Santa Monica was compressed, it now makes more sense for the city name Los Angeles to be compressed. The following example changes the single compressed city name value from Santa Monica to Los Angeles, which also means that it should also be compressed:

```
ALTER TABLE customer  
  ADD city_name COMPRESS 'Los Angeles';
```

If *city\_name* had not been compressed previously, this statement would compress all occurrences of Los Angeles. Note, too, that this is an extremely artificial example, because you could just as well have compressed both Santa Monica and Los Angeles.

### Example 14: NO COMPRESS For A New Column

The following example adds a column named *qty\_shipped\_2006* to the customer table and makes that column uncompressible.

```
ALTER TABLE customer
  ADD qty_shipped_2006 NO COMPRESS;
```

### Example 15: Add a New Column With Multivalued Compression

The following ALTER TABLE statement adds a new compressible column and specifies the maximum number of distinct values for compression:

```
ALTER TABLE mkw.x
  ADD b CHARACTER(2)
  COMPRESS (
    'a1','a2','a3','a4','a5','a6','a7','a8','a9','a10',
    'b1','b2','b3','b4','b5','b6','b7','b8','b9','b10',
    'c1','c2','c3','c4','c5','c6','c7','c8','c9','c10',
    'd1','d2','d3','d4','d5','d6','d7','d8','d9','d10',
    'e1','e2','e3','e4','e5','e6','e7','e8','e9','e10',
    'f1','f2','f3','f4','f5','f6','f7','f8','f9','f10',
    'g1','g2','g3','g4','g5','g6','g7','g8','g9','g10',
    'h1','h2','h3','h4','h5','h6','h7','h8','h9','h10',
    'i1','i2','i3','i4','i5','i6','i7','i8','i9','i10',
    'j1','j2','j3','j4','j5','j6','j7','j8','j9','j10',
    'k1','k2','k3','k4','k5','k6','k7','k8','k9','k10',
    'l1','l2','l3','l4','l5','l6','l7','l8','l9','l10',
    'm1','m2','m3','m4','m5','m6','m7','m8','m9','m10',
    'n1','n2','n3','n4','n5','n6','n7','n8','n9','n10',
    'o1','o2','o3','o4','o5','o6','o7','o8','o9','o10',
    'p1','p2','p3','p4','p5','p6','p7','p8','p9','p10',
    'q1','q2','q3','q4','q5','q6','q7','q8','q9','q10',
    'r1','r2','r3','r4','r5','r6','r7','r8','r9','r10',
    's1','s2','s3','s4','s5','s6','s7','s8','s9','s10',
    't1','t2','t3','t4','t5','t6','t7','t8','t9','t10',
    'u1','u2','u3','u4','u5','u6','u7','u8','u9','u10',
    'v1','v2','v3','v4','v5','v6','v7','v8','v9','v10',
    'w1','w2','w3','w4','w5','w6','w7','w8','w9','w10',
    'x1','x2','x3','x4','x5','x6','x7','x8','x9','x10',
    'y1','y2','y3','y4','y5','y6','y7','y8','y9','y10',
    'z1','z2','z3','z4','z5');
```

## Example 16: Renaming a Column, Then Adding a New Column Using the Previous Name of the Renamed Column

When the need arises, you can rename an existing column, then create a new column, perhaps with a completely different data type, using the old name of the renamed column. For example, suppose you have the following table definition:

```
CREATE SET TABLE t1, NO FALLBACK, NO BEFORE JOURNAL,  
NO AFTER JOURNAL,  
    upi INTEGER NOT NULL,  
    f1  FLOAT,  
    d1  DECIMAL(7,2),  
    i1  INTEGER)  
UNIQUE PRIMARY INDEX (upi);
```

Suppose you decide to rename column *f1* as *f2* and then add a new column named *f1* having the INTEGER data type rather than the FLOAT data type previously associated with the column now named *f2*:

```
ALTER TABLE t1  
    RENAME f1 AS f2,  
    ADD    f1 INTEGER;  
  
*** Table has been modified.  
*** Total elapsed time was 1 second.
```

You then also decide to rename column *i1* as *i2* and then add a new column named *i1* having the DECIMAL data type rather than the INTEGER data type previously associated with the column now named *i2*:

```
ALTER TABLE t1  
    RENAME i1 AS i2,  
    ADD    i1 DECIMAL(8,3);  
  
*** Table has been modified.  
*** Total elapsed time was 1 second.
```

You then display the new table definition using the SHOW TABLE statement (see [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW”](#) on page 796):

```
SHOW TABLE t1;  
  
*** Text of DDL statement returned.  
*** Total elapsed time was 1 second.  
  
CREATE SET TABLE DF2.t1, NO FALLBACK,NO BEFORE JOURNAL,  
NO AFTER JOURNAL,CHECKSUM = DEFAULT (  
    upi INTEGER NOT NULL,  
    f2  FLOAT,  
    d1  DECIMAL(7,2),  
    i2  INTEGER,  
    f1  INTEGER,  
    i1  DECIMAL(8,3)  
UNIQUE PRIMARY INDEX (upi);
```

### Example 17: Add a PRIMARY KEY Constraint

*table\_1* must not already have a defined PRIMARY KEY constraint. Constraint name *primary\_1* must not duplicate an existing name in *table\_1*.

```
ALTER TABLE table_1
  ADD CONSTRAINT primary_1 PRIMARY KEY (field_1, field_2);
```

*field\_1* and *field\_2* must be NOT NULL or an error is returned.

### Example 18: Add a Named CHECK Constraint

Constraint name *check\_1* must not be an existing name in *table\_1*.

```
ALTER TABLE table_1 ADD CONSTRAINT check_1
  CHECK (field_1 > field_2);
```

### Example 19: Add a Named UNIQUE Constraint

Constraint name *unique\_1* must not be an existing name in *table\_1*.

```
ALTER TABLE table_1
  ADD CONSTRAINT unique_1
  UNIQUE (field_1, field_2);
```

### Example 20: Add a Named FOREIGN KEY Constraint

Constraint name *reference\_1* must not be an existing name in *table\_1*.

```
ALTER TABLE table_1
  ADD CONSTRAINT reference_1
  FOREIGN KEY (field_1) REFERENCES table_2;
```

### Example 21: Drop a Named CHECK Constraint

Constraint name *check\_1* must exist in *table\_1*.

```
ALTER TABLE table_1
  DROP CONSTRAINT check_1;
```

### Example 22: Drop a Named CHECK Constraint

Constraint name *check\_1* must exist in *table\_1* as a CHECK constraint.

```
ALTER TABLE table_1
  DROP CONSTRAINT check_1
  CHECK;
```

### Example 23: Drop a UNIQUE Constraint

Constraint name *unique\_1* must exist in *table\_1*.

```
ALTER TABLE table_1
  DROP CONSTRAINT unique_1;
```

## Example 24: Drop a Named Constraint

Constraint name *reference\_1* must exist in *table\_1*.

```
ALTER TABLE table_1
  DROP CONSTRAINT reference_1;
```

## Example 25: Modify a Named CHECK Constraint

Replace the current definition for CHECK constraint *check\_1* with the new definition.

Constraint name *check\_1* must be an existing CHECK constraint.

```
ALTER TABLE table_1
  MODIFY CONSTRAINT check_1
  CHECK (field_2 > 0);
```

## Example 26: Add an Unnamed CHECK Constraint

The following statement adds an unnamed CHECK constraint to ensure that values in column *field\_2* are always greater than 100:

```
ALTER TABLE table_1
  ADD CHECK (field_2 > 100);
```

## Example 27: Add a Column With an Unnamed CHECK Constraint

The following statement adds an unnamed CHECK constraint to ensure that values in column *field\_1* are always greater than 0.

This example is valid only if there is not an existing unnamed column level CHECK for *field\_1* in *table\_1*.

```
ALTER TABLE table_1
  ADD field_1
  CHECK (field_1 > 0);
```

## Example 28: Add a Multicolumn Unnamed UNIQUE Constraint

The following statement adds an unnamed uniqueness constraint to the columns named *field\_3* and *field\_4*:

```
ALTER TABLE table_1
  ADD UNIQUE (field_3, field_4);
```

## Example 29: Add a FOREIGN KEY Constraint

The following statement adds a foreign key constraint on the column named *field\_2* in *table\_1*:

```
ALTER TABLE table_1
  ADD FOREIGN KEY (field_2) REFERENCES table_3;
```



### Example 30: Drop All Unnamed Table-Level CHECK Constraints

This example drops all unnamed table-level CHECK constraints.

```
ALTER TABLE table_1
  DROP CHECK;
```

### Example 31: Drop an Unnamed Column-Level CHECK Constraint

This example drops the unnamed column level CHECK constraint from column *field\_1* in *table\_1*.

```
ALTER TABLE table_1 DROP field_1
  CHECK;
```

### Example 32: Drop a FOREIGN KEY Constraint

This example drops the foreign key constraint on the column named column *field\_2* in table *table\_3*.

```
ALTER TABLE table_1
  DROP FOREIGN KEY (field_2) REFERENCES table_3;
```

### Example 33: Add an Unnamed CHECK Constraint

This example modifies column by adding an unnamed CHECK constraint. Column *field\_1* is an existing, already constrained field in *table\_1*.

```
ALTER TABLE table_1
  MODIFY field_1
  CHECK (field_1 IS NOT NULL);
```

### Example 34: Non-Valid Use of ALTER TABLE With Constraints

The following statement is not valid because you can add or drop only one constraint per ALTER TABLE statement:

```
ALTER TABLE table_1
  DROP CONSTRAINT check_1,
  ADD CONSTRAINT check_2
  CHECK (field_2 > 0);
```

The system returns the following message:

```
Only a check specification is allowed for the modification.
```

### Example 35: Nonvalid Use of ALTER TABLE With Named Constraints

The following statement is not valid because the constraint named *dup\_constr\_name* already exists in *table\_1*. For this reason, you cannot add it to the table.

```
ALTER TABLE table_1
  ADD CONSTRAINT dup_constr_name
  FOREIGN KEY (field_3) REFERENCES table_2;
```

The system returns the following message:

```
Constraint with the same name 'dup_constr_name' already exists in table.
```

### Example 36: Nonvalid Use of ALTER TABLE With Named Constraints

The following statement is not valid because the constraint named *no\_such\_constr* does not exist in *table\_1*. For this reason, you cannot modify or drop it.

```
ALTER TABLE table_1
  MODIFY CONSTRAINT no_such_constr
  CHECK (field_1 > 0);
```

### Example 37: Nonvalid Use of ALTER TABLE With Named Constraints

The following statement is not valid because the specified constraint does not exist; therefore, it cannot be dropped.

```
ALTER TABLE table_1
  DROP CONSTRAINT no_such_constr;
```

The system returns the following message:

The specified constraint name does not exist in table.

### Example 38: Add or Drop a Batch Referential Constraint

This example first adds a table-level batch referential constraint to column *d1* in table *drs.t2* referencing column *c1* in table *drs.t1* and then drops that same constraint.

```
CREATE SET TABLE drs.t1, NO FALLBACK,
  NO BEFORE JOURNAL,
  NO AFTER JOURNAL
  (
    c1 INTEGER NOT NULL,
    c2 INTEGER NOT NULL,
    c3 INTEGER NOT NULL)
  UNIQUE PRIMARY INDEX (c1);

CREATE SET TABLE drs.t2, NO FALLBACK,
  NO BEFORE JOURNAL,
  NO AFTER JOURNAL
  (
    d1 INTEGER,
    d2 INTEGER,
    d3 INTEGER);

ALTER TABLE drs.t2
  ADD CONSTRAINT fpk1
  FOREIGN KEY (d1) REFERENCES WITH CHECK OPTION drs.t1 (c1);

ALTER TABLE drs.t2
  DROP FOREIGN KEY (d1) REFERENCES WITH CHECK OPTION drs.t1 (c1);
```

### Example 39: Adding a Table-Level Referential Constraint

The first statement adds a table-level Referential Constraint relationship on foreign key column *a3* with column *e1* in table *e*. Referential integrity is not enforced for this relationship.

The second statement drops the foreign key Referential Constraint that was created by the first.

```

ALTER TABLE a
ADD FOREIGN KEY (a3) REFERENCES WITH NO CHECK OPTION e(e1);

ALTER TABLE a
DROP FOREIGN KEY (a3) REFERENCES e(e1);

```

### CREATE TABLE Request for Examples 40- 47

Examples 42 through 49 assume that the following table has been created:

```

CREATE TABLE orders (
  o_orderkey      INTEGER NOT NULL,
  o_custkey       INTEGER,
  o_orderstatus   CHARACTER(1) CASESPECIFIC,
  o_totalprice    DECIMAL(13,2) NOT NULL,
  o_orderdate     DATE FORMAT 'yyyy-mm-dd' NOT NULL,
  o_orderpriority CHARACTER(21),
  o_clerk         CHARACTER(16),
  o_shippriority  INTEGER,
  o_comment       VARCHAR(79))
PRIMARY INDEX (o_orderkey)
PARTITION BY RANGE_N(o_orderdate
  BETWEEN DATE '1992-01-01'
  AND      DATE '1998-12-31'
  EACH INTERVAL '1' MONTH)
UNIQUE INDEX (o_orderkey);

```

### Example 40: Nonvalid MODIFY INDEX Requests

The following requests are illegal because they do not specify options that alter the table:

```

ALTER TABLE orders
MODIFY PRIMARY INDEX;

ALTER TABLE orders
MODIFY NOT UNIQUE PRIMARY INDEX;

```

### Example 41: Modify the Primary Index Partition Ranges

The following ALTER TABLE request modifies the table created in [“CREATE TABLE Request for Examples 40- 47” on page 59](#). The request is valid if the table is empty.

```

ALTER TABLE orders
MODIFY PRIMARY INDEX
PARTITION BY RANGE_N(o_orderdate BETWEEN DATE '1993-01-01'
  AND      DATE '2000-12-31'
  EACH INTERVAL '1' MONTH);

```

The identical principles hold for altering the partitioning of a join index. Suppose, for example, you needed to change the partitioning of a join index named *ji\_32*. The example might look something like the following:

```
ALTER TABLE ji_32
MODIFY PRIMARY INDEX
PARTITION BY RANGE_N(o_orderdate BETWEEN DATE '1993-01-01'
                      AND          DATE '2009-12-31'
                      EACH INTERVAL '1' MONTH);
```

## Example 42: Drop and Add Primary Index Partition Ranges

The following ALTER TABLE request modifies the table created in [“CREATE TABLE Request for Examples 40- 47” on page 59](#). The outcome of this request is identical to the table alterations performed in [“Example 43: Drop and Add Primary Index Partition Ranges” on page 60](#) and [“Example 44: Drop and Add Primary Index Partition Ranges” on page 61](#) using different syntax.

The request is valid if there are no rows with values for *o\_orderdate* between January 1, 1992 (DATE '1992-01-01') and December 31, 1992 (DATE '1992-12-31').

```
ALTER TABLE orders
MODIFY PRIMARY INDEX
  DROP RANGE BETWEEN DATE '1992-01-01'
                AND    DATE '1992-12-31'
                EACH INTERVAL '1' MONTH
  ADD RANGE BETWEEN DATE '1999-01-01'
                AND    DATE '2000-12-31'
                EACH INTERVAL '1' MONTH;
```

## Example 43: Drop and Add Primary Index Partition Ranges

The following ALTER TABLE request modifies the table created in [“CREATE TABLE Request for Examples 40- 47” on page 59](#). The result is equivalent to the outcome of the requests used in [“Example 42: Drop and Add Primary Index Partition Ranges” on page 60](#) and [“Example 44: Drop and Add Primary Index Partition Ranges” on page 61](#) using different syntax and is valid if there are no rows with values for *o\_orderdate* between January 1 1992 (DATE '1992-01-01') and December 31 1992 (DATE '1992-12-31').

```
ALTER TABLE orders
MODIFY PRIMARY INDEX
  DROP RANGE WHERE PARTITION BETWEEN 1
                                AND    12
  ADD RANGE BETWEEN DATE '1999-01-01'
                AND    DATE '2000-12-31'
                EACH INTERVAL '1' MONTH;
```

### Example 44: Drop and Add Primary Index Partition Ranges

The following ALTER TABLE request modifies the table created in [“CREATE TABLE Request for Examples 40- 47” on page 59](#). The result is equivalent to the outcome of the requests used in [“Example 42: Drop and Add Primary Index Partition Ranges” on page 60](#) and [“Example 43: Drop and Add Primary Index Partition Ranges” on page 60](#) using different syntax and is valid if there are no rows with values for *o\_orderdate* between January 1 1992 (DATE ‘1992-01-01’) and December 31 1992 (DATE ‘1992-12-31’).

```
ALTER TABLE orders
MODIFY PRIMARY INDEX
  DROP RANGE WHERE Orders.PARTITION IN (1,2,3,4,5,6,7,8,9,10,11,12)
  ADD RANGE BETWEEN DATE '1999-01-01'
              EACH INTERVAL '1' MONTH,
              DATE '2000-01-01'
              AND    DATE '2000-12-31'
              EACH INTERVAL '1' MONTH;
```

### Example 45: Drop and Add Primary Index Partition Ranges and Delete Rows Outside the Defined Ranges

The following ALTER TABLE request modifies the table created in [“CREATE TABLE Request for Examples 40- 47” on page 59](#). It is valid if there are 0 or more rows with *o\_orderdate* values between January 1 1992 (DATE ‘1992-01-01’) and December 31 1992 (DATE ‘1992-12-31’). As a result of the WITH DELETE specification, those rows, if any, are deleted from orders because they do not belong to any partition in the new partitioning expression:

```
ALTER TABLE orders
MODIFY PRIMARY INDEX (o_orderkey)
  DROP RANGE BETWEEN DATE '1992-01-01'
              AND    DATE '1992-12-31'
              EACH INTERVAL '1' MONTH
  ADD RANGE BETWEEN DATE '1999-01-01'
              AND    DATE '2000-12-31'
              EACH INTERVAL '1' MONTH
WITH DELETE;
```

### Example 46: Using MODIFY PRIMARY INDEX to Repartition a Table and Save Nonvalid Rows That Result From the Redefinition in a Save Table

Assume that the orders table defined in [“CREATE TABLE Request for Examples 40- 47” on page 59](#) exists and the following new save table has been created to handle rows that are no longer valid when you change the partitioning expression for the orders table:

```
CREATE TABLE old_orders (
  o_orderkey      INTEGER NOT NULL,
  o_custkey       INTEGER,
  o_orderstatus   CHARACTER(1) CASESPECIFIC,
  o_totalprice    DECIMAL(13,2) NOT NULL,
  o_orderdate     DATE FORMAT 'yyyy-mm-dd' NOT NULL,
  o_orderpriority CHARACTER(21),
  o_clerk         CHARACTER(16),
  o_shippriority  INTEGER,
  o_comment       VARCHAR(79))
UNIQUE PRIMARY INDEX (o_orderkey);
```

The following ALTER TABLE request is valid if there are 0 or more rows with *o\_orderdate* between January 1, 1992 and December 31, 1992 (DATE '1992-01-01 AND DATE '1992-12-31').

The rows having those values, if any, are moved into the *old\_orders* save table and then deleted from *orders*:

```
ALTER TABLE orders
MODIFY PRIMARY INDEX
  DROP RANGE BETWEEN DATE '1992-01-01'
                AND      DATE '1992-12-31'
                EACH INTERVAL '1' MONTH
  ADD RANGE  BETWEEN DATE '1999-01-01'
                AND      DATE '2000-12-31'
                EACH INTERVAL '1' MONTH
WITH INSERT INTO old_orders;
```

### Example 47: Adding a Name to a Previously Unnamed Primary Index

To name the primary index of the *orders* table defined in [“CREATE TABLE Request for Examples 40- 47” on page 59](#), you could perform the following request:

```
ALTER TABLE orders
MODIFY PRIMARY INDEX ordpi;
```

### Example 48: Revalidating the Partitioning for a PPI Table

Suppose any of the following events make you think that incorrect partitioning of the *orders* table has occurred:

- You suspect that row partitioning might not be correct after a restore.
- You copy the table to a system with different hardware or operating system.
- Some sort of system malfunction has occurred.

You can validate the partitioning of *orders* table rows using either of the following ALTER TABLE requests, with the first request deleting any problematic rows and the second moving them into a new table:

```
ALTER TABLE orders
REVALIDATE PRIMARY INDEX WITH DELETE;

ALTER TABLE orders
REVALIDATE PRIMARY INDEX WITH INSERT INTO old_orders;
```

### Example 49: Unmatched Partitioning Expression Ranges

Assume that table *cust\_orderdate* exists with the following definition:

```
CREATE TABLE cust_orderdate (
  o_custkey  INTEGER,
  o_orderdate DATE)
PRIMARY INDEX (o_custkey)
PARTITION BY RANGE_N(o_orderdate
  BETWEEN DATE '2000-01-01'
  AND      DATE '2000-12-31'
  EACH INTERVAL '1' MONTH;
```

The following ALTER TABLE request returns an error because the expanded partitioning expression ranges defined in the PARTITION BY clause of the CREATE TABLE request do not match the expanded partitioning ranges defined by the ALTER TABLE specification.

```
ALTER TABLE cust_orderdate
MODIFY PRIMARY INDEX
  DROP RANGE BETWEEN DATE '2000-01-01'
                    AND   DATE '2000-04-30' ;
```

The current table, after expansion of the EACH clause, has 12 ranges, each with a width of one month. The DROP RANGE clause of this ALTER TABLE request, as written, attempts to drop a single range with a width of four months, and that range does not match any of the ranges currently defined for *cust\_orderdate*.

The following two ALTER TABLE requests produce the result intended by the nonvalid ALTER TABLE request in “[Example 49: Unmatched Partitioning Expression Ranges](#)” on [page 62](#), each using a different syntax:

```
ALTER TABLE cust_orderdate
MODIFY PRIMARY INDEX
  DROP RANGE BETWEEN DATE '2000-01-01'
                    AND   DATE '2000-04-30'
                    EACH INTERVAL '1' MONTH;

ALTER TABLE cust_orderdate
MODIFY PRIMARY INDEX
  DROP RANGE WHERE PARTITION <=4;
```

### Example 50: Dropping a Partition From a PPI Table When the PPI Is Defined Using The RANGE\_N Function and NO RANGE Is Specified

Suppose you have the following PPI base table definition:

```
CREATE SET TABLE ppi_salestable, NO FALLBACK,
  NO BEFORE JOURNAL, NO AFTER JOURNAL, CHECKSUM = DEFAULT (
  product_code  CHARACTER(8) CHARACTER SET LATIN NOT CASESPECIFIC,
  sales_date    DATE FORMAT 'YYYY-MM-DD',
  agent_id      CHARACTER(8) CHARACTER SET LATIN NOT CASESPECIFIC,
  quantity_sold INTEGER,
  product_desc  VARCHAR(50) CHARACTER SET LATIN NOT CASESPECIFIC)
PRIMARY INDEX (product_code, sales_date, agent_id)
PARTITION BY RANGE_N(sales_date
  BETWEEN DATE '2001-01-01'
        AND   DATE '2001-12-31'
        EACH INTERVAL '1' MONTH ,
        '2002-01-01' (DATE)
        AND   '2002-12-31' (DATE)
        EACH INTERVAL '1' MONTH ,
        '2003-01-01' (DATE)
        AND   '2003-12-31' (DATE)
        EACH INTERVAL '1' MONTH ,
  NO RANGE);
```

You then define the following PPI base table to act as the save table for an ALTER TABLE request in which you will drop one or more partitions from *ppi\_salestable*:

```
CREATE SET TABLE ppi_salestable1, NO FALLBACK,
NO BEFORE JOURNAL, NO AFTER JOURNAL, CHECKSUM = DEFAULT (
  product_code CHARACTER(8) CHARACTER SET LATIN NOT CASESPECIFIC,
  sales_date DATE FORMAT 'YYYY-MM-DD',
  agent_id CHARACTER(8) CHARACTER SET LATIN NOT CASESPECIFIC,
  quantity_sold INTEGER,
  product_desc VARCHAR(50) CHARACTER SET LATIN NOT CASESPECIFIC)
PRIMARY INDEX (product_code, sales_date, agent_id)
PARTITION BY RANGE_N(sales_date
  BETWEEN DATE '2001-01-01'
  AND DATE '2001-12-31'
  EACH INTERVAL '1' MONTH , NO RANGE);
```

You then populate *ppi\_salestable* with the following rows:

```
INSERT INTO ppi_salestable
VALUES ('PC2','2001-01-10','AG2',5,'PC');

INSERT INTO ppi_salestable
VALUES ('PC3','2001-03-10','AG2',5,'PC');

INSERT INTO ppi_salestable
VALUES ('PC4','2002-05-10','AG2',5,'PC');

INSERT INTO ppi_salestable
VALUES ('PC5','2003-07-10','AG2',5,'PC');

INSERT INTO ppi_salestable
VALUES ('PC5','2004-07-10','AG2',5,'PC');
```

The following SELECT request indicates that the five intended rows were successfully inserted into *ppi\_salestable*:

```
SELECT partition, product_code, sales_date, agent_id,
       quantity_sold, product_description
FROM ppi_salestable
ORDER BY 1;
```

| PARTITION | product_code | sales_date | agent_id | quantity_sold | product_desc |
|-----------|--------------|------------|----------|---------------|--------------|
| 1         | PC2          | 2001-01-10 | AG2      | 5             | PC           |
| 3         | PC3          | 2001-03-10 | AG2      | 5             | PC           |
| 17        | PC4          | 2002-05-10 | AG2      | 5             | PC           |
| 31        | PC5          | 2003-07-10 | AG2      | 5             | PC           |
| 37        | PC5          | 2004-07-10 | AG2      | 5             | PC           |

You now use ALTER TABLE to drop a range of partitions from *ppi\_salestable* with the intent of saving any dropped rows in *ppi\_salestable1*, specifying a WITH INSERT INTO *ppi\_salestable1* clause to do so:



```

ALTER TABLE ppi_salestable
MODIFY PRIMARY INDEX (product_code, sales_date, agent_id)
DROP RANGE BETWEEN DATE '2001-01-01'
AND DATE '2001-12-31'
EACH INTERVAL '1' MONTH
WITH INSERT INTO ppi_salestable1;

*** Table has been modified.
*** Total elapsed time was 1 second.

```

Now you check the contents of *ppi\_salestable* to ensure that the rows within the partition you dropped were removed from the table:

```

SELECT PARTITION, product_code, sales_date, agent_id,
       quantity_sold, product_desc
FROM ppi_salestable
ORDER BY 1;

*** Query completed. 5 rows found. 6 columns returned.
*** Total elapsed time was 1 second.

```

| PARTITION | product_code | sales_date | agent_id | quantity_sold | product_desc |
|-----------|--------------|------------|----------|---------------|--------------|
| 5         | PC4          | 2002-05-10 | AG2      | 5             | PC           |
| 19        | PC5          | 2003-07-10 | AG2      | 5             | PC           |
| 25        | PC2          | 2001-01-10 | AG2      | 5             | PC<<<<<      |
| 25        | PC3          | 2001-03-10 | AG2      | 5             | PC<<<<<      |
| 25        | PC5          | 2004-07-10 | AG2      | 5             | PC<<<<<      |

Notice that because you specified a NO RANGE clause when you created the base table *ppi\_salestable*, no rows are dropped from it when you drop the range of partitions that had contained them. Instead, those rows are moved to the NO RANGE partition, which is identified by the external partition number 25, and retained in *ppi\_salestable*.

To do what you had intended, you should have defined *ppi\_salestable* without specifying a NO RANGE clause.

## Example 51: Altering Partitions for Multilevel PPI Tables

Assume you have created a table named *orders* using the following CREATE TABLE request:

```

CREATE TABLE orders (
  o_orderkey    INTEGER NOT NULL,
  o_custkey     INTEGER,
  o_orderstatus CHARACTER(1) CASESPECIFIC,
  o_totalprice  DECIMAL(13,2) NOT NULL,
  o_orderdate   DATE FORMAT 'yyyy-mm-dd' NOT NULL)
PRIMARY INDEX (o_orderkey)
PARTITION BY (
  RANGE_N(o_custkey    BETWEEN 0
          AND 49999
          EACH 100),
  RANGE_N(o_orderdate  BETWEEN DATE '2000-01-01'
          AND DATE      '2006-12-31'
          EACH INTERVAL '1' MONTH))
UNIQUE INDEX (o_orderkey);

```

If *orders* is empty, you could submit the following ALTER TABLE request to modify it to have a single-level partitioned primary index:

```
ALTER TABLE orders
  MODIFY PRIMARY INDEX
  PARTITION BY RANGE_N(
    o_orderdate BETWEEN DATE '2000-01-01'
                  AND     DATE '2006-12-31'
                  EACH INTERVAL '1' MONTH);
```

Assume the previously defined CREATE TABLE definition for *orders*. If there are no rows with *o\_orderdate* between the dates 2000-01-01 and 2000-12-31, you could submit any one of the following equivalent ALTER TABLE requests to modify the partitioning expression for level 2:

```
ALTER TABLE orders
  MODIFY PRIMARY INDEX
  DROP RANGE#L2 BETWEEN DATE '2000-01-01'
                  AND     DATE '2000-12-31'
                  EACH INTERVAL '1' MONTH
  ADD RANGE BETWEEN DATE '2007-01-01'
              AND     DATE '2007-12-31'
              EACH INTERVAL '1' MONTH;
```

or

```
ALTER TABLE orders
  MODIFY PRIMARY INDEX
  DROP RANGE#L2
  WHERE Orders.PARTITION#L2 BETWEEN 1
                              AND    12
  ADD RANGE #L2 BETWEEN DATE '2007-01-01'
                      AND    DATE '2007-12-31'
                      EACH INTERVAL '1' MONTH;
```

or

```
ALTER TABLE orders
  MODIFY PRIMARY INDEX
  DROP RANGE#L2
  WHERE PARTITION#L2 IN (1,2,3,4,5,6,7,8,9,10,11,12)
  ADD RANGE BETWEEN DATE '2007-01-01'
                  EACH INTERVAL '1' MONTH,
                  DATE '2007-07-01'
                  AND    DATE '2007-12-31'
                  EACH INTERVAL '1' MONTH;
```

Assume the previously defined CREATE TABLE definition for *orders*. If there are zero, one, or more rows with *o\_orderdate* between 2000-01-01 and 2000-12-31, you could submit the following ALTER TABLE request to alter the partitioning. In this case, the system deletes the rows satisfying the condition:

```

ALTER TABLE orders
  MODIFY PRIMARY INDEX (o_orderkey)
  DROP RANGE#L2 BETWEEN DATE '2000-01-01'
                  AND      DATE '2000-12-31'
                  EACH INTERVAL '1' MONTH
  ADD RANGE      BETWEEN DATE '2007-01-01'
                  AND      DATE '2007-12-31'
                  EACH INTERVAL '1' MONTH
  WITH DELETE;

```

Assume you have created one table using the previously defined CREATE TABLE definition for *orders* and another table using the following CREATE TABLE request:

```

CREATE TABLE old_orders (
  o_orderkey  INTEGER NOT NULL,
  o_custkey   INTEGER,
  o_orderstatus CHARACTER(1) CASESPECIFIC,
  o_totalprice DECIMAL(13,2) NOT NULL,
  o_orderdate  DATE FORMAT 'yyyy-mm-dd' NOT NULL)
  UNIQUE PRIMARY INDEX (o_orderkey);

```

The following ALTER TABLE request is one way to alter the partitioning if there are zero, one, or more rows with *o\_orderdate* between 2000-01-01 and 2000-12-31. In this case, the system saves the rows in *old\_orders* prior to deleting them from *orders*.

```

ALTER TABLE orders
  MODIFY PRIMARY INDEX
  DROP RANGE#L2 BETWEEN DATE '2000-01-01'
                  AND      DATE '2000-12-31'
                  EACH INTERVAL '1' MONTH
  ADD RANGE#L2 BETWEEN DATE '2007-01-01'
                  AND      DATE '2007-12-31'
                  EACH INTERVAL '1' MONTH
  WITH INSERT INTO old_orders;

```

The following ALTER TABLE request is not valid for a nonempty table because it changes the number of partitions at a level other than level 1:

```

ALTER TABLE orders
  MODIFY PRIMARY INDEX
  DROP RANGE#L2 BETWEEN DATE '2000-01-01'
                  AND      DATE '2000-12-31'
                  EACH INTERVAL '1' MONTH
  ADD RANGE      BETWEEN DATE '2007-01-01'
                  AND      DATE '2008-12-31'
                  EACH INTERVAL '1' MONTH
  WITH DELETE;

```

Assume the previously defined CREATE TABLE definition for *orders*. You could submit the following ALTER TABLE request to alter the partitioning expressions at both levels:

```
ALTER TABLE orders
  MODIFY PRIMARY INDEX
  DROP RANGE BETWEEN      0
                BETWEEN    99
  ADD RANGE  BETWEEN 50000
                AND        50199
                EACH 100,
  DROP RANGE WHERE PARTITION#L2 = 1
  ADD RANGE  BETWEEN DATE '2007-01-01'
                AND      DATE '2007-01-31'
  WITH DELETE;
```

Note that the number of partitions at level 1 is increased by one and the number of partitions at level 2 remains the same.

## Example 52: Adding a LOB Column to a Table

The following example adds the CLOB column *extended\_description* to a table named *partshistory*:

```
ALTER TABLE partshistory
  ADD extended_description CLOB;
```

## Example 53: SET DOWN

The following request restricts or suspends access to *emp\_table*. With the exception of fast path DELETE ALL requests, DML statements cannot be executed on this table until an ALTER TABLE ... RESET DOWN request makes *emp\_table* accessible again.

```
ALTER TABLE emp_table SET DOWN;
```

## Example 54: RESET DOWN

The following request reenables access to *emp\_table*, which had been set down either because of an excessive number of down regions in one of its data subtables on one of the AMPs or because someone had submitted a SET DOWN request against it.

```
ALTER TABLE emp_table RESET DOWN;
```

The following request aborts because it attempts to alter *emp\_table* to have fallback, and you cannot specify additional options with a SET | RESET DOWN request.

```
ALTER TABLE emp_tablec, FALLBACK, RESET DOWN;
```

## Related Topics

See [“CREATE TABLE” on page 382](#) and [“CREATE TABLE \(Queue Table Form\)” on page 462](#) and *SQL Data Definition Language Detailed Topics* for further information about table definitions and primary index partitioning.

See *Database Design* for more information about partitioned primary indexes and the system-derived PARTITION and PARTITION#*Ln* columns.

See *SQL Request and Transaction Processing* for information about the various forms of partition elimination.

# ALTER TRIGGER

## Purpose

Enables or disables a trigger or changes its creation timestamp.

## Syntax

```
ALTER TRIGGER [database_name.] [trigger_name | table_name | trigger_name — TIMESTAMP] [ENABLED | DISABLED] ;
```

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where:

| Syntax Element ...   | Specifies ...                                                                                                                                                                                                                                                |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i> | an optional qualifier for the <i>trigger_name</i> or <i>table_name</i> .                                                                                                                                                                                     |
| <i>trigger_name</i>  | the name of the trigger to be altered.<br>If you specify <i>trigger_name</i> you can alter only one trigger at a time.                                                                                                                                       |
| <i>table_name</i>    | the name of the table, all the triggers on which are to be enabled or disabled.<br>The <b>TIMESTAMP</b> option does not apply to a table.                                                                                                                    |
| <b>ENABLED</b>       | that the named trigger or all triggers on the named table are to be enabled.<br>Enabled triggers function as active database objects and follow normal trigger protocol.                                                                                     |
| <b>DISABLED</b>      | that the named trigger or all triggers on the named table are to be disabled.<br>Disabled triggers continue to exist as database objects, but cannot execute. For a trigger to execute, it must first be enabled.                                            |
| <b>TIMESTAMP</b>     | that the creation timestamp of the named trigger is to be replaced with the <i>current</i> timestamp.<br>Altering the creation timestamp of a trigger changes its position in the default order of execution, when multiple triggers are defined on a table. |

## ANSI Compliance

ALTER TRIGGER is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

To perform ALTER TRIGGER, you must have the DROP TRIGGER privilege on the table on which the trigger is defined, or on the database containing it.

## Privileges Granted Automatically

None.

## Related Topics

See [“CREATE TRIGGER/ REPLACE TRIGGER” on page 489](#) for more information about trigger definitions.

---

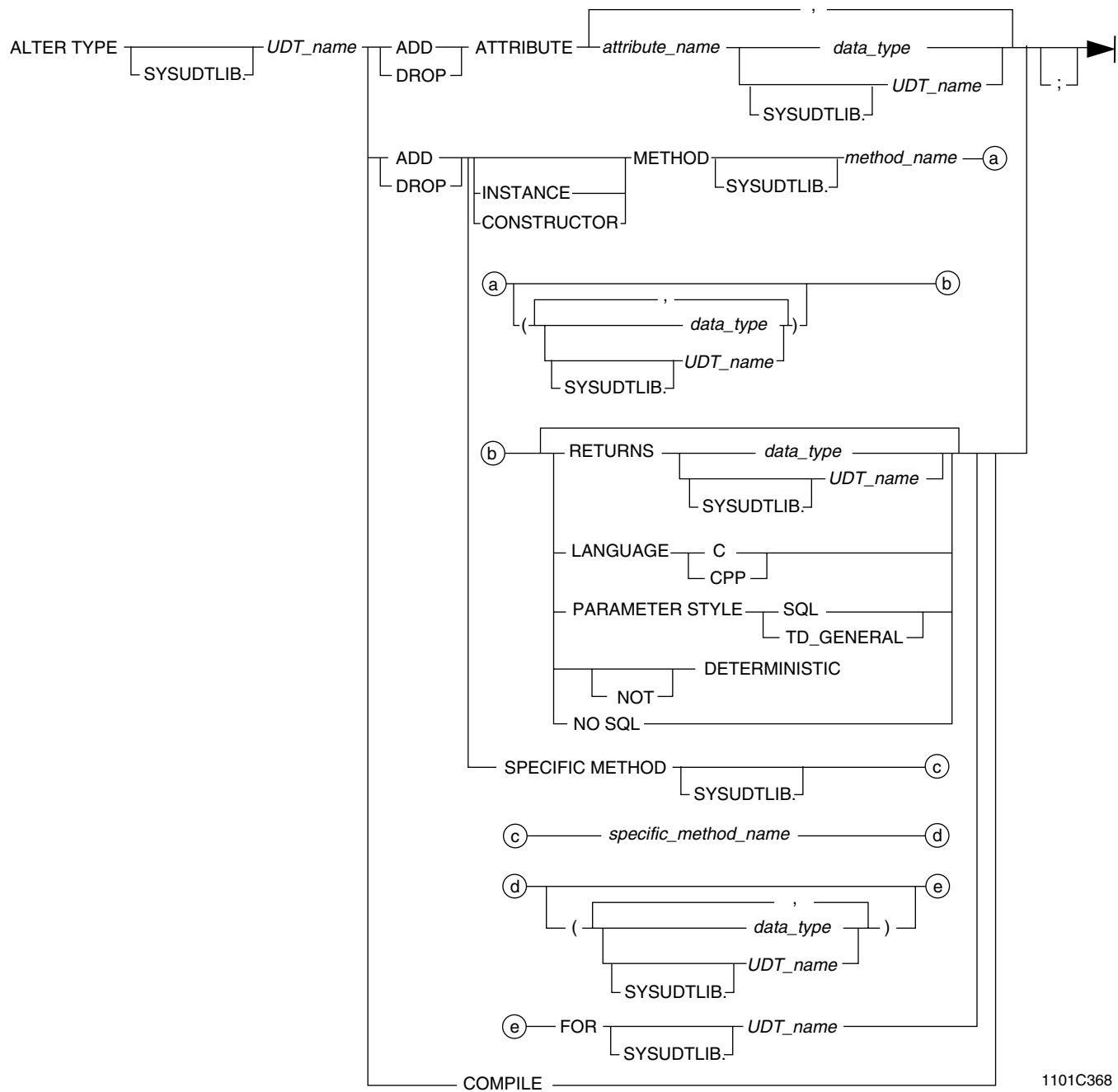
# ALTER TYPE

## Purpose

Performs any of the following operations:

- Add a new attribute to a structured UDT definition.
- Drop an existing attribute from a structured UDT definition.
- Add a method to a distinct or structured UDT definition.
- Drop a method from a distinct or structured UDT definition.

## Syntax



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where:

| Syntax element ...                                                          | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                      |      |          |   |   |     |     |
|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------|---|---|-----|-----|
| [SYSUDTLIB.] <i>UDT_name</i>                                                | the name of the UDT whose definition is to be altered.                                                                                                                                                                                                                                                                                                                                                             |      |          |   |   |     |     |
| ADD ATTRIBUTE <i>attribute_name</i>                                         | to add the attribute named <i>attribute_name</i> to the definition of the structured UDT named <i>UDT_name</i> .<br><br>You cannot add more than 512 attributes at a time.                                                                                                                                                                                                                                         |      |          |   |   |     |     |
| <i>data_type</i>   [SYSUDTLIB.] <i>UDT_name</i>                             | the data type of the attribute to be added.                                                                                                                                                                                                                                                                                                                                                                        |      |          |   |   |     |     |
| DROP ATTRIBUTE <i>attribute_name</i>                                        | to drop the attribute named <i>attribute_name</i> from the definition of the structured UDT named <i>UDT_name</i> .                                                                                                                                                                                                                                                                                                |      |          |   |   |     |     |
| ADD [ <u>INSTANCE</u>   CONSTRUCTOR] METHOD [SYSUDTLIB.] <i>method_name</i> | to add the method signature for the method named <i>method_name</i> to the definition of the UDT named <i>UDT_name</i> .<br><br>You must use the CREATE METHOD statement (see <a href="#">“CREATE METHOD” on page 259</a> ) to create the body for <i>method_name</i> before you can invoke it.                                                                                                                    |      |          |   |   |     |     |
| <i>data_type</i>   SYSUDTLIB.] <i>UDT_name</i>                              | the data type list for the method to be added.                                                                                                                                                                                                                                                                                                                                                                     |      |          |   |   |     |     |
| RETURNS <i>data_type</i>   [SYSUDTLIB.] <i>UDT_name</i>                     | the list of the data types returned by <i>method_name</i> .                                                                                                                                                                                                                                                                                                                                                        |      |          |   |   |     |     |
| LANGUAGE                                                                    | the code for the language in which the external routine for <i>method_name</i> is written.<br><br><table border="1"> <thead> <tr> <th>Code</th><th>Language</th></tr> </thead> <tbody> <tr> <td>C</td><td>C</td></tr> <tr> <td>CPP</td><td>C++</td></tr> </tbody> </table><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Language Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. | Code | Language | C | C | CPP | C++ |
| Code                                                                        | Language                                                                                                                                                                                                                                                                                                                                                                                                           |      |          |   |   |     |     |
| C                                                                           | C                                                                                                                                                                                                                                                                                                                                                                                                                  |      |          |   |   |     |     |
| CPP                                                                         | C++                                                                                                                                                                                                                                                                                                                                                                                                                |      |          |   |   |     |     |

| Syntax element ...                                                 | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |             |     |                                                                                     |            |                                          |
|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------|-----|-------------------------------------------------------------------------------------|------------|------------------------------------------|
| PARAMETER STYLE                                                    | <p>the parameter passing style for <i>method_name</i>.</p> <table> <tr> <th>Parameter Style</th><th>Description</th></tr> <tr> <td>SQL</td><td>allows the code body to indicate NULL data.<br/>This is the default parameter style.</td></tr> <tr> <td>TD_GENERAL</td><td>the code body cannot indicate NULL data.</td></tr> </table> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Parameter Style Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.</p> | Parameter Style | Description | SQL | allows the code body to indicate NULL data.<br>This is the default parameter style. | TD_GENERAL | the code body cannot indicate NULL data. |
| Parameter Style                                                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |             |     |                                                                                     |            |                                          |
| SQL                                                                | allows the code body to indicate NULL data.<br>This is the default parameter style.                                                                                                                                                                                                                                                                                                                                                                                                      |                 |             |     |                                                                                     |            |                                          |
| TD_GENERAL                                                         | the code body cannot indicate NULL data.                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |             |     |                                                                                     |            |                                          |
| [NOT] DETERMINISTIC                                                | <p>whether <i>method_name</i> returns the same results for identical inputs or not. The clause is documentary only.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Deterministic Characteristics Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.</p>                                                                                                                                                                                                 |                 |             |     |                                                                                     |            |                                          |
| NO SQL                                                             | <p>whether SQL language calls are permitted within the user-written external routine for <i>method_name</i>.</p> <p>The only valid specification is NO SQL.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “SQL Data Access Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.</p>                                                                                                                                                                       |                 |             |     |                                                                                     |            |                                          |
| ADD SPECIFIC METHOD<br>[SYSUDTLIB.]<br><i>specific_method_name</i> | to add the specific method named <i>specific_method_name</i> to the definition of the UDT named <i>UDT_name</i> .                                                                                                                                                                                                                                                                                                                                                                        |                 |             |     |                                                                                     |            |                                          |
| <i>data_type</i>   <i>SUSUDTLIB.</i><br><i>UDT_name</i>            | the data type list for the <i>specific_method_name</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |             |     |                                                                                     |            |                                          |
| RETURNS <i>data_type</i>  <br>[SYSUDTLIB.] <i>UDT_name</i>         | the list of the data types returned by <i>method_name</i> .                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |             |     |                                                                                     |            |                                          |
| LANGUAGE                                                           | <p>the code for the language in which the external routine for <i>method_name</i> is written.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Language Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.</p>                                                                                                                                                                                                                                            |                 |             |     |                                                                                     |            |                                          |
| PARAMETER STYLE                                                    | <p>the parameter passing style for <i>method_name</i>.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Parameter Style Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.</p>                                                                                                                                                                                                                                                                            |                 |             |     |                                                                                     |            |                                          |

| Syntax element ...                                                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [NOT] DETERMINISTIC                                                     | <p>whether <i>method_name</i> returns the same results for identical inputs or not. The clause is documentary only.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Deterministic Characteristics Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.</p>                                                                                                                                                                                                                         |
| NO SQL                                                                  | <p>The SQL language call specification for the user-written external routine for <i>method_name</i>.</p> <p>The only valid specification is NO SQL.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “SQL Data Access Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.</p>                                                                                                                                                                                                       |
| DROP [INSTANCE   CONSTRUCTOR] METHOD<br>[SYSUDTLIB.] <i>method_name</i> | <p>to drop the instance or constructor method named <i>method_name</i> from the definition of the UDT named <i>UDT_name</i>.</p> <p>You cannot drop observer or mutator methods.</p> <p>To replace the external routine for a method, use the REPLACE METHOD statement (see “<a href="#">REPLACE METHOD</a>” on page 640).</p> <p>INSTANCE is the default.</p>                                                                                                                                                   |
| <i>data_type</i>   <i>UDT_name</i>                                      | the data type of the attribute to be dropped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| DROP SPECIFIC METHOD<br>[SYSUDTLIB.]<br><i>specific_method_name</i>     | <p>to drop the specific method named <i>specific_method_name</i> from the definition of the UDT named in the FOR <i>UDT_name</i> clause.</p> <p>When you drop a method definition, the system also destroys all files associated with that method.</p> <p>To replace the external routine for a method, use the REPLACE METHOD statement (see “<a href="#">REPLACE METHOD</a>” on page 640).</p>                                                                                                                 |
| <i>data_type</i>   <i>UDT_name</i>                                      | the data type of the attribute to be dropped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| FOR <i>UDT_name</i>                                                     | the name of the UDT from which the association with the specified set of method signatures is to be dropped.                                                                                                                                                                                                                                                                                                                                                                                                     |
| COMPILE                                                                 | <p>to do all of the following things:</p> <ul style="list-style-type: none"> <li>• Recompile the code source for the specified type.</li> <li>• Generate the object code.</li> <li>• Recreate the appropriate .so or .dll file.</li> <li>• Distribute the recreated .so or .dll file to all nodes of the system.</li> </ul> <p>The system replaces the existing type with the recompiled version.</p> <p>Note that you must recompile <i>all</i> UDTs when you upgrade or migrate to Teradata Database 12.0.</p> |

| Syntax element ... | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| COMPILE ONLY       | <p>to do both of the following things:</p> <ul style="list-style-type: none"><li>• Recompile the code source for the specified type.</li><li>• Generate the object code.</li></ul> <p>If you specify COMPILE ONLY, the system does <i>not</i> generate or distribute the .so or .dll file.</p> <p>The system <i>does</i> replace the existing type with the recompiled version.</p> <p>Note that you must recompile <i>all</i> UDTs when you upgrade or migrate to Teradata Database 12.0.</p> |

## ANSI Compliance

ALTER TYPE is ANSI SQL-2003-compliant with Teradata extensions.

## Required Privileges

To add or drop an attribute, you must have the UDTTYPE or UDTMETHOD privilege on the *SYSUDTLIB* database.

To add or drop a method, you must have the UDTMETHOD privilege on the *SYSUDTLIB* database.

## Privileges Granted Automatically

None.

## Example 1: COMPILE Option

The following example recompiles the UDT named *address*, generates the appropriate object code, generates the new .so or .dll library, and redistributes it to all system nodes:

```
ALTER TYPE address COMPILE;
```

## Example 2: COMPILE ONLY Option

The following example recompiles the UDT named *address* and generates the appropriate object code, but does not generate the new .so or .dll library, or redistribute it to all system nodes:

```
ALTER TYPE address COMPILE ONLY;
```

## Example 3

The following example adds an attribute named *country* to the structured UDT named *address*:

```
ALTER TYPE address          /* Add attribute to structured type */  
ADD ATTRIBUTE country VARCHAR(15);
```

## Example 4

The following example adds three attributes named *country*, *continent*, and *zone* to the structured UDT named *address*:

```
ALTER TYPE address      /* Add 3 attributes to structured type */
ADD ATTRIBUTE country   VARCHAR(15),
              continent VARCHAR(20),
              zone      INTEGER;
```

## Example 5

The following example adds two instance methods named *toYen()* and *toPeso()* to the structured UDT named *euro*:

```
ALTER TYPE euro          /* Add 2 original methods */
ADD INSTANCE METHOD
toYen()
  RETURNS yen
  LANGUAGE C
  PARAMETER STYLE SQL
  DETERMINISTIC
  NO SQL,
toPeso()
  RETURNS peso
  LANGUAGE C
  PARAMETER STYLE SQL
  DETERMINISTIC
  NO SQL;
```

## Example 6

The following example adds a new instance method named *toYen()* to the structured UDT named *euro*:

```
ALTER TYPE euro      /* Add original method */
ADD INSTANCE METHOD toYen()
  RETURNS yen
  LANGUAGE C
  PARAMETER STYLE SQL
  DETERMINISTIC
  NO SQL;
```

## Example 7

The following example drops the attribute named *country* from the structured UDT named *address*:

```
ALTER TYPE address      /* Drop attribute of structured type */
DROP ATTRIBUTE country;
```

## Example 8

The following example drops the method having the specific method name *polygon\_mbr* from the structured UDT named *polygon*:

```
ALTER TYPE polygon      /* Drop method */  
DROP SPECIFIC METHOD SYSUDTLIB.polygon_mbr;
```

## Related Topics

The following topics and manual provide additional information about user-defined data types:

- [“ALTER METHOD” on page 19](#)
- [“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120](#)
- [“CREATE CAST/ REPLACE CAST” on page 125](#)
- [“CREATE METHOD” on page 259](#)
- [“CREATE ORDERING/ REPLACE ORDERING” on page 272](#)
- [“CREATE TRANSFORM/ REPLACE TRANSFORM” on page 484](#)
- [“CREATE TYPE \(Structured Form\)” on page 515](#)
- [“DROP AUTHORIZATION” on page 553](#)
- [“DROP CAST” on page 554](#)
- [“DROP ORDERING” on page 577](#)
- [“DROP TRANSFORM” on page 591](#)
- [“DROP TYPE” on page 592](#)
- [“HELP CAST” on page 693](#)
- [“HELP FUNCTION” on page 715](#)
- [“HELP METHOD” on page 735](#)
- [“HELP TRANSFORM” on page 775](#)
- [“HELP TYPE” on page 779](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)

See *SQL Data Control Language* for information about the UDTTYPE, UDTMETHOD, UDTUSAGE, and EXECUTE FUNCTION privileges, particularly as described for the topics “EXECUTE FUNCTION Privilege” and “UDT-Related Privileges” under “GRANT (SQL Form).”

Also see *SQL External Routine Programming* for information about how to write user-defined external routines.

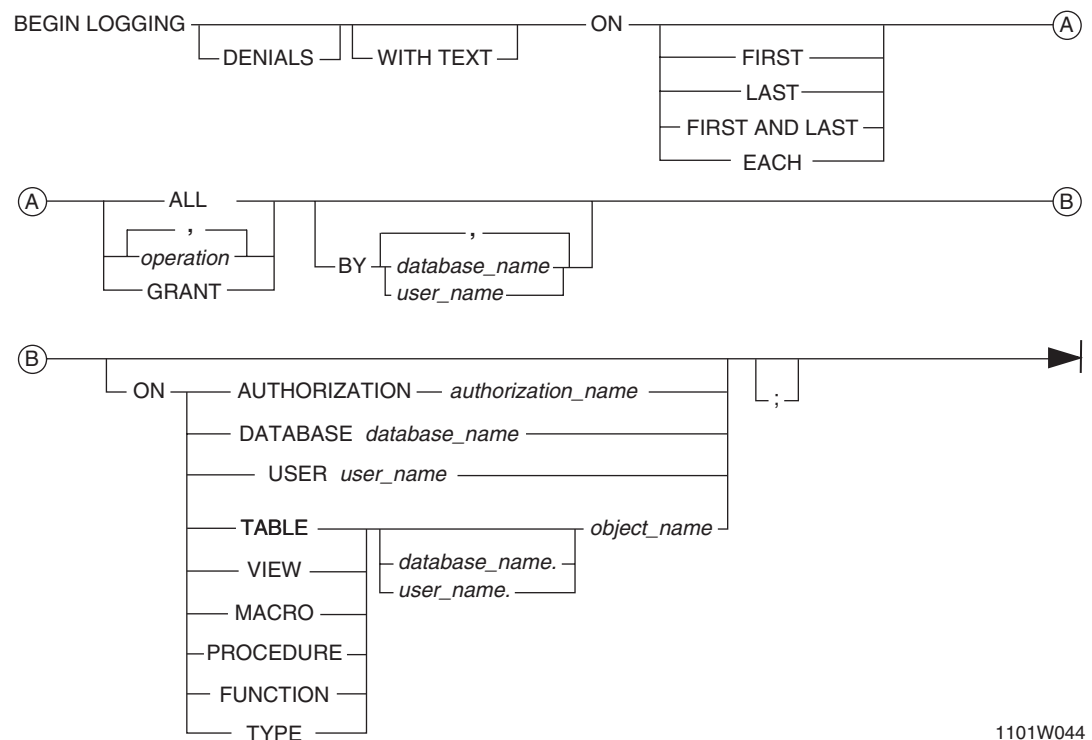
# BEGIN LOGGING

## Purpose

Starts the auditing of SQL requests that attempt to access data.

Also see [“END LOGGING” on page 598](#).

## Syntax



1101W044

where:

| Syntax Element ... | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DENIALS            | <p>that entries should be made only when statement execution fails because the user did not have the privilege(s) necessary to perform the statement.</p> <p>DENIALS is applied to only those actions listed in the <code>BEGIN LOGGING</code> statement that contains it.</p> <p>For example, two <code>BEGIN LOGGING</code> statements can specify the same object, user, and action, but different frequency and DENIALS options. This allows the user to log all denials, but only the first successful use of a privilege.</p> <p>If this option is not specified, a log entry is made if the privilege check either fails or succeeds.</p> |

| Syntax Element ...                                | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |                      |                                                   |                                                               |                                              |               |                |                                                                                                              |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|----------------------|---------------------------------------------------|---------------------------------------------------------------|----------------------------------------------|---------------|----------------|--------------------------------------------------------------------------------------------------------------|
| WITH TEXT                                         | <p>that the text of the statement which caused the log entry is to be saved in the log.</p> <p>If two BEGIN LOGGING statements specify the same user, object, and action, and one of the statements specifies the DENIALS option, then WITH TEXT can be specified on either one of the statements, on both statements, or on neither statement.</p> <table> <tr> <th>IF WITH TEXT is specified ...</th><th>THEN the text is ...</th></tr> <tr> <td>only on the statement that also specifies DENIALS</td><td>saved only when the entry is created as a result of a denial.</td></tr> <tr> <td>either without DENIALS or on both statements</td><td>always saved.</td></tr> <tr> <td>on END LOGGING</td><td>not saved for the specified actions or the DENIALS specification, but the logging frequency is not affected.</td></tr> </table> | IF WITH TEXT is specified ... | THEN the text is ... | only on the statement that also specifies DENIALS | saved only when the entry is created as a result of a denial. | either without DENIALS or on both statements | always saved. | on END LOGGING | not saved for the specified actions or the DENIALS specification, but the logging frequency is not affected. |
| IF WITH TEXT is specified ...                     | THEN the text is ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                               |                      |                                                   |                                                               |                                              |               |                |                                                                                                              |
| only on the statement that also specifies DENIALS | saved only when the entry is created as a result of a denial.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |                      |                                                   |                                                               |                                              |               |                |                                                                                                              |
| either without DENIALS or on both statements      | always saved.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |                      |                                                   |                                                               |                                              |               |                |                                                                                                              |
| on END LOGGING                                    | not saved for the specified actions or the DENIALS specification, but the logging frequency is not affected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                               |                      |                                                   |                                                               |                                              |               |                |                                                                                                              |
| FIRST<br>LAST<br>FIRST AND LAST<br>EACH           | <p>the frequency with which to log events.</p> <p>The default is FIRST.</p> <p>The only valid combination is FIRST AND LAST.</p> <p>A log entry is made for either the first, the last, the first and last, or each time during any session that the specified action is attempted against the specified object.</p> <p>If logging is already begun for an action on an object, a subsequent statement to begin logging for the same object, action, user, and DENIALS specification causes only the current frequency of logging to be changed to whatever the new statement specifies.</p>                                                                                                                                                                                                                                               |                               |                      |                                                   |                                                               |                                              |               |                |                                                                                                              |
| ALL<br><i>operation</i><br>GRANT                  | <p>the events to record in log entries.</p> <p>ALL specifies that a log entry is potentially to be made when any of the actions in the following list is attempted against the specified object.</p> <p>Note that both the name and ID for each column are logged when you log privileges to INSERT, REFERENCES, SELECT, and UPDATE.</p> <p>If logging has begun for ALL actions on an object, a statement to begin or end logging for an action will change logging activity only for the specified action.</p>                                                                                                                                                                                                                                                                                                                           |                               |                      |                                                   |                                                               |                                              |               |                |                                                                                                              |



| Syntax Element ...                              | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ALL<br><i>operation</i><br>GRANT<br>(continued) | <p>One or more action names from the following list can be used to specify the type of access to be logged. These are the same names as those for the statements for which a privilege can be granted.</p> <ul style="list-style-type: none"> <li>• ALTER EXTERNAL PROCEDURE</li> <li>• ALTER FUNCTION</li> <li>• ALTER GROUP<sup>a</sup></li> <li>• ALTER PROCEDURE</li> <li>• CHECKPOINT</li> <li>• CREATE AUTHORIZATION</li> <li>• CREATE DATABASE</li> <li>• CREATE EXTERNAL PROCEDURE</li> <li>• CREATE FUNCTION</li> <li>• CREATE GLOP SET</li> <li>• CREATE GROUP<sup>a</sup></li> <li>• CREATE MACRO</li> <li>• CREATE PROCEDURE</li> <li>• CREATE PROFILE</li> <li>• CREATE ROLE</li> <li>• CREATE TABLE</li> <li>• CREATE TRIGGER</li> <li>• CREATE USER</li> <li>• CREATE VIEW</li> <li>• DATABASE</li> <li>• DELETE</li> <li>• DROP</li> <li>• DROP AUTHORIZATION</li> <li>• DROP DATABASE</li> <li>• DROP FUNCTION</li> <li>• DROP GLOP SET</li> <li>• DROP GROUP<sup>a</sup></li> <li>• DROP MACRO</li> <li>• DROP PROCEDURE</li> <li>• DROP PROFILE</li> <li>• DROP ROLE</li> <li>• DROP TABLE</li> <li>• DROP TRIGGER</li> <li>• DROP USER</li> <li>• DROP VIEW</li> <li>• DUMP</li> <li>• EXECUTE</li> <li>• EXECUTE FUNCTION</li> <li>• EXECUTE PROCEDURE</li> <li>• GRANT</li> <li>• INDEX</li> <li>• INSERT</li> <li>• MACRO</li> <li>• OVERRIDE REPLICATION<sup>b</sup></li> <li>• PROCEDURE</li> <li>• REFERENCES</li> <li>• RESTORE</li> <li>• ROLLBACK DATABASE</li> <li>• ROLLFORWARD DATABASE</li> <li>• SELECT</li> <li>• TABLE</li> <li>• TRIGGER</li> <li>• UDTMETHOD</li> <li>• UDTTYPE</li> <li>• UDTUSAGE</li> <li>• UPDATE</li> <li>• USER</li> <li>• VIEW</li> </ul> <p>The ALL option does <i>not</i> include logging of the following actions because they do not apply to a specific object:</p> <ul style="list-style-type: none"> <li>• CREATE PROFILE</li> <li>• CREATE ROLE</li> <li>• DROP PROFILE</li> </ul> |

| Syntax Element ...                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BY <i>database_name</i>   <i>user_name</i>                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p>the community for which access attempt log entries should be made.</p> <p>If you specify <i>user_name</i>, then the name must refer to a user currently defined to the system.</p> <p>Absence of the BY <i>user_name</i> option specifies <i>all</i> users (those already defined to the system as well as any defined in the future while this logging directive is in effect).</p> <p>If neither BY <i>user_name</i> nor ON keyword <i>object_name</i> are specified, then the specified action is logged for all users and objects throughout the system.</p>                                                                                                      |
| ON                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <p>one or more entities for which log entries are to be made.</p> <p>Absence of the ON keyword <i>object_name</i> option specifies logging of all entities the user attempts to access.</p> <p>If neither ON keyword <i>object_name</i> nor BY <i>user_name</i> is specified, then the specified action is logged for <i>all</i> users and objects throughout the system.</p> <p>The ON keyword <i>object_name</i> option does not apply to the CREATE PROFILE, DROP PROFILE, CREATE ROLE, or DROP ROLE action.</p>                                                                                                                                                      |
| AUTHORIZATION<br><i>authorization_name</i><br>DATABASE <i>database_name</i><br>FUNCTION <i>database_name</i>  <br><i>user_name.function_name</i><br>MACRO <i>database_name</i>  <br><i>user_name.macro_name</i><br>PROCEDURE <i>database_name</i>  <br><i>user_name.stored_procedure_name</i><br>TABLE <i>database_name</i>  <br><i>user_name.table_name</i><br>TYPE SYSUDTLIB.UDT_name<br>USER <i>user_name</i><br>VIEW <i>database_name</i>  <br><i>user_name.view_name</i> | <p>the name of the object to be logged.</p> <p>The keyword AUTHORIZATION, DATABASE, FUNCTION, MACRO, PROCEDURE, TABLE, TYPE, USER, or VIEW must precede each object name.</p> <p>The object name is the name of a database, specific function, macro, procedure, table, user, or view on which logging is to be established.</p> <p>You cannot log hash or join indexes. Instead, establish logging on the base tables they belong to.</p> <p>The name of a function, macro, procedure, table, UDT, user, or view must be qualified by the name of the database or user under which that object is defined. For TYPE, this specification is always <i>SYSUDTLIB</i>.</p> |

- a. ALTER GROUP, CREATE GROUP, and DROP GROUP represent ALTER REPLICATION GROUP, CREATE REPLICATION GROUP, and DROP REPLICATION GROUP, respectively.
- b. OVERRIDE REPLICATION represents SET SESSION OVERRIDE REPLICATION.

## ANSI Compliance

BEGIN LOGGING is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have the EXECUTE privilege on the *DBC.AccLogRule* macro.

## Privileges Granted Automatically

None.

### Example 1

The following example illustrates the use of BEGIN LOGGING:

```
BEGIN LOGGING WITH TEXT ON EACH USER, DATABASE, GRANT;
```

### Example 2: Logging UDTs

This example begins logging all of the following attempts that failed because of insufficient privileges:

- ALTER TYPE
- CREATE CAST
- CREATE ORDERING
- CREATE TRANSFORM
- CREATE TYPE
- DROP CAST
- DROP ORDERING
- DROP TRANSFORM
- DROP TYPE
- REPLACE CAST
- REPLACE ORDERING
- REPLACE TRANSFORM
- method invocation
- NEW specification
- UDT reference

```
BEGIN LOGGING DENIALS ON EACH UDTTYPE;
```

### Example 3

This example is similar to “[Example 2: Logging UDTs](#)” except that the log entries contain the SQL text.

```
BEGIN LOGGING DENIALS WITH TEXT ON EACH UDTTYPE;
```

### Example 4

This example logs the first of the following operations and logs its SQL text:

- ALTER METHOD
- ALTER TYPE
- CREATE CAST
- CREATE METHOD
- CREATE ORDERING
- CREATE TRANSFORM
- CREATE TYPE
- DROP CAST
- DROP METHOD
- DROP ORDERING
- DROP TRANSFORM
- DROP TYPE
- REPLACE CAST
- REPLACE ORDERING
- REPLACE TRANSFORM
- method invocation
- NEW specification
- UDT reference

```
BEGIN LOGGING WITH TEXT ON FIRST UDTMETHOD ON DATABASE SYSUDTLIB;
```

## Example 5

This example begins logging all UDT reference, method invocation, and NEW specification attempts that failed because of insufficient privileges on UDTs within the *SYSUDTLIB* database:

```
BEGIN LOGGING DENIALS ON EACH UDTUSAGE ON DATABASE SYSUDTLIB;
```

## Example 6

This example begins logging all UDT reference, method invocation, and NEW specification attempts that failed because of insufficient privileges on the UDT named *circle*.

```
BEGIN LOGGING DENIALS ON EACH UDTUSAGE ON TYPE SYSUDTLIB.circle;
```

## Related Topics

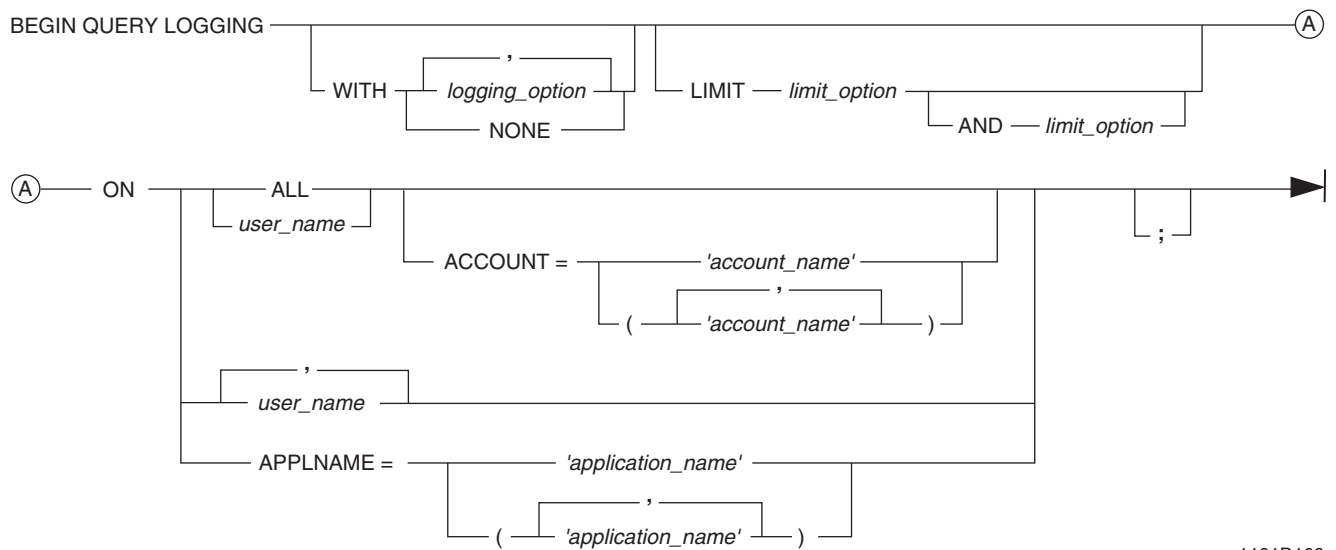
| FOR more about this topic ... | See ...                                                                                                                                                                                               |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| query logging                 | <ul style="list-style-type: none"><li>• <a href="#">“END LOGGING” on page 598</a></li><li>• <i>Database Administration</i></li></ul>                                                                  |
| non-audit query logging       | <ul style="list-style-type: none"><li>• <a href="#">“BEGIN QUERY LOGGING” on page 86</a></li><li>• <a href="#">“END QUERY LOGGING” on page 603</a></li><li>• <i>Database Administration</i></li></ul> |
| external users                | the term EXTUSER in <i>Security Administration</i>                                                                                                                                                    |

# BEGIN QUERY LOGGING

## Purpose

Starts the logging of database query information.

## Syntax



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where:

| Syntax element ...    | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        |             |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>logging_option</i> | <p>options for logging the objects used by a request, the AMP steps produced to perform the query, the EXPLAIN text for the request, the SQL request text, or the optimizer query plan as an XML document.</p> <p>You cannot specify <i>any</i> keyword option for <i>logging_option</i> if you specify either the THRESHOLD keyword or the SUMMARY keyword for <i>limit_option</i>.</p> <p>Specifying any of the logging options can have a performance impact on your system.</p> <p>If you neither specify a logging option nor WITH NONE, then only the default set of query information is logged in a defined default row (see <i>DBC.DBQLogTbl</i> in <i>Data Dictionary</i> for a description of the columns defined for this row) for each request for each specified user.</p> <table><tr><th>Option</th><th>Description</th></tr><tr><td>ALL</td><td><p>Log query object information, step information, EXPLAIN text, and all SQL requests for all logged on users. This is equivalent to specifying OBJECTS, STEPINFO, EXPLAIN, and SQL individually.</p><p>This option does <i>not</i> invoke either the SUMMARY or THRESHOLD limit options.</p><p>If you specify ALL, then you should also specify a value of 0 for SQLTEXT to ensure that the text for the SQL request is not logged in both the <i>DBQLogTbl</i> and <i>DBQLSqlTbl</i> tables.</p><p>If you specify ALL, then you cannot specify other logging options.</p></td></tr><tr><td>EXPLAIN</td><td><p>Log the unformatted EXPLAIN text for the request.</p><p>This option generates and logs the unformatted EXPLAIN text for each request. It does <i>not</i> generate EXPLAIN text for requests preceded by the EXPLAIN request modifier.</p><p>For example, the system does <i>not</i> log EXPLAIN text for the following request:</p><pre>EXPLAIN SELECT *           FROM table_a ; /* EXPLAIN text logging                         does not occur */</pre><p>If you perform the same query <i>without</i> the preceding EXPLAIN modifier, however, the system <i>does</i> log unformatted EXPLAIN text.</p><pre>SELECT * FROM table_a; /* EXPLAIN text logging               does occur */</pre><p>You should be cautious about specifying this option because the performance cost of generating the EXPLAIN text for a query can be expensive.</p></td></tr></table> | Option | Description | ALL | <p>Log query object information, step information, EXPLAIN text, and all SQL requests for all logged on users. This is equivalent to specifying OBJECTS, STEPINFO, EXPLAIN, and SQL individually.</p> <p>This option does <i>not</i> invoke either the SUMMARY or THRESHOLD limit options.</p> <p>If you specify ALL, then you should also specify a value of 0 for SQLTEXT to ensure that the text for the SQL request is not logged in both the <i>DBQLogTbl</i> and <i>DBQLSqlTbl</i> tables.</p> <p>If you specify ALL, then you cannot specify other logging options.</p> | EXPLAIN | <p>Log the unformatted EXPLAIN text for the request.</p> <p>This option generates and logs the unformatted EXPLAIN text for each request. It does <i>not</i> generate EXPLAIN text for requests preceded by the EXPLAIN request modifier.</p> <p>For example, the system does <i>not</i> log EXPLAIN text for the following request:</p> <pre>EXPLAIN SELECT *           FROM table_a ; /* EXPLAIN text logging                         does not occur */</pre> <p>If you perform the same query <i>without</i> the preceding EXPLAIN modifier, however, the system <i>does</i> log unformatted EXPLAIN text.</p> <pre>SELECT * FROM table_a; /* EXPLAIN text logging               does occur */</pre> <p>You should be cautious about specifying this option because the performance cost of generating the EXPLAIN text for a query can be expensive.</p> |
| Option                | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |             |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| ALL                   | <p>Log query object information, step information, EXPLAIN text, and all SQL requests for all logged on users. This is equivalent to specifying OBJECTS, STEPINFO, EXPLAIN, and SQL individually.</p> <p>This option does <i>not</i> invoke either the SUMMARY or THRESHOLD limit options.</p> <p>If you specify ALL, then you should also specify a value of 0 for SQLTEXT to ensure that the text for the SQL request is not logged in both the <i>DBQLogTbl</i> and <i>DBQLSqlTbl</i> tables.</p> <p>If you specify ALL, then you cannot specify other logging options.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |             |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| EXPLAIN               | <p>Log the unformatted EXPLAIN text for the request.</p> <p>This option generates and logs the unformatted EXPLAIN text for each request. It does <i>not</i> generate EXPLAIN text for requests preceded by the EXPLAIN request modifier.</p> <p>For example, the system does <i>not</i> log EXPLAIN text for the following request:</p> <pre>EXPLAIN SELECT *           FROM table_a ; /* EXPLAIN text logging                         does not occur */</pre> <p>If you perform the same query <i>without</i> the preceding EXPLAIN modifier, however, the system <i>does</i> log unformatted EXPLAIN text.</p> <pre>SELECT * FROM table_a; /* EXPLAIN text logging               does occur */</pre> <p>You should be cautious about specifying this option because the performance cost of generating the EXPLAIN text for a query can be expensive.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |             |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

| Syntax element ...                           | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |             |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |                                                                                                                                                                                                                  |          |                                                                                                                              |         |                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------------------------------------------------------------------------------------------------------------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>logging_option</i><br>(continued)<br>NONE | <table> <tr> <th>Option</th><th>Description</th></tr> <tr> <td>OBJECTS</td><td>           Log information about databases, tables, columns, and indexes accessed by SQL requests for the specified user set.<br/><br/>           This option does not log activity for macros or views, nor does it log activity for dictionary tables and columns. For example, CREATE TABLE does not log any objects in the DBQL system because it only generates dictionary objects. Similarly, a query like the following does not log any objects because it only accesses dictionary tables:<br/><br/> <pre>SELECT * FROM DBC.TVFields;</pre> </td></tr> <tr> <td>SQL</td><td>           Log the full text of all SQL requests performed by the specified user set in system table <i>DBQLSqlTbl</i>.<br/><br/>           This option does not log SQL requests within stored procedures, macros, views, or triggers.         </td></tr> <tr> <td>STEPINFO</td><td>Log AMP step-level information for all SQL requests performed by the specified user set in system table <i>DBQLStepTbl</i>.</td></tr> <tr> <td>XMLPLAN</td><td>           Logs the query plan generated by the Optimizer for all SQL DML requests<sup>a</sup> as an XML document in system table <i>DBC.DBQLXMLTbl</i>.<br/><br/>           Because the XML document includes the query and step text, you generally do not need to specify the EXPLAIN and SQL options if you specify XMLPLAN. You should also specify a value of 0 for SQLTEXT to avoid redundant logging when you specify XMLPLAN.         </td></tr> </table> <p>that the specified items do not log DBQL data.</p> <p>You can specify any of the following items with NONE:</p> <ul style="list-style-type: none"> <li>• account:user pair or account:user list</li> <li>• application name or application name list</li> <li>• user name list</li> <li>• ALL:account name</li> <li>• ALL:account name list</li> <li>• ALL (which specifies all accounts)</li> </ul> <p>No additional options are valid if you specify WITH NONE.</p> <p>To eliminate the WITH NONE rule, you must issue an appropriate END QUERY LOGGING request (see <a href="#">“END QUERY LOGGING” on page 603</a>).</p> | Option | Description | OBJECTS | Log information about databases, tables, columns, and indexes accessed by SQL requests for the specified user set.<br><br>This option does not log activity for macros or views, nor does it log activity for dictionary tables and columns. For example, CREATE TABLE does not log any objects in the DBQL system because it only generates dictionary objects. Similarly, a query like the following does not log any objects because it only accesses dictionary tables:<br><br><pre>SELECT * FROM DBC.TVFields;</pre> | SQL | Log the full text of all SQL requests performed by the specified user set in system table <i>DBQLSqlTbl</i> .<br><br>This option does not log SQL requests within stored procedures, macros, views, or triggers. | STEPINFO | Log AMP step-level information for all SQL requests performed by the specified user set in system table <i>DBQLStepTbl</i> . | XMLPLAN | Logs the query plan generated by the Optimizer for all SQL DML requests <sup>a</sup> as an XML document in system table <i>DBC.DBQLXMLTbl</i> .<br><br>Because the XML document includes the query and step text, you generally do not need to specify the EXPLAIN and SQL options if you specify XMLPLAN. You should also specify a value of 0 for SQLTEXT to avoid redundant logging when you specify XMLPLAN. |
| Option                                       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |             |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |                                                                                                                                                                                                                  |          |                                                                                                                              |         |                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| SQL                                          | Log the full text of all SQL requests performed by the specified user set in system table <i>DBQLSqlTbl</i> .<br><br>This option does not log SQL requests within stored procedures, macros, views, or triggers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |             |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |                                                                                                                                                                                                                  |          |                                                                                                                              |         |                                                                                                                                                                                                                                                                                                                                                                                                                  |
| STEPINFO                                     | Log AMP step-level information for all SQL requests performed by the specified user set in system table <i>DBQLStepTbl</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |        |             |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |                                                                                                                                                                                                                  |          |                                                                                                                              |         |                                                                                                                                                                                                                                                                                                                                                                                                                  |
| XMLPLAN                                      | Logs the query plan generated by the Optimizer for all SQL DML requests <sup>a</sup> as an XML document in system table <i>DBC.DBQLXMLTbl</i> .<br><br>Because the XML document includes the query and step text, you generally do not need to specify the EXPLAIN and SQL options if you specify XMLPLAN. You should also specify a value of 0 for SQLTEXT to avoid redundant logging when you specify XMLPLAN.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |             |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |                                                                                                                                                                                                                  |          |                                                                                                                              |         |                                                                                                                                                                                                                                                                                                                                                                                                                  |

| Syntax element ...             | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                |             |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                |                                                       |        |                                    |        |                                                       |       |                                                       |        |                                 |
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| <i>limit_option</i>            | <p>one of the following options for determining various boundary conditions for query logging.</p> <p>Specifying any of the limit options can have a performance impact on your system.</p> <table> <tr> <th>Option</th><th>Description</th></tr> <tr> <td>SQLTEXT[=<i>n</i>]</td><td> <p>Sets the maximum number of SQL text characters to log in the default row. The default value is 200.</p> <p>The value specified cannot be negative. If you specify 0, then no characters are logged.</p> <p>If you specify SQLTEXT without specifying a numeric value to limit the number of characters logged, then the entire SQL request is logged up to a maximum of 10,000 characters in <i>DBQLogTbl</i>. If the request exceeds 10,000 characters, then the excessive characters are not logged.</p> <p>If you specify either ALL or SQL, SQLTEXT is logged redundantly in both <i>DBQLogTbl</i> and <i>DBQLSqlTbl</i>.</p> <p>You should not specify both ALL and SQLTEXT. If you specify ALL, then you should set the value for SQLTEXT to 0; otherwise, the SQL text is redundantly logged in both the <i>DBQLogTbl</i> and <i>DBQLSqlTbl</i> tables.</p> </td></tr> <tr> <td>SUMMARY=<i>n1,n2,n3</i></td><td> <p>Designed for use with short, OLTP-like, queries.</p> <p>Counts the number of requests for a session that fall into each of four time intervals or count ranges. Interval values can be specified in CPU time, normalized CPU time, elapsed seconds, elapsed hundredths of seconds, or I/O counts.</p> <p>If you do not specify a summary unit for the intervals, the default is expressed in elapsed seconds.</p> <p>If you specify SUMMARY, then you cannot specify any other options.</p> <p>You must specify the first three intervals explicitly. The fourth interval is created by default.</p> <table> <tr> <th>The range of this interval ...</th><th>Is from ...</th></tr> <tr> <td>first</td><td>0 to <i>n<sub>1</sub></i> seconds.</td></tr> <tr> <td>second</td><td><i>n<sub>1</sub></i> to <i>n<sub>2</sub></i> seconds.</td></tr> <tr> <td>third</td><td><i>n<sub>2</sub></i> to <i>n<sub>3</sub></i> seconds.</td></tr> <tr> <td>fourth</td><td>&gt; <i>n<sub>3</sub></i> seconds.</td></tr> </table> <p>Counts for each interval are stored in the <i>QueryCount</i> column of four separate rows in <i>DBQLSummaryTbl</i>.</p> <p>SUMMARY is the only option whose cache is flushed at regular, system-defined, intervals.</p> </td></tr> </table> | Option                         | Description | SQLTEXT[= <i>n</i> ] | <p>Sets the maximum number of SQL text characters to log in the default row. The default value is 200.</p> <p>The value specified cannot be negative. If you specify 0, then no characters are logged.</p> <p>If you specify SQLTEXT without specifying a numeric value to limit the number of characters logged, then the entire SQL request is logged up to a maximum of 10,000 characters in <i>DBQLogTbl</i>. If the request exceeds 10,000 characters, then the excessive characters are not logged.</p> <p>If you specify either ALL or SQL, SQLTEXT is logged redundantly in both <i>DBQLogTbl</i> and <i>DBQLSqlTbl</i>.</p> <p>You should not specify both ALL and SQLTEXT. If you specify ALL, then you should set the value for SQLTEXT to 0; otherwise, the SQL text is redundantly logged in both the <i>DBQLogTbl</i> and <i>DBQLSqlTbl</i> tables.</p> | SUMMARY= <i>n1,n2,n3</i> | <p>Designed for use with short, OLTP-like, queries.</p> <p>Counts the number of requests for a session that fall into each of four time intervals or count ranges. Interval values can be specified in CPU time, normalized CPU time, elapsed seconds, elapsed hundredths of seconds, or I/O counts.</p> <p>If you do not specify a summary unit for the intervals, the default is expressed in elapsed seconds.</p> <p>If you specify SUMMARY, then you cannot specify any other options.</p> <p>You must specify the first three intervals explicitly. The fourth interval is created by default.</p> <table> <tr> <th>The range of this interval ...</th><th>Is from ...</th></tr> <tr> <td>first</td><td>0 to <i>n<sub>1</sub></i> seconds.</td></tr> <tr> <td>second</td><td><i>n<sub>1</sub></i> to <i>n<sub>2</sub></i> seconds.</td></tr> <tr> <td>third</td><td><i>n<sub>2</sub></i> to <i>n<sub>3</sub></i> seconds.</td></tr> <tr> <td>fourth</td><td>&gt; <i>n<sub>3</sub></i> seconds.</td></tr> </table> <p>Counts for each interval are stored in the <i>QueryCount</i> column of four separate rows in <i>DBQLSummaryTbl</i>.</p> <p>SUMMARY is the only option whose cache is flushed at regular, system-defined, intervals.</p> | The range of this interval ... | Is from ...                                           | first  | 0 to <i>n<sub>1</sub></i> seconds. | second | <i>n<sub>1</sub></i> to <i>n<sub>2</sub></i> seconds. | third | <i>n<sub>2</sub></i> to <i>n<sub>3</sub></i> seconds. | fourth | > <i>n<sub>3</sub></i> seconds. |
| Option                         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                |             |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                |                                                       |        |                                    |        |                                                       |       |                                                       |        |                                 |
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| The range of this interval ... | Is from ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                |             |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                |                                                       |        |                                    |        |                                                       |       |                                                       |        |                                 |
| first                          | 0 to <i>n<sub>1</sub></i> seconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                |             |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                |                                                       |        |                                    |        |                                                       |       |                                                       |        |                                 |
| second                         | <i>n<sub>1</sub></i> to <i>n<sub>2</sub></i> seconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                |             |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                |                                                       |        |                                    |        |                                                       |       |                                                       |        |                                 |
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| Syntax element ...          | Specifies ...                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                    |             |         |                                                                                                                                                                                                                                                                                                                     |             |                                                                                                                                                                                                                                                                                                                                                    |                   |                                                                                                                                                                                                                      |             |                                                                                                                                                                                                                                                            |         |                                                                                                                 |
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| limit_option<br>(continued) | Option                                                                                                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                    |             |         |                                                                                                                                                                                                                                                                                                                     |             |                                                                                                                                                                                                                                                                                                                                                    |                   |                                                                                                                                                                                                                      |             |                                                                                                                                                                                                                                                            |         |                                                                                                                 |
|                             | SUMMARY= <i>n1,n2,n3</i><br>(continued)                                                                         | <table><tr><th>Option Modifier</th><th>Description</th></tr><tr><td>CPUTIME</td><td>Use this option to set ranges and to summarize counts of the number of requests that fall into a CPU time interval.<br/><br/>The SUMMARY value is expressed in units of 0.01 second.<br/><br/>For example, if you specify 500 for one of the intervals, then the value used to make the determination is 5 CPU seconds.</td></tr><tr><td>CPUTIMENORM</td><td>Use this option to set ranges and to summarize counts of the number of requests that fall into a normalized CPU time interval.<br/><br/>This option is designed for use with coexistence systems to aid in managing mixed nodes more efficiently, but it can be used with any system.<br/><br/>The SUMMARY value is expressed in units of 0.01 second.</td></tr><tr><td><u>ELAPSEDSEC</u></td><td>Use this option to set ranges and to summarize counts of the number of requests that fall into an elapsed time interval.<br/><br/>The SUMMARY value is expressed in units of 1.00 seconds.<br/><br/>This is the default.</td></tr><tr><td>ELAPSEDTIME</td><td>Use this option to set ranges and to summarize counts of the number of requests that fall into an elapsed time interval.<br/><br/>The SUMMARY value is expressed in units of 0.01 second, so it provides finer granularity for elapsed time than ELAPSEDSEC.</td></tr><tr><td>IOCOUNT</td><td>Use this option to set ranges and to summarize counts of the number of requests that fall into an I/O interval.</td></tr></table> | Option Modifier                                                                                                                                                                                                                                                                                                                                    | Description | CPUTIME | Use this option to set ranges and to summarize counts of the number of requests that fall into a CPU time interval.<br><br>The SUMMARY value is expressed in units of 0.01 second.<br><br>For example, if you specify 500 for one of the intervals, then the value used to make the determination is 5 CPU seconds. | CPUTIMENORM | Use this option to set ranges and to summarize counts of the number of requests that fall into a normalized CPU time interval.<br><br>This option is designed for use with coexistence systems to aid in managing mixed nodes more efficiently, but it can be used with any system.<br><br>The SUMMARY value is expressed in units of 0.01 second. | <u>ELAPSEDSEC</u> | Use this option to set ranges and to summarize counts of the number of requests that fall into an elapsed time interval.<br><br>The SUMMARY value is expressed in units of 1.00 seconds.<br><br>This is the default. | ELAPSEDTIME | Use this option to set ranges and to summarize counts of the number of requests that fall into an elapsed time interval.<br><br>The SUMMARY value is expressed in units of 0.01 second, so it provides finer granularity for elapsed time than ELAPSEDSEC. | IOCOUNT | Use this option to set ranges and to summarize counts of the number of requests that fall into an I/O interval. |
|                             |                                                                                                                 | Option Modifier                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Description                                                                                                                                                                                                                                                                                                                                        |             |         |                                                                                                                                                                                                                                                                                                                     |             |                                                                                                                                                                                                                                                                                                                                                    |                   |                                                                                                                                                                                                                      |             |                                                                                                                                                                                                                                                            |         |                                                                                                                 |
|                             |                                                                                                                 | CPUTIME                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Use this option to set ranges and to summarize counts of the number of requests that fall into a CPU time interval.<br><br>The SUMMARY value is expressed in units of 0.01 second.<br><br>For example, if you specify 500 for one of the intervals, then the value used to make the determination is 5 CPU seconds.                                |             |         |                                                                                                                                                                                                                                                                                                                     |             |                                                                                                                                                                                                                                                                                                                                                    |                   |                                                                                                                                                                                                                      |             |                                                                                                                                                                                                                                                            |         |                                                                                                                 |
|                             |                                                                                                                 | CPUTIMENORM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Use this option to set ranges and to summarize counts of the number of requests that fall into a normalized CPU time interval.<br><br>This option is designed for use with coexistence systems to aid in managing mixed nodes more efficiently, but it can be used with any system.<br><br>The SUMMARY value is expressed in units of 0.01 second. |             |         |                                                                                                                                                                                                                                                                                                                     |             |                                                                                                                                                                                                                                                                                                                                                    |                   |                                                                                                                                                                                                                      |             |                                                                                                                                                                                                                                                            |         |                                                                                                                 |
|                             |                                                                                                                 | <u>ELAPSEDSEC</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Use this option to set ranges and to summarize counts of the number of requests that fall into an elapsed time interval.<br><br>The SUMMARY value is expressed in units of 1.00 seconds.<br><br>This is the default.                                                                                                                               |             |         |                                                                                                                                                                                                                                                                                                                     |             |                                                                                                                                                                                                                                                                                                                                                    |                   |                                                                                                                                                                                                                      |             |                                                                                                                                                                                                                                                            |         |                                                                                                                 |
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| ALL                                       | that all users should be logged.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |             |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |                                                                                                                              |                   |                                                                                                             |             |                                                                                                                              |         |                                                                                                             |
| ACCOUNT =<br>' <i>account_name</i> '      | that all users logged on under the specified account name set are to be logged.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                 |             |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |                                                                                                                              |                   |                                                                                                             |             |                                                                                                                              |         |                                                                                                             |
| <i>user_name</i>                          | <p>the name of one or more users for whom SQL query information is to be logged. The maximum number of individual user names you can specify in a single BEGIN QUERY LOGGING request is 100. If you specify BEGIN QUERY LOGGING ON ALL, however, then the system logs each query performed for every user on the system.</p> <p>The more users you specify, the greater the impact on system performance.</p>                                                                                                                                                                                                                                               |                 |             |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |                                                                                                                              |                   |                                                                                                             |             |                                                                                                                              |         |                                                                                                             |
| ACCOUNT =<br>' <i>account_name</i> '      | the set of user account IDs for which SQL query information is to be logged for the specified <i>user_name</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |             |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |                                                                                                                              |                   |                                                                                                             |             |                                                                                                                              |         |                                                                                                             |
| APPLNAME =<br>' <i>application_name</i> ' | <p>that logging is enabled or disabled for any user who logs on under the specified application name set. Application names are the names the system passes in the LogonSource string. They must be enclosed by LEFT and RIGHT PARENTHESIS characters.</p> <p>When you specify a list of application names, each name must be delimited by APOSTROPHE characters and separated by COMMA characters.</p>                                                                                                                                                                                                                                                     |                 |             |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |                                                                                                                              |                   |                                                                                                             |             |                                                                                                                              |         |                                                                                                             |

- a. The XMLPLAN option does not log query plans for EXPLAIN request modifiers, the INSERT EXPLAIN and DUMP EXPLAIN statements, or for any DDL statements.

## ANSI Compliance

BEGIN QUERY LOGGING is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have the EXECUTE privilege on the macro *DBQLAccessMacro* to perform BEGIN QUERY LOGGING.

Example 1: Logging All Users for All Accounts

The following request creates a rule to log default query information on all users and accounts.

```
BEGIN QUERY LOGGING ON ALL;
```

Example 2: Logging Up To 1,000 SQL Text Characters in DBQLogTbl

The following request creates a rule to log query information for AMP steps, database objects, and SQL text up to 1,000 characters on *user\_1*. A request submitted without specifying the SQLTEXT limit logs only 200 characters.

```
BEGIN QUERY LOGGING WITH STEPINFO, OBJECTS LIMIT SQLTEXT=1000  
ON user_1;
```

Example 3: Logging Specific Users

The following request creates a rule to log query information for AMP steps, database objects, and SQL text up to 100 characters for *user\_1* and *user\_2*.

```
BEGIN QUERY LOGGING WITH STEPINFO, OBJECTS LIMIT SQLTEXT=100  
ON user_1, user_2;
```

Example 4: Handling Short Queries

The following request creates a rule to log query information with a SQL text limit for *user\_1* and *user\_2*.

```
BEGIN QUERY LOGGING LIMIT THRESHOLD=4 AND SQLTEXT=100  
ON user_1, user_2;
```

The following table describes the logging behavior for various query completion times with respect to the specified threshold.

| Queries that complete in this many seconds ... | Are logged in this table ...                                                                        |
|------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| ≤ 4                                            | <i>DBQLSummaryTbl</i> .<br>The queries are recorded only as counts in the <i>QueryCount</i> column. |
| > 4                                            | <i>DBQLogTbl</i> .<br>The logged SQL text is limited to 100 characters.                             |

Example 5: Logging All Users Who Are Logged On Under Specific Accounts

The following request creates a rule to log query information for AMP steps, database objects, unformatted EXPLAIN text, the query plan as an XML document, and SQL text for all users logged on under account IDs *account\_1* and *account\_2*.

```
BEGIN QUERY LOGGING WITH STEPINFO, OBJECTS, SQL  
ON ALL ACCOUNT = ('account_1', 'account_2');
```

## Example 6: Logging Queries By Summary Completion Time Full Second Intervals

The following request creates a rule to log counts of the number of queries performed by *user\_1* into the following interval set in *DBQLSummaryTbl*:

- 0 - 1 second
- 1 - 5 seconds
- 5 - 10 seconds
- > 10 seconds

```
BEGIN QUERY LOGGING WITH LIMIT SUMMARY=1,5,10 ELAPSEDSEC ON user_1;
```

## Example 7: Logging Queries by Summary Completion Time Subsecond Intervals

The following request creates a rule to summarize queries for all users into the following subsecond interval set in *DBQLSummaryTbl*:

- 0 - 0.05 seconds
- 0.05 - 0.50 seconds
- 0.50 - 1.00 seconds
- > 1 second

This option allows you to quantify queries in the subsecond range.

```
BEGIN QUERY LOGGING LIMIT SUMMARY=5,50,100 ELAPSEDTIME ON ALL;
```

## Example 8: Another Approach to the Problem of Short Queries Based on CPU Time

An alternative to using simple SUMMARY or THRESHOLD option approaches to dealing with short duration queries is to also specify the CPUTIME option modifier. This permits you to specify a criterion for either counting only or fully logging query information based on the number of CPU seconds required to complete a request.

The following request creates a rule to count the number of queries for *user\_1* during a session that fall into each of the CPU second intervals specified.

```
BEGIN QUERY LOGGING LIMIT SUMMARY=100, 200, 300 CPUTIME ON user_1;
```

CPUTIME intervals are created in units of 0.01 seconds of CPU time, so the intervals this query specifies are the following:

- 0 - 1 CPU seconds
- 1 - 2 CPU seconds
- 2 - 3 CPU seconds
- >3 CPU seconds

The following request creates a rule that says queries in a session for *user\_1* taking less than 100 CPU seconds are to increment the query counter in *DBQLSummaryTbl*, while queries taking more than 100 CPU seconds are to be logged with a complete DBQL entry in *DBQLLogTbl*.

```
BEGIN QUERY LOGGING LIMIT THRESHOLD=100 CPUTIME ON user_1;
```

## Example 9: Another Approach to the Problem of Short Queries Based on I/O Counts

An alternative to using simple SUMMARY OR THRESHOLD option approaches to dealing with short duration queries is to also specify the IOCOUNT option modifier. This permits you to specify a criterion for either counting only or fully logging query information based on the number of disk I/O operations required to complete a request.

The following request creates a rule to count the number of queries for *user\_1* during a session that fall into each of the I/O intervals specified.

```
BEGIN QUERY LOGGING LIMIT SUMMARY=10, 15, 20 IOCOUNT ON user_1;
```

I/O count intervals are created for the number of I/O operations required to complete the query, so the intervals this query specifies are the following:

- 0 - 10 I/Os
- 10 - 15 I/Os
- 15 - 20 I/Os
- >20 I/Os

The following request creates a rule that says queries in a session for *user\_1* making fewer than 10 I/O operations are to increment the query counter, while queries making greater than 10 I/O operations are to be logged with a complete DBQL entry in *DBQLLogTbl*.

```
BEGIN QUERY LOGGING LIMIT THRESHOLD=10 IOCOUNT ON user_1;
```

## Example 10: Logging Queries by Threshold Normalized CPU Times

The following request creates a rule that produces detail logs for all users for any query that uses more than 0.10 seconds of normalized CPU time. Any query that uses less than 0.10 seconds of normalized CPU time is tallied in *DBQLSummaryTbl*. The CPU times are normalized by being weighted by processor speed factors.

```
BEGIN QUERY LOGGING LIMIT THRESHOLD=10 CPUTIMENORM ON ALL;
```

## Example 11

Suppose that the current query logging situation is that all users are logged in the default table. Because the DBA wants to monitor the usage of *myuser* in more detail, she adds another rule for *myuser* that logs STEPINFO and OBJECTS.

The following requests create query logging rules on all users in the default table and specific logging of steps and objects for *myuser*, respectively:

```
BEGIN QUERY LOGGING ON ALL;  
  
BEGIN QUERY LOGGING WITH STEPINFO, OBJECTS ON myuser;
```

## Example 12

Suppose you want to disable logging for any MultiLoad job, but you have a rule for ALL users. To create this rule, you would submit the following request:

```
BEGIN QUERY LOGGING WITH NONE ON APPLNAME = 'MULTLOAD';
```

If you later want to enable logging for MultiLoad jobs, you would submit the following request:

```
END QUERY LOGGING ON APPLNAME = 'MULTLOAD';
```

You must also submit an applicable BEGIN QUERY LOGGING request to enable logging for MultiLoad jobs.

Note that the WITH NONE specification in your BEGIN QUERY LOGGING request creates a rule in *DBQLRuleTbl*, and that rule is removed by submitting an END QUERY LOGGING request.

## Example 13

Suppose you want to log all users for SQL, but you do not want to log any queries from the *myuser2* account 'ABC' pair. In this case, if user *myuser2* submits a request under account 'ABC' DBQL does not log the query. However, if *myuser2* logs on with account 'DEF', then DBQL logs the query and the system captures the SQL text for *myuser2*: 'DEF' in *DBC.DBQLSQLTbl*.

To remove the rule for *myuser2*, you must first submit an END QUERY LOGGING request, even though the rule is to suppress DBQL.

To enable query logging with SQL for all users, but exclude queries for the *myuser2*:*'ABC'* pair, submit the following two BEGIN QUERY LOGGING requests:

```
BEGIN QUERY LOGGING WITH SQL ON ALL;
```

```
BEGIN QUERY LOGGING WITH NONE ON myuser2 ACCOUNT='abc';
```

To then remove the rules you established for logging all user for SQL, but excluding logging of the *myuser2*:*'ABC'* pair, respectively, submit the following two END QUERY LOGGING requests:

```
END QUERY LOGGING ON ALL;
```

```
END QUERY LOGGING ON myuser2 ACCOUNT='ABC';
```

## Example 14

Note how the following sequence of requests invokes DBQL rules. Also note how logging for *myuser2* changes as rules are successively disabled by submitting appropriate END QUERY LOGGING requests:

```
BEGIN QUERY LOGGING WITH SUMMARY = 1,5,10 CPUTIME ON ALL ;
```

This request creates the following rule:

(Rule 1) Summary logging for any user, any account

```
BEGIN QUERY LOGGING WITH SQL ON ALL ACCOUNT='xxx';
```

```
BEGIN QUERY LOGGING WITH NONE ON myuser2 ACCOUNT = 'xxx';
```

These requests create the following two new rules in *DBC.DBQLRuleTbl*:

(Rule 2) Log default information and SQL for any user with specific account 'xxx'

(Rule 3) Do not log for myuser2 with specific account 'xxx'

```
BEGIN QUERY LOGGING WITH SQL, OBJECTS ON myuser2, myuser3;
```

This request creates the following two additional new rules in *DBC.DBQLRuleTbl*:

(Rule 4) Log default, SQL and objects for myuser2, any account

(Rule 5) Log default, SQL and objects for myuser3, any account

Now observe the following query logging behavior that results from these rules:

- 1 User *myuser2* logs on with account 'xxx', so Rule 3 applies and no logging occurs.
- 2 You submit the following END QUERY LOGGING request:

```
END QUERY LOGGING on ALL ACCOUNT='xxx';
```

This request removes Rule 2, but *myuser2*:*'xxx'* continues to use Rule 3.

- 3 You submit the following END QUERY LOGGING request:

```
END QUERY LOGGING myuser2 ACCOUNT='xxx';
```

This request removes Rule 3, so *myuser2*:*'xxx'* begins to log queries using Rule 1 with the summary log instead of using Rule 3 as it had previously.



## Example 15

Suppose you already have a WITH NONE rule in place, but later you decide to create a logging rule for user *myuser2*. To begin, you submit the following BEGIN QUERY LOGGING requests:

```
BEGIN QUERY LOGGING WITH SQL ON ALL;
```

```
BEGIN QUERY LOGGING WITH NONE ON myuser2 ACCOUNT='abc';
```

After some time passes, you decide to create a logging rule for *myuser2* to capture step data in *DBQLStepTbl*.

To do this, you must submit an END QUERY LOGGING request to remove the existing rule before you can add the new rule.

```
END QUERY LOGGING ON myuser2 ACCOUNT='abc';
```

When the END QUERY LOGGING request completes successfully, you can submit the following BEGIN QUERY LOGGING request to create the new rule:

```
BEGIN QUERY LOGGING WITH STEPINFO ON myuser2 ACCOUNT='abc';
```

## Example 16: Logging Query Plans as XML Text

The following request logs the Optimizer query plans of all DML statements performed by user *u1* as XML text in *DBC.DBQLXMLTbl*. Because the XML document contains the full SQL text, a SQLText value of 0 is specified for *limit\_option* to avoid duplicate logging of the query text in *DBC.DBQLLogTbl*.

```
BEGIN QUERY LOGGING WITH XMLPLAN LIMIT SQLTEXT=0 on U1;
```

## Related Topics

See the following for more information about various aspects of query logging:

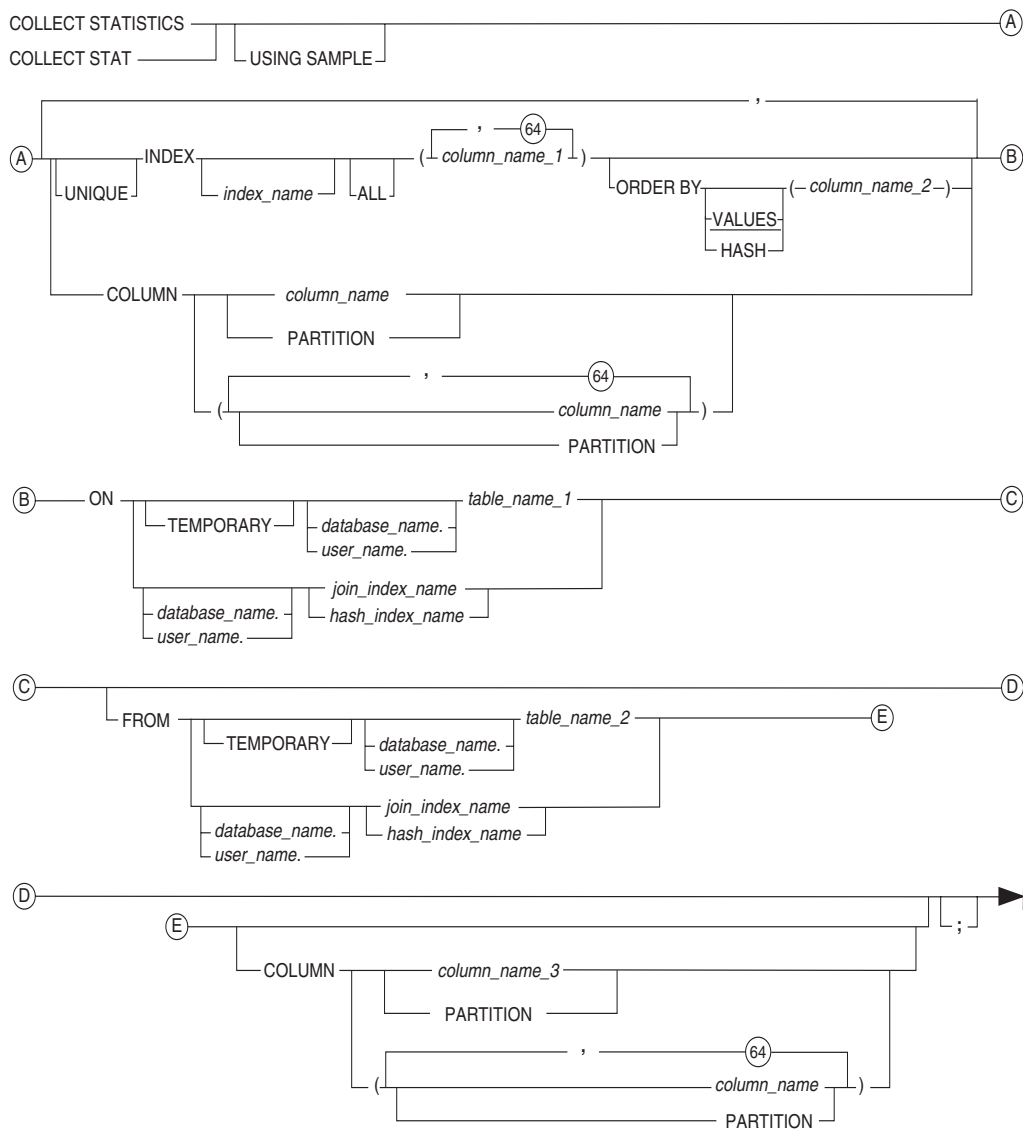
- “DUMP EXPLAIN” in *SQL Data Manipulation Language*
- [“END QUERY LOGGING” on page 603](#)
- “INSERT EXPLAIN” in *SQL Data Manipulation Language*
- “EXPLAIN” in *SQL Data Manipulation Language*
- *Database Administration*
- *Data Dictionary*
- *Utilities*

## COLLECT STATISTICS (Optimizer Form)

### Purpose

Collects demographic data for one or more columns of a table, hash index, or join index, computes a statistical profile of the collected data, stores the synopsis in the data dictionary, and optionally copies the statistics for one or more columns to a duplicate target table. The Optimizer uses the synopsis data when it generates its table access and join plans.

### Syntax (Recommended "CREATE INDEX" Style)



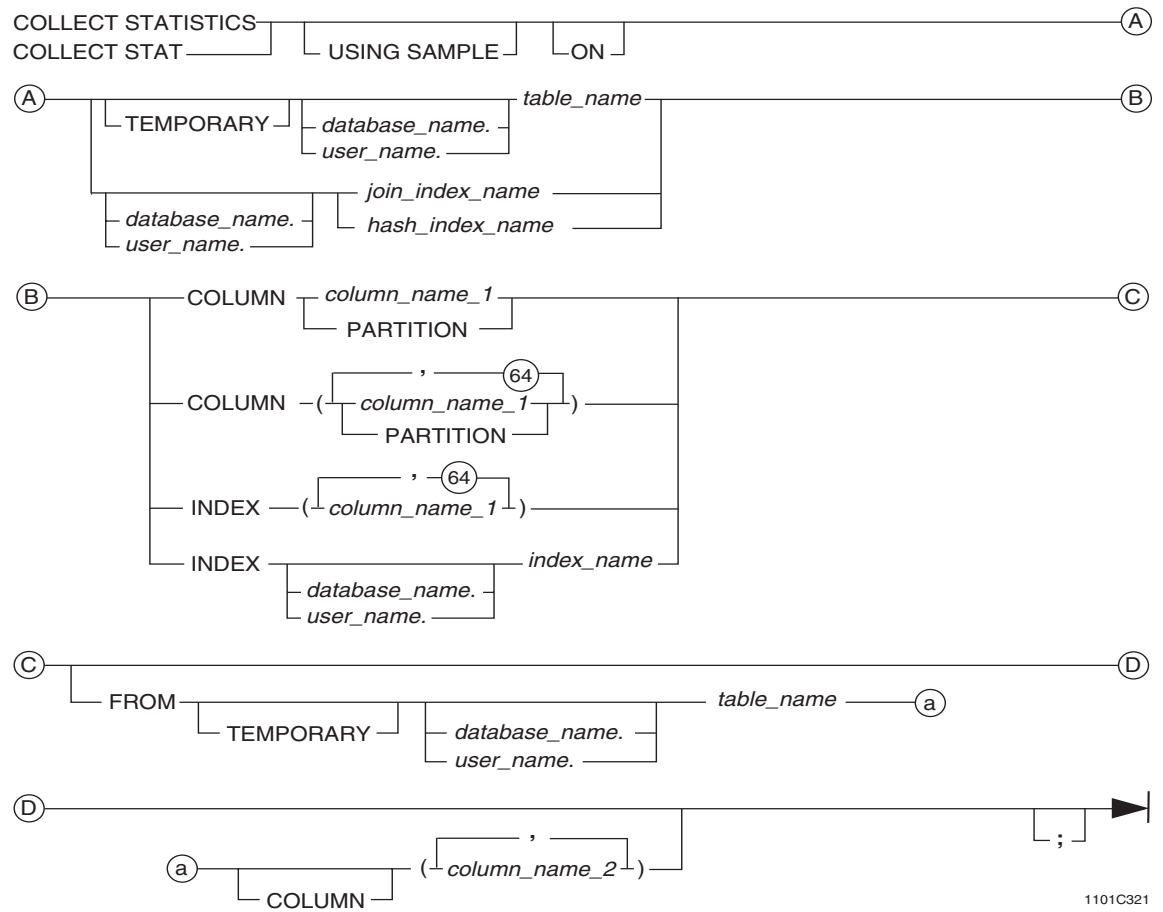
1101C322

where:

| Syntax Element ...   | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| USING SAMPLE         | <p>to scan a system-selected percentage of table rows rather than scanning all rows for a table.</p> <p>You cannot specify a USING SAMPLE clause for a standard recollection of statistics on implicitly specified column and index sets.</p> <p>You cannot specify a USING SAMPLE clause if any <i>column_name</i> in the specified COLUMN set is a member of the partitioning column set for a table or join index defined with a partitioned primary index. This restriction does <i>not</i> apply to collecting sampled statistics on a specified INDEX column set.</p> <p>If sampled statistics have already been collected on such a column and you recollect statistics on it, the system collects <i>full</i> statistics on the column: it does <i>not</i> use sampling to gather the new statistics.</p> <p>This option is ignored for single-column statistics requests for the PARTITION column of a PPI table. Instead, the system automatically increases the percentage to 100 and collects full statistics.</p> <p>You should only use this option for unique or highly singular columns and indexes, or only on extremely large tables. In this case, <i>extremely large</i> means having cardinalities in the tens of billions of rows.</p> <p>See the COLLECT STATISTICS (Optimizer Form) topic “Reducing the Cost of Collecting Statistics by Sampling” in <i>SQL Data Definition Language Detailed Topics</i> for more information.</p> |
| UNIQUE               | the index for which statistics are to be collected is unique.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <i>database_name</i> | the containing database for <i>index_name</i> if something other than the current database.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <i>index_name</i>    | <p>the name of the named index for which statistics are to be collected.</p> <p>Note that you specify column names with a named index only when it is defined with an ORDER BY clause.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| ALL                  | that ALL option was used to create the index.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <i>column_name_1</i> | <p>the names of one or more columns on which the index exists and for which statistics are to be collected.</p> <p>You cannot collect statistics on UDT, Period, or LOB columns.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| ORDER BY             | <p>that an ORDER BY clause was used to create the index.</p> <p>ORDER BY orders the index by the contents of a single column. If you specify ORDER BY but not VALUES or HASH, then VALUES is assumed.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| VALUES               | <p>that the ORDER BY VALUES option was used to create the index.</p> <p>VALUES can order a single numeric column of four bytes or less.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| HASH                 | <p>that the ORDER BY HASH option was used to create the index.</p> <p>HASH hash-orders a single column instead of hash-ordering all columns (the default).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <i>column_name_2</i> | <p>the name of the column on which the index is ordered.</p> <p>If you specify an ORDER BY clause, then you must also specify a <i>column_name_2</i> set.</p> <p>You cannot collect statistics on UDT, Period, or LOB columns.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| COLUMN               | that statistics are to be collected for a column set.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

| Syntax Element ...                    | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>column_name</i>                    | <p>the names of the columns for which statistics are to be collected.</p> <p>The maximum number of columns on which joint statistics can be collected for a single COLLECT STATISTICS request is 64.</p> <p>You cannot collect statistics on UDT, Period, or LOB columns.</p>                                                                                                                                                 |
| PARTITION                             | <p>that statistics are to be collected on the system-derived PARTITION column set for a PPI table.</p> <p>You <i>cannot</i> collect statistics on the system-derived PARTITION#Ln columns.</p>                                                                                                                                                                                                                                |
| TEMPORARY                             | <p>that statistics are to be collected for a materialized global temporary table.</p> <p>This keyword is not valid for permanent tables and if you use it with a table defined as permanent, an error is returned.</p> <p>You <i>cannot</i> collect multicolumn statistics for global temporary tables.</p> <p>You <i>cannot</i> collect system-derived PARTITION or PARTITION#Ln statistics for global temporary tables.</p> |
| <i>database_name</i>                  | the containing database for <i>table_name</i> if something other than the default database.                                                                                                                                                                                                                                                                                                                                   |
| <i>user_name</i>                      | the containing user for <i>table_name</i> if something other than the default user.                                                                                                                                                                                                                                                                                                                                           |
| <i>table_name</i>                     | <p>the name of the table or global temporary table for which column or index statistics are to be collected.</p> <p>You <i>cannot</i> collect statistics on journal tables.</p>                                                                                                                                                                                                                                               |
| <i>database_name</i>                  | the containing database for <i>join_index_name</i> if something other than the default database.                                                                                                                                                                                                                                                                                                                              |
| <i>user_name</i>                      | the containing user for <i>join_index_name</i> if something other than the default user.                                                                                                                                                                                                                                                                                                                                      |
| <i>join_index_name</i>                | the name of the join index for which statistics are to be collected.                                                                                                                                                                                                                                                                                                                                                          |
| <i>database_name</i>                  | the containing database for <i>hash_index_name</i> if something other than the current database.                                                                                                                                                                                                                                                                                                                              |
| <i>user_name</i>                      | the containing user for <i>hash_index_name</i> if something other than the default user.                                                                                                                                                                                                                                                                                                                                      |
| <i>hash_index_name</i>                | the name of the hash index for which statistics are to be collected.                                                                                                                                                                                                                                                                                                                                                          |
| FROM [TEMPORARY]<br><i>table_name</i> | the name of the source table from which statistics are to be copied to the target table.                                                                                                                                                                                                                                                                                                                                      |
| <i>column_name_3</i>                  | the column name set for which statistics are to be copied from the source table to the target table.                                                                                                                                                                                                                                                                                                                          |

## Syntax (Alternate)



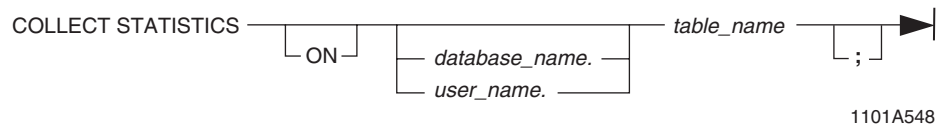
1101C321

where:

| Syntax Element ...     | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| USING SAMPLE           | <p>to scan a system-selected percentage of table rows rather than scanning all rows for a table.</p> <p>You cannot specify a USING SAMPLE clause for a standard recollection of statistics on implicitly specified column and index sets.</p> <p>You cannot specify a USING SAMPLE clause if any <i>column_name</i> in the specified COLUMN set is a member of the partitioning column set for a table defined with a partitioned primary index. This restriction does <i>not</i> apply to collecting sampled statistics on a specified INDEX column set.</p> <p>If sampled statistics have already been collected on such a column and you recollect statistics on it, the system collects <i>full</i> statistics on the column: it does <i>not</i> use sampling to gather the new statistics.</p> <p>This option is ignored for single-column statistics requests for the PARTITION column of a PPI table. Instead, the system automatically increases the percentage to 100.</p> <p>You should only use this option for unique or highly singular columns and indexes, or only on extremely large tables. In this case, <i>extremely large</i> means having cardinalities in the tens of billions of rows.</p> <p>See the COLLECT STATISTICS (Optimizer Form) topic “Reducing the Cost of Collecting Statistics by Sampling” in <i>SQL Data Definition Language Detailed Topics</i> for more information.</p> |
| TEMPORARY              | <p>that statistics are to be collected for a materialized global temporary table.</p> <p>This keyword is not valid for permanent tables and if you use it with a table defined as permanent, an error is returned.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <i>database_name</i>   | the containing database for <i>table_name</i> if something other than the current database.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <i>table_name</i>      | <p>the name of the table or global temporary table for which statistics are to be collected.</p> <p>You <i>cannot</i> collect statistics on journal tables.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>database_name</i>   | the containing database for <i>join_index_name</i> if something other than the current database.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <i>join_index_name</i> | the name of the join index for which statistics are to be collected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <i>database_name</i>   | the containing database for <i>hash_index_name</i> if something other than the current database.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <i>hash_index_name</i> | the name of the hash index for which statistics are to be collected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| COLUMN                 | that statistics are to be collected for the specified column set.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>column_name_1</i>   | <p>the names of the non-indexed columns for which statistics are to be collected.</p> <p>The maximum number of non-indexed columns on which joint statistics can be collected for a single COLLECT STATISTICS request is 64.</p> <p>You cannot collect statistics on UDT, Period, or LOB columns.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| PARTITION              | <p>that statistics are to be collected on the system-derived PARTITION column set for an SLPPI table.</p> <p>You cannot collect statistics on the system-derived PARTITION#Ln columns.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| INDEX                  | that statistics are to be collected for the specified index column set.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <i>column_name</i>     | the names of the index columns for which statistics are to be collected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| Syntax Element ...                    | Specifies ...                                                                                                                       |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>                  | the containing database for <i>index_name</i> if something other than the current database.                                         |
| <i>index_name</i>                     | the name of the index for which statistics are to be collected.<br>When you specify a named index, you do not specify column names. |
| FROM [TEMPORARY]<br><i>table_name</i> | the name of the source table from which statistics are to be copied to the target table.                                            |
| <i>column_name_2</i>                  | the column name set for which statistics are to be copied from the source table to the target table.                                |

## Syntax (Recollect Statistics)



where:

| Syntax element ...                         | Specifies ...                                                                                         |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------|
| <i>database_name</i>  <br><i>user_name</i> | the containing database or user for <i>table_name</i> if different from the current database or user. |
| <i>table_name</i>                          | the name of the table for which all existing statistics are to be recollected.                        |

## ANSI Compliance

COLLECT STATISTICS (Optimizer Form) is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

| To COLLECT STATISTICS on a ...           | You must have STATISTICS, INDEX, or DROP TABLE privileges on ... |
|------------------------------------------|------------------------------------------------------------------|
| permanent or base global temporary table | the table.                                                       |
| materialized global temporary table      | none.                                                            |
| volatile table                           | none.                                                            |
| join index                               | the join index.                                                  |
| hash index                               | the hash index.                                                  |

## Example 1: Collecting Full Statistics

Assuming that an index is defined on the *empno* and *name* columns of the *employee* table, the following requests collect statistics for that index.

```
COLLECT STATISTICS INDEX (empno, name) ON employee;  
  
COLLECT STATISTICS employee INDEX (empno, name);
```

## Example 2: Collecting Sampled Statistics

The following requests are similar to those of “[Example 1: Collecting Full Statistics](#)”, but they collect sampled statistics on the index instead of scanning the entire index.

```
COLLECT STATISTICS USING SAMPLE INDEX (empno, name) ON employee;  
  
COLLECT STATISTICS USING SAMPLE ON employee INDEX (empno, name);
```

## Example 3: Recollecting Statistics

Subsequent entry of the following request on the same table refreshes the statistics for the EmpNo-Name index, along with any other statistics previously collected for the *employee* table, including PARTITION statistics.

```
COLLECT STATISTICS ON employee;  
  
COLLECT STATISTICS employee;
```

## Example 4: Collecting Statistics on Multiple Columns

These requests collect statistics on two columns of *table\_1*.

```
COLLECT STATISTICS ON table_1 COLUMN (column_1, column_2);  
  
COLLECT STATISTICS COLUMN (column_1, column_2) ON table_1;
```

## Example 5: Collecting Single-Column PARTITION Statistics

The following examples collect statistics on the system-derived PARTITION column for the PPI table named *table\_1*.

Even though you have specified sampled statistics for the second example, the system ignores it and uses a value of 100 percent (see the COLLECT STATISTICS (Optimizer Form) topic “Collecting Statistics on the System-Derived PARTITION Column and the Partitioning Column Set of a PPI Table” in *SQL Data Definition Language Detailed Topics*).

```
COLLECT STATISTICS ON table_1 COLUMN PARTITION;  
  
COLLECT STATISTICS USING SAMPLE table_1 COLUMN PARTITION;
```



## Example 6: Collecting Multicolumn PARTITION Statistics

The following example collects multicolumn statistics on the following column set for the *orders* table:

- System-derived PARTITION column
- *quant\_ord*
- *quant\_shpd*

```
COLLECT STATISTICS ON orders
COLUMN (quant_ord, PARTITION, quant_shpd);
```

There is no essential ordering of the column list for multicolumn PARTITION statistics. The PARTITION keyword can be specified at any position in the list; however, the statistics are collected in field ID order, beginning with PARTITION, which always has a field ID of 0.

## Example 7: Named Indexes

This example collects statistics on an index named *unique\_1*.

```
COLLECT STATISTICS INDEX unique_1 ON table_1;

COLLECT STATISTICS ON table_1 INDEX unique_1;
```

## Example 8: Unnamed Indexes

The following example illustrates collecting statistics on an unnamed index that includes the index definition.

```
COLLECT STAT INDEX (field_1,field_2) ON table_1;

COLLECT STAT ON table_1 INDEX (field_1,field_2);
```

## Example 9: Determining When Statistics Are Stale

The following example indicates a possible procedure to determine whether the statistics on a table are stale or relatively current.

Consider the following table definition:

```
CREATE TABLE bpaefeer.taemg22, FALLBACK, (
  m22_m_fer_ff          DECIMAL(10,2) NOT NULL,
  m22_d_fin_validite    DATE FORMAT 'yyyy-mm-dd',
  m22_m_fer_dev         DECIMAL(9,2) NOT NULL,
  m08_c_uic_m08         CHARACTER(2) NOT NULL,
  m22_d_deb_v_id        DATE FORMAT 'yyyy-mm-dd' NOT NULL,
  p66_c_code_id         CHARACTER(8) NOT NULL)
UNIQUE PRIMARY INDEX (m22_d_deb_v_id, p66_c_code_id);
```

The DBA collected statistics on the unique primary index and on each of the two columns making up that index:

```
COLLECT STATISTICS ON bpaefer.taemg22
INDEX (m22_d_deb_v_id, p66_c_code_id);

COLLECT STATISTICS ON bpaefer.taemg22
COLUMN m22_d_deb_v_id;

COLLECT STATISTICS ON bpaefer.taemg22
COLUMN p66_c_code_id;
```

A current check of this table and its statistics reveals the following information:

- An analysis of the current cardinality of statistics for unique indexes made by the following query produced the report that follows:

```
SELECT COUNT(*)
FROM bpaefer.taemg22;
```

```
Count (*)
-----
9203
```

- An analysis of the number of unique values for statistics and their collection dates produced the report that follows:

```
HELP STATISTICS bpaefer.taemg22;

Date Time Unique  Values Column Names
-----
99/11/03 12:39:55 17      M22_D_DEB_V_ID
99/11/03 12:40:09 2,095   P66_C_CODE_ID
99/11/03 13:57:17 2,275   M22_D_DEB_V_ID, P66_C_CODE_ID
```

Note the following items of interest in these reports:

- Statistics have not been collected for several years, which suggests that they are probably stale.
- The last line from the HELP STATISTICS report is the number of rows for the UNIQUE primary index, and therefore reflects the cardinality of the table at the time statistics were last collected.

At that time, there were 2,275 rows in the table.

The current cardinality of the table is 9,203 rows, a 400 percent increase.

- The *M22\_D\_DEB\_V\_ID* column is a DATE, with relatively few unique values. With the fourfold increase in its cardinality, it is almost certain that additional values for this column are now present in the table.

The conclusion to draw from these data is that it is time to recollect the statistics for this table.

Also see *Teradata Statistics Wizard User Guide* and *SQL Request and Transaction Processing* for information about how to determine whether statistics are stale.

## Example 10: Copying Statistics From a Source Table to an Identical Target Table

The following table definition and collected statistics apply to this example:

```

CREATE SET TABLE tab1, NO FALLBACK, NO BEFORE JOURNAL,
                        NO AFTER JOURNAL, CHECKSUM = DEFAULT (
    col1  INTEGER,
    col2  CHARACTER(30) CHARACTER SET LATIN NOT CASESPECIFIC,
    col3  INTEGER,
    col4  DATE FORMAT 'YY/MM/DD',
    col5  INTEGER,
    col6  INTEGER,
    col7  INTEGER,
    col8  INTEGER,
    col9  INTEGER,
    col10 INTEGER)
PRIMARY INDEX (col1)
PARTITION BY RANGE_N(COL10 BETWEEN 1
                      AND 1000
                      EACH 10),

INDEX i1(col4),
UNIQUE INDEX i2(col5, col6),
INDEX i3(col7, col8, col9);

```

The following ten requests collect statistics on each of the ten individual columns of *tab1*:

```

COLLECT STATISTICS ON tab1 COLUMN (col1);

COLLECT STATISTICS ON tab1 COLUMN (col2);

COLLECT STATISTICS ON tab1 COLUMN (col3);

COLLECT STATISTICS ON tab1 COLUMN (col4);

COLLECT STATISTICS ON tab1 COLUMN (col5);

COLLECT STATISTICS ON tab1 COLUMN (col6);

COLLECT STATISTICS ON tab1 COLUMN (col7);

COLLECT STATISTICS ON tab1 COLUMN (col8);

COLLECT STATISTICS ON tab1 COLUMN (col9);

COLLECT STATISTICS ON tab1 COLUMN (col10);

```

These statistics are all stored in the system table *DBC.TVFields*.

The following request collects statistics on the system-defined PARTITION column of *tab1*:

```
COLLECT STATISTICS ON tab1 COLUMN (PARTITION);
```

The PARTITION statistics are also stored in system table *DBC.TVFields*.

The following request collect statistics on the NUPI for *tab1*:

```
COLLECT STATISTICS ON tab1 INDEX (col1);
```

Again, the statistics collected from this request are stored in *DBC.TVFields*.

The following request set shows how you can collect statistics on the single-column NUSI *i1* for *tab1*, either by specifying its name (*i1*) or by specifying its column definition:

```
COLLECT STATISTICS ON tab1 INDEX i1;  
  
or  
  
COLLECT STATISTICS ON tab1 INDEX (col4);
```

As was true for all the previously collected statistics, the statistics collected from this request are stored in *DBC.TVFields* because they are single-column statistics.

The following request set shows how you can collect statistics on the multicolumn NUSI *i2* for *tab1*, either by specifying its name or by specifying its column definition:

```
COLLECT STATISTICS ON tab1 INDEX i2;  
  
or  
  
COLLECT STATISTICS ON tab1 INDEX (col5, col6);
```

The statistics collected by either of these requests are stored in *DBC.Indexes* because they are multicolumn statistics.

The following request set shows how you can collect statistics on the multicolumn NUSI *i3* for *tab1*, either by specifying its name or by specifying its column definition. This set demonstrates how much easier it can be to collect statistics on named indexes when those indexes are defined over multiple columns:

```
COLLECT STATISTICS ON tab1 INDEX i3;  
  
or  
  
COLLECT STATISTICS ON tab1 INDEX (col7, col8, col9);
```

Again, because the statistics collected by these semantically identical requests are stored in *DBC.Indexes* because they are multicolumn statistics.

The following three requests collect statistics on various simple nonindexed multicolumn sets of the columns from *tab1*:

```
COLLECT STATISTICS ON tab1 COLUMN (col1, col2);  
  
COLLECT STATISTICS ON tab1 COLUMN (col7, col8, col9, col10);  
  
COLLECT STATISTICS ON tab1 COLUMN (col8, col10);
```

Once again, the statistics collected by these requests are stored in *DBC.Indexes* because they are multicolumn statistics.

The following request collects statistics on a multicolumn set from *tab1* that includes the system-derived *PARTITION* column:

```
COLLECT STATISTICS ON tab1 COLUMN (PARTITION, col5);
```

As is true for all statistics collected over multiple columns, the statistics collected by this request are stored in *DBC.Indexes*.

Of course, you can recollect all the defined statistics for table *tab1* by submitting the following COLLECT STATISTICS request:

```
COLLECT STATISTICS ON tab1;
```

When you submit this request, the system recollects all of the statistics defined for *tab1* in either *DBC.TVFields* or *DBC.Indexes*, depending on whether the statistics were collected for a single column or over multiple columns.

Given that you have now created table *tab1* and collected a fairly large set of statistics on various sets of its columns, suppose you then create the following structurally identical table, *tab2*:

```
CREATE SET TABLE tab2, NO FALLBACK, NO BEFORE JOURNAL,
                        NO AFTER JOURNAL, CHECKSUM = DEFAULT (
    col1  INTEGER,
    col2  CHARACTER(30) CHARACTER SET LATIN NOT CASESPECIFIC,
    col3  INTEGER,
    col4  DATE FORMAT 'YY/MM/DD',
    col5  INTEGER,
    col6  INTEGER,
    col7  INTEGER,
    col8  INTEGER,
    col9  INTEGER,
    col10 INTEGER)
PRIMARY INDEX (col1)
PARTITION BY RANGE_N(col10 BETWEEN 1
                        AND 1000
                        EACH 10),

INDEX i1(col4),
UNIQUE INDEX i2(col5, col6),
INDEX i3(col7, col8, col9);
```

Because you can use the FROM *source\_table* option if the data in *tab1* and *tab2* is identical, you can copy the statistics that have already been collected for *tab1* in *DBC.TVFields* and *DBC.Indexes* to the statistics for *tab2* in those same system tables, as you can see in the following examples.

In the following three requests, the system enforces the rule that the source and target tables must have identical column attributes.

The first request transfers all collected statistics from *tab1* to *tab2*:

```
COLLECT STATISTICS ON tab2 FROM tab1;
```

The second request copies the collected statistics for *tab1.col7* into *tab2.col7*.

```
COLLECT STATISTICS ON tab2 COLUMN(col7) FROM tab1;
```

The third request copies the collected statistics for *tab1.col9* into *tab2.col9*.

```
COLLECT STATISTICS ON tab2 FROM tab1 COLUMN(col9);
```

In the following variation of the copy statistics syntax, the only requirement is that the column attributes for the specified target table column list, *col8*, must match the attributes of the specified source table column set. In this case, both the source and target columns are defined with the INTEGER data type and with no additional column attributes, so the copy is valid.

```
COLLECT STATISTICS tab2 COLUMN(col8) FROM tab1 COLUMN(col8);
```

Note that the columns do both not need to be named *col8* for the copy to work.

## Related Topics

See the following for more information about collecting Optimizer statistics:

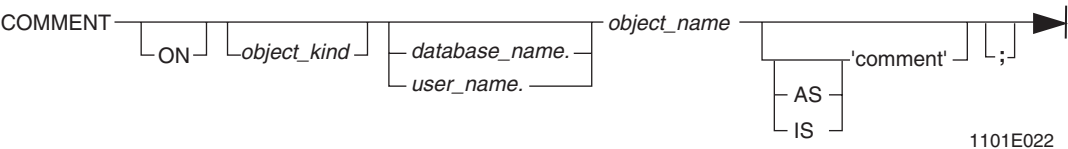
- [“DROP STATISTICS \(Optimizer Form\)” on page 586](#)
- *Database Design*
- *SQL Request and Transaction Processing*
- *Teradata Statistics Wizard User Guide*
- *Teradata Index Wizard User Guide*
- Carrie Ballinger, *Collecting Statistics*, Teradata Database Orange Book 541-0006463
- Online help for Teradata Statistics Wizard
- Online help for Teradata Index Wizard
- Online help for Teradata Manager Statistics Collection module

# COMMENT (Comment Placing Form)

## Purpose

Creates a user-defined description of a user-defined database object or definition in the data dictionary.

## Syntax



where:

| Syntax Element ...   | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>object_kind</i>   | an optional database object kind specification. <sup>a</sup><br>The following database object kinds are valid: <ul style="list-style-type: none"><li>• COLUMN</li><li>• DATABASE</li><li>• FUNCTION</li><li>• GLOP SET</li><li>• GROUP</li><li>• MACRO</li><li>• METHOD</li><li>• PROCEDURE</li><li>• PROFILE</li><li>• ROLE</li><li>• TABLE</li><li>• TRIGGER</li><li>• TYPE</li><li>• USER</li><li>• VIEW</li></ul> |
| <i>database_name</i> | the containing database for <i>object_name</i> if it is not contained by the current database.                                                                                                                                                                                                                                                                                                                        |

| Syntax Element ...                                                                                                                                                                | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                   |                                                                                                                                                                                |          |                                                                           |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                   |                                                                                                                                                                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------------------------------------------------------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>object_name</i>                                                                                                                                                                | <p>the name of the object to be commented on or for which a comment is to be retrieved.</p> <p>The specified object can be any of the following:</p> <ul style="list-style-type: none"><li>• A parameter in a macro, stored procedure, or user-defined function.</li><li>• A column in a user base table or view.</li><li>• A specific function, macro, profile, role, stored procedure, base table, trigger, or view name contained by a database or user.</li><li>• A database or user.</li><li>• A replication group.</li><li>• A UDT.</li></ul> <p>You can add a comment to a particular attribute of a structured UDT by specifying <i>database_name.udt_name.attribute_name</i>.</p> <ul style="list-style-type: none"><li>• A method.</li></ul> <p>If you specify a method, you must use its specific method name.</p> <ul style="list-style-type: none"><li>• A GLOP set.</li></ul> <p>If no object kind keyword precedes the object name, then the system attempts to deduce the object from the level of qualification in the name. Use the fully qualified name if there is any ambiguity.</p> <p>Let <i>x.y.z</i> indicate the qualification hierarchy, with <i>x</i> being the highest, or more granular, level and <i>z</i> the lowest, or least granular. The following table describes the objects implied by the various qualification levels:</p> <table><tr><th>IF you specify this hierarchy level ...</th><th>THEN the specified object is implied to be one of the following ...</th></tr><tr><td><i>x</i></td><td><ul style="list-style-type: none"><li>• database</li><li>• user</li></ul></td></tr><tr><td><i>x.y</i></td><td><table><tr><td><ul style="list-style-type: none"><li>• base table</li><li>• error table</li><li>• GLOP set</li><li>• hash index</li><li>• join index</li><li>• macro</li><li>• profile</li></ul></td><td><ul style="list-style-type: none"><li>• replication group</li><li>• role</li><li>• stored procedure</li><li>• trigger</li><li>• user-defined function</li><li>• view</li></ul></td></tr></table><p>within database or user <i>x</i>.</p></td></tr></table> | IF you specify this hierarchy level ...                                                                                                                                           | THEN the specified object is implied to be one of the following ...                                                                                                            | <i>x</i> | <ul style="list-style-type: none"><li>• database</li><li>• user</li></ul> | <i>x.y</i> | <table><tr><td><ul style="list-style-type: none"><li>• base table</li><li>• error table</li><li>• GLOP set</li><li>• hash index</li><li>• join index</li><li>• macro</li><li>• profile</li></ul></td><td><ul style="list-style-type: none"><li>• replication group</li><li>• role</li><li>• stored procedure</li><li>• trigger</li><li>• user-defined function</li><li>• view</li></ul></td></tr></table> <p>within database or user <i>x</i>.</p> | <ul style="list-style-type: none"><li>• base table</li><li>• error table</li><li>• GLOP set</li><li>• hash index</li><li>• join index</li><li>• macro</li><li>• profile</li></ul> | <ul style="list-style-type: none"><li>• replication group</li><li>• role</li><li>• stored procedure</li><li>• trigger</li><li>• user-defined function</li><li>• view</li></ul> |
| IF you specify this hierarchy level ...                                                                                                                                           | THEN the specified object is implied to be one of the following ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                   |                                                                                                                                                                                |          |                                                                           |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                   |                                                                                                                                                                                |
| <i>x</i>                                                                                                                                                                          | <ul style="list-style-type: none"><li>• database</li><li>• user</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                   |                                                                                                                                                                                |          |                                                                           |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                   |                                                                                                                                                                                |
| <i>x.y</i>                                                                                                                                                                        | <table><tr><td><ul style="list-style-type: none"><li>• base table</li><li>• error table</li><li>• GLOP set</li><li>• hash index</li><li>• join index</li><li>• macro</li><li>• profile</li></ul></td><td><ul style="list-style-type: none"><li>• replication group</li><li>• role</li><li>• stored procedure</li><li>• trigger</li><li>• user-defined function</li><li>• view</li></ul></td></tr></table> <p>within database or user <i>x</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>• base table</li><li>• error table</li><li>• GLOP set</li><li>• hash index</li><li>• join index</li><li>• macro</li><li>• profile</li></ul> | <ul style="list-style-type: none"><li>• replication group</li><li>• role</li><li>• stored procedure</li><li>• trigger</li><li>• user-defined function</li><li>• view</li></ul> |          |                                                                           |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                   |                                                                                                                                                                                |
| <ul style="list-style-type: none"><li>• base table</li><li>• error table</li><li>• GLOP set</li><li>• hash index</li><li>• join index</li><li>• macro</li><li>• profile</li></ul> | <ul style="list-style-type: none"><li>• replication group</li><li>• role</li><li>• stored procedure</li><li>• trigger</li><li>• user-defined function</li><li>• view</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                   |                                                                                                                                                                                |          |                                                                           |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                   |                                                                                                                                                                                |



| Syntax Element ...                | Specifies ...                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>object_name</i><br>(continued) | IF you specify this hierarchy level ...                                                                                                                                                                                                                                                               | THEN the specified object is implied to be one of the following ...                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                   | <i>x.y.z</i>                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>• table column</li> <li>• view column</li> <li>• user-defined function parameter</li> <li>• macro parameter</li> <li>• stored procedure parameter</li> <li>• structured UDT attribute</li> </ul> <p>within GLOP set, UDF, UDT, macro, stored procedure, profile, role, base table, trigger, or view <i>y</i> which, in turn, is within database or user <i>x</i>.<br/>Replication groups do not have <i>z</i>-level components.</p> |
| AS<br>IS                          | an optional keyword that introduces a clause defining a comment string.                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <i>'comment'</i>                  | <p>the commentary on or description of the object name.</p> <p>Maximum string length is 255 characters from any supported client character sets.</p> <p>An existing string can be changed by specifying a new string.</p> <p>If no string is specified, any string previously stored is returned.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

- a. The valid specifications for *object\_kind* are not all database objects. Triggers, views, and replication groups, for example, are definitions of actions or conceptual groups rather than database objects.

## ANSI Compliance

COMMENT is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

The following privileges are required to place a COMMENT:

| IF you want to do this ...                                                                            | THEN you must have this privilege ...                                                                                                 |
|-------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Create or replace a comment on an object or definition other than a replication group, UDT, or method | DROP on the object.<br>If the object is a column, then you must have the DROP privilege on the object in which the column is defined. |
| Create or replace a comment on a replication group definition                                         | REPLCONTROL.                                                                                                                          |
| Create or replace a comment on a method                                                               | UDTMETHOD on the <i>SYSUDTLIB</i> database.                                                                                           |
| Create or replace a comment on a user-defined data type                                               | UDTTYPE on the <i>SYSUDTLIB</i> database.                                                                                             |
| Create or replace a comment on a GLOP                                                                 | DROP GLOP.                                                                                                                            |

## Privileges Granted Automatically

None.

## Example 1: Placing a Comment

The following request can be used to specify a description of the *name* column in the *employee* table, which is assumed to be in the current database by default because *employee* is not qualified with a database name:

```
COMMENT ON COLUMN employee.name
IS 'Employee name, last name followed by first initial';
```

## Function Definition for Examples 2 and 3

Assume the following UDF definition for “[Example 2](#)” and “[Example 3](#)”:

```
CREATE FUNCTION Find_Text
( Searched_String VARCHAR(500), Pattern VARCHAR(500) )
RETURNS CHAR
LANGUAGE C
NO SQL
EXTERNAL
PARAMETER STYLE SQL;
```

## Example 2

The following request places a comment on the parameter pattern of the user-defined function *Find\_text*:

```
COMMENT ON COLUMN Find_text.Pattern
IS 'The pattern matching string';
```

### Example 3

The following request places a comment on the definition of the user-defined function *Find\_text*:

```
COMMENT ON FUNCTION Find_text
IS 'Text search function';
```

### Example 4

Suppose you have a hash index named *OrdHIdx* defined on the *orders* table in the *accounting* database.

You could type the following request to define a comment on the hash index *OrdHIdx*:

```
COMMENT accounting.OrdHIdx AS 'hash index on Orders';
```

### Example 5

The following request places a comment on the replication group definition named *receivables\_group*:

```
COMMENT ON GROUP receivables_group AS
'This is the group for receivables';
```

## UDT and UDM Definitions for Examples 6 and 7

Suppose you have the following UDT and UDM definitions:

```
CREATE TYPE address AS (
    street VARCHAR(20),
    zip CHARACTER(5) )
NOT FINAL
CONSTRUCTOR METHOD address( A VARCHAR(20), B CHARACTER(5) )
RETURNS address
SPECIFIC address_constructor_1
SELF AS RESULT
LANGUAGE C
PARAMETER STYLE SQL
DETERMINISTIC
NO SQL;

CREATE CONSTRUCTOR METHOD address( VARCHAR(20), CHARACTER(5) )
RETURNS address
FOR address
EXTERNAL NAME
'SO!C:\structured_lib\addr_cons.obj!F!addr_constructor';
```

The following example set shows how to place comments on a UDT or method:

- [“Example 6: Commenting on a UDT Definition” on page 117](#) shows how to place a comment on the address type definition.
- [“Example 7: Commenting on a UDM Definition” on page 117](#) shows how to place a comment on the constructor method definition having the specific method name *address\_constructor\_1*.

## Example 6: Commenting on a UDT Definition

The following request places a comment on the UDT named *address*:

```
COMMENT ON TYPE address
AS    'Type containing the Street Address and Zipcode' ;
```

## Example 7: Commenting on a UDM Definition

The following request places a comment on the constructor method named *address\_constructor\_1*:

```
COMMENT ON METHOD address_constructor_1
AS    'Constructor for the Address UDT' ;
```

The method name specification must be the *specific* name of the method.

## Related Topics

See “COMMENT (Comment-Returning Form)” in *SQL Data Manipulation Language* for information about the comment returning form of the COMMENT statement.





## CHAPTER 2 **CREATE AUTHORIZATION - CREATE GLOP SET**

---

DDL statements define, modify, and remove database object definitions.

This chapter documents the syntax for, and provides examples of, the Teradata Database DDL statements from CREATE AUTHORIZATION to CREATE GLOP SET.

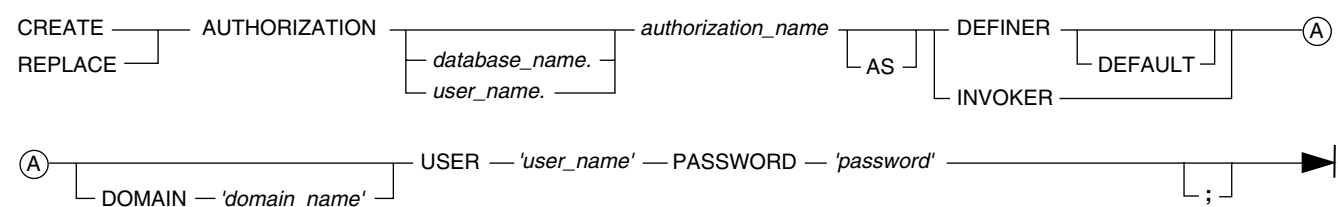
# CREATE AUTHORIZATION/ REPLACE AUTHORIZATION

## Purpose

Creates the definition for an authorization object.

Authorization definitions make an association between a database user and an OS platform user identification, allowing an external routine<sup>1</sup> to run in secure mode using the context, privileges, and access control accrued to the specified OS user.

## Syntax



1101C227

where:

| Syntax element ...           | Specifies ...                                                                                                                                      |                                                                                           |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| database_name  <br>user_name | the optional name of a database or user other than the current or default in which the authorization being defined or replaced is to be contained. |                                                                                           |
|                              | IF you specify this authorization option ...                                                                                                       | THEN database_name   user_name must be the ...                                            |
|                              | DEFINER                                                                                                                                            | containing database or user for the UDF, table UDF, method, or external stored procedure. |
|                              | INVOKER                                                                                                                                            | user logon database or user.                                                              |

1. *External routine* is a generic term for UDFs, table UDFs, UDMs, and external stored procedures.



| Syntax element ...        | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>authorization_name</i> | <p>a name to be used for this authorization so it can be invoked within an external routine definition (see <a href="#">“CREATE FUNCTION/ REPLACE FUNCTION” on page 138</a>, <a href="#">“CREATE FUNCTION (Table Form)” on page 161</a>, <a href="#">“CREATE METHOD” on page 259</a>, and <a href="#">“CREATE PROCEDURE (External Form)/ REPLACE PROCEDURE (External Form)” on page 276</a>).</p> <p>The following rules apply to authorization names:</p> <ul style="list-style-type: none"> <li>• A database can have only one INVOKER authorization name.</li> <li>• A database can have only one default DEFINER authorization name.</li> <li>• A database can have many non-default DEFINER authorization names.</li> </ul> <p>Because authorizations are database objects, the specified authorization name must be unique within its containing database.</p>                                                                                              |
| DEFINER                   | <p>a keyword that associates an external routine with an operating system platform user to the database that contains the external routine.</p> <p>If you specify DEFINER, then <i>database_name</i> or <i>user_name</i> must be the containing database or user for the external routine.</p> <p>You can specify either a DEFINER or an INVOKER, but not both.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| DEFAULT                   | <p>an optional keyword modifier for the DEFINER keyword that associates this authorization with all external routines that do not specify the authorization name in the EXTERNAL SECURITY DEFINER clause of the following statements:</p> <ul style="list-style-type: none"> <li>• CREATE/REPLACE FUNCTION (see <a href="#">“CREATE FUNCTION/ REPLACE FUNCTION” on page 138</a>).</li> <li>• CREATE/REPLACE FUNCTION (Table Form) (see <a href="#">“CREATE FUNCTION (Table Form)” on page 161</a>).</li> <li>• CREATE PROCEDURE (External Form) (see <a href="#">“CREATE PROCEDURE (External Form)/ REPLACE PROCEDURE (External Form)” on page 276</a>).</li> </ul> <p>You can assign only one default DEFINER object per database. All others must have specific definer names.</p> <p>If a default DEFINER already exists for the current or specified database, the system aborts the CREATE AUTHORIZATION request and returns a message to the requestor.</p> |
| INVOKER                   | <p>a keyword that associates an operating system user to the database user who invokes the external routine.</p> <p>If you specify INVOKER, then <i>database_name</i> or <i>user_name</i> must be the logon database or user for the user.</p> <p>You can assign only one INVOKER authorization name per database.</p> <p>You can specify either a DEFINER or an INVOKER, but not both.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

| Syntax element ... | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DOMAIN             | <p>a keyword that specifies that the single-quoted text string that follows is the name of the operating system domain to which the specified user belongs.</p> <p>The domain clause has the following characteristics:</p> <ul style="list-style-type: none"> <li>It is mandatory for Windows systems.</li> <li>It is <i>not</i> used by UNIX and Linux systems.<br/>If you specify a domain clause for a UNIX system, it is ignored.</li> <li>It is a Windows-specific operating system term that has nothing to do with the domains used in database management systems, where the term relates to a set of valid value ranges for a column as specified by a predefined data type or UDT (see <i>Database Design</i> for more information about relational domains).</li> </ul> |
| 'domain_name'      | <p>the single-quoted name of the Windows operating system domain to which the specified user belongs.</p> <p>If the user does not have a domain, then specify an empty string, for example DOMAIN ''.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| USER               | a keyword that specifies that the single-quoted text string that follows is the name of the operating system user to whom this authorization applies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 'user_name'        | the single-quoted name of the operating system user being assigned an authorization name.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| PASSWORD           | a keyword that specifies that the single-quoted text string that follows is the name of the operating system platform password assigned to <i>user_name</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 'password'         | <p>the single-quoted operating system platform password associated with <i>user_name</i>.</p> <p>The password is used to authenticate the user when the secure server process is created. Best practices suggest that any session that uses this statement should be set up to use the encrypted transport protocol (see <i>Security Administration</i> for details).<sup>a</sup></p>                                                                                                                                                                                                                                                                                                                                                                                               |

- a. While it is never desirable for a password to be typed in the clear, it only becomes an issue when you enter your password using an interface such as BTEQ. The issue becomes moot if you are prompted to enter your password by an application that requests the information in a secure manner such as a GUI or World Wide Web interface that displays ASTERISK characters to represent the password as it is typed. This is the recommended practice for all security conscious sites.

## ANSI Compliance

CREATE AUTHORIZATION is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have either the CREATE/REPLACE AUTHORIZATION or AUTHORIZATION privilege to perform the CREATE/REPLACE AUTHORIZATION statement.

## Privileges Granted Automatically

DROP AUTHORIZATION to the creator of the authorization.

### Example 1

This example creates an INVOKER authorization object with the name *sales* for the domain *eastsales*, the user name *sam johnson*, and the user password *tercesym*.

```
CREATE AUTHORIZATION sales AS INVOKER
  DOMAIN 'eastsales'
  USER 'sam johnson'
  PASSWORD 'tercesym';
```

The system uses this OS platform user context to execute all external routines that contain an EXTERNAL SECURITY INVOKER clause when invoked by the database user that created this authorization.

### Example 2

The following example creates a DEFINER authorization object with the name *sales\_processing* for the domain *DistrictA*, the user name *salesmng*, and the user password *mysecret*.

```
CREATE AUTHORIZATION sales_processing AS DEFINER
  DOMAIN 'DistrictA'
  USER 'salesmng'
  PASSWORD 'mysecret';
```

The system uses this OS platform user context to execute all external routines that contain an EXTERNAL SECURITY DEFINER clause when run under the same OS user authorization independent of the user who runs the routine.

### Example 3

This example creates a definer authorization with the name *accounting* in the *SYSLIB* database for the client user name *accdept* and user password *nesuahkcotsk*.

```
CREATE AUTHORIZATION SYSLIB.accounting AS DEFINER DEFAULT
  USER 'accdept'
  PASSWORD 'nesuahkcotsk';
```

The example associates *accounting* as the DEFAULT authorization in the *SYSLIB* database with the specified client user name *accdept*.

Because *accdept* is the DEFAULT authorization object, the system associates it with all external routines that contain the EXTERNAL SECURITY DEFINER clause. All external routines in database *SYSLIB* that contain an EXTERNAL SECURITY DEFINER clause are executed using the user context defined by this statement.

Recall that there can only be one default definer object in a database. All others must have specific names. If the DEFAULT already exists, this statement aborts and returns an error to the requestor.

## Example 4

This example creates a specific definer authorization name *sales* with all external routines that contain the external security clause `EXTERNAL SECURITY DEFINER sales`. The authorization object name *sales* is part of the text specified for the external security clause. This specification causes the system to validate the authorization object *SYSLIB.sales* in the data dictionary and then, once it has been validated, to use the specified user context to run the external routine.

```
CREATE AUTHORIZATION SYSLIB.sales AS DEFINER
  USER 'SalesDept'
  PASSWORD 'ikcerednep';
```

## Related Topics

The following topics document the `EXTERNAL SECURITY` clause for the various external routine types:

- For UDFs, see the `CREATE FUNCTION/REPLACE FUNCTION` topic “EXTERNAL SECURITY CLAUSE” in *SQL Data Definition Language Detailed Topics*.
- For external stored procedures, see the `CREATE PROCEDURE (External Form)/REPLACE PROCEDURE (External Form)` topic “EXTERNAL SECURITY CLAUSE” in *SQL Data Definition Language Detailed Topics*.
- For UDMs, see the `CREATE METHOD` topic “EXTERNAL SECURITY Clause” in *SQL Data Definition Language Detailed Topics*.

See [“DROP AUTHORIZATION” on page 553](#) for information about dropping the definition for an authorization object.

See [“CREATE FUNCTION/ REPLACE FUNCTION” on page 138](#), [“CREATE FUNCTION \(Table Form\)” on page 161](#), and [“CREATE PROCEDURE \(External Form\)/ REPLACE PROCEDURE \(External Form\)” on page 276](#) for information about how authorization objects are used with external UDFs and stored procedures.

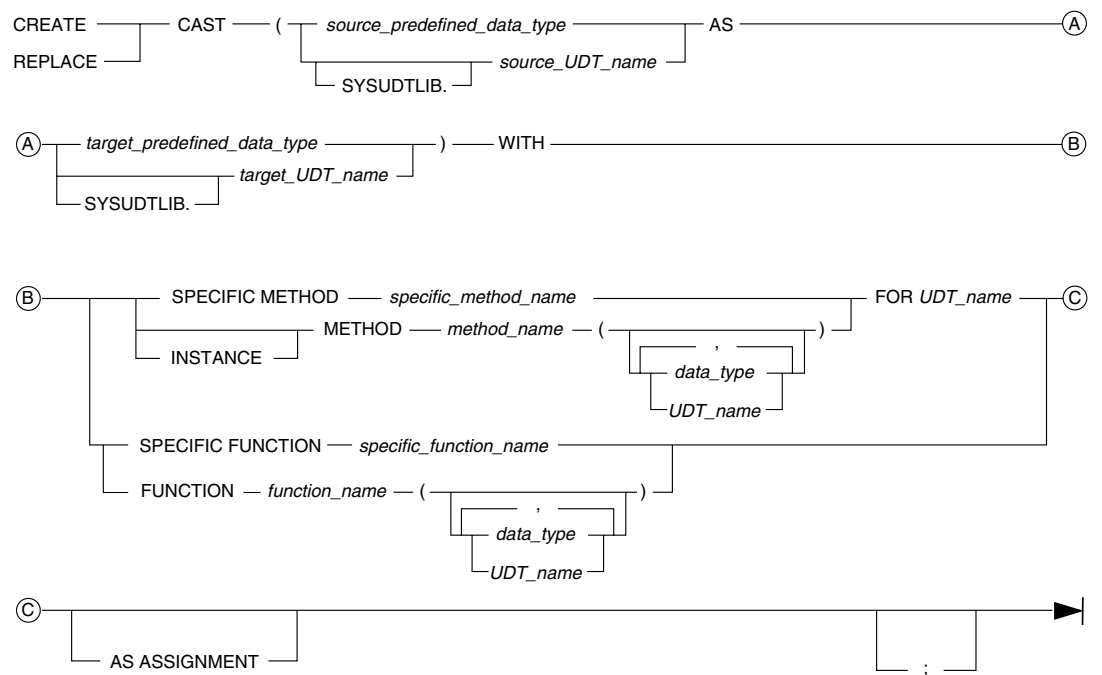
See the `cufconfig` utility in *Utilities* for information about how to configure external routine server processes and how to alter secure group membership.

# CREATE CAST/ REPLACE CAST

## Purpose

Creates or replaces a cast operation for a UDT.

## Syntax



1101A358

where:

| Syntax element ...      | Specifies ...                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>source_data_type</i> | <p>either a structured or distinct UDT or any valid predefined data type.</p> <p>Either <i>source_data_type</i> or <i>target_data_type</i> or both <i>must</i> be a UDT.</p> <p>If <i>source_data_type</i> is a predefined data type, then its cast routine must be a cast function (see “SPECIFIC FUNCTION <i>specific_function_name</i>” in this table).</p> |

| Syntax element ...                                                                                                 | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>target_data_type</i>                                                                                            | either a structured or distinct UDT or any valid predefined data type.<br>Either <i>target_data_type</i> or <i>source_data_type</i> or both <i>must</i> be a UDT.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| SPECIFIC FUNCTION<br><i>specific_function_name</i>                                                                 | the name or specific name of the UDF to be used to convert <i>source_data_type</i> to <i>target_data_type</i> . x must specify a unique function.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| FUNCTION <i>function_name</i><br>[( <i>data_type</i> )]                                                            | If you do not specify a set of data types for a function name, then the specified function must be the only UDF with that name in the database.<br>The specified function must satisfy the following conditions: <ul style="list-style-type: none"> <li>• It can have only one parameter.<br/>Its parameter data type must be the same as <i>source_data_type</i>.</li> <li>• Its result data type must be the same as <i>target_data_type</i>.</li> <li>• It must be defined to be deterministic.</li> <li>• Its function name must identify a UDF in the <i>SYSUDTLIB</i> database.</li> </ul> |
| SPECIFIC METHOD<br><i>SYSUDTLIB.specific_method_name</i>                                                           | the name of the method to be used to convert a source UDT value to the target data type.<br>If you specify a specific method, then a method with the same specific method name must be defined in the <i>SYSUDTLIB</i> database.                                                                                                                                                                                                                                                                                                                                                                 |
| [INSTANCE] METHOD<br>[ <i>database_name</i> .]<br><i>method_name</i> [( <i>data_type</i> )]<br>FOR <i>UDT_name</i> | If you specify a method, then a method associated with the specified <i>UDT_name</i> must exist with the same signature.<br>The method must satisfy the following conditions: <ul style="list-style-type: none"> <li>• Its associated UDT is the same as the source data type.</li> <li>• Its declared parameter list is empty.</li> <li>• Its result data type is the same as the target data type.</li> <li>• It must be deterministic.</li> </ul> If no method is found, an error is returned.                                                                                                |
| FOR <i>UDT_name</i>                                                                                                | the name of the UDT associated with <i>method_name</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| Syntax element ... | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AS ASSIGNMENT      | <p>to implicitly invoke the specified cast routine on an assignment operation if both of the following statements are true:</p> <ul style="list-style-type: none"> <li>The source data type of the assignment is compatible with the source data type of the cast result.</li> <li>The target data types are identical.</li> </ul> <p>Note that an assignment operation is defined to be any of the following operations:</p> <ul style="list-style-type: none"> <li>INSERT</li> <li>UPDATE</li> <li>parameter passing</li> </ul> <p>You can disable this functionality by means of the DisableImplCastForSysFuncOp DBSControl flag (see the CREATE CAST topic “Using the AS ASSIGNMENT Clause To Make a Cast Operation Implicitly Invokable” in <i>SQL Data Definition Language Detailed Topics and Utilities</i> for details).</p> <p><b>Caution:</b> Be very careful if you are performing a REPLACE CAST statement because the system updates the UDTCast dictionary to reflect the value of the AS ASSIGNMENT flag. See the topic “Difference Between CREATE CAST and REPLACE CAST” in <i>SQL Data Definition Language Detailed Topics</i>.</p> |

## ANSI Compliance

CREATE CAST is ANSI SQL:2008-compliant with extensions.

REPLACE CAST is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have either the UDTTYPE or UDTMETHOD privilege on the *SYSUDTLIB* database to create or replace a cast.

If you specify a *cast\_function*, then you must also have the EXECUTE FUNCTION privilege on the UDF, and it must be contained within the *SYSUDTLIB* database.

## Privileges Granted Automatically

None.

## Example 1

The following CREATE CAST statement creates a cast operation that converts the source data type *circle* to the target data type VARCHAR(32) using the method having the specific method name *circleToVarchar*.

```
CREATE CAST (circle AS VARCHAR(32))
WITH SPECIFIC METHOD SYSUDTLIB.circleToVarchar
```

## Example 2

The following CREATE CAST statement creates a cast operation that converts the source data type *euro* to the target data type VARCHAR(20) using the method *euroString*. The casting routine is defined so it is implicitly invoked on an assignment operation assuming the necessary conditions are met for the assignment (see “AS ASSIGNMENT” in the syntax table for more information).

```
CREATE CAST (euro AS VARCHAR(20))  
WITH METHOD SYSUDTLIB.euroString( ) FOR euro  
AS ASSIGNMENT
```

## Example 3

The following CREATE CAST statement creates a cast operation that converts the source data type VARCHAR(32) to the target data type circle using the UDF having the specific function name *VarcharTocircle*.

```
CREATE CAST (VARCHAR(32) AS circle)  
WITH SPECIFIC FUNCTION SYSUDTLIB.VarcharTocircle
```

## Related Topics

See the following statements, as appropriate, for additional information about user-defined data types:

- [“ALTER METHOD” on page 19](#)
- [“ALTER TYPE” on page 71](#)
- [“CREATE METHOD” on page 259](#)
- [“CREATE ORDERING/ REPLACE ORDERING” on page 272](#)
- [“CREATE TRANSFORM/ REPLACE TRANSFORM” on page 484](#)
- [“CREATE TYPE \(Distinct Form\)” on page 507](#)
- [“CREATE TYPE \(Structured Form\)” on page 515](#)
- [“DROP CAST” on page 554](#)
- [“DROP ORDERING” on page 577](#)
- [“DROP TRANSFORM” on page 591](#)
- [“DROP TYPE” on page 592](#)
- [“REPLACE METHOD” on page 640](#)
- [“HELP CAST” on page 693](#)
- [“HELP METHOD” on page 735](#)
- [“HELP TRANSFORM” on page 775](#)
- [“HELP TYPE” on page 779](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)



See the following statements, as appropriate, for additional information about user-defined functions:

- [“ALTER FUNCTION” on page 16](#)
- [“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120](#)
- [“CREATE FUNCTION/ REPLACE FUNCTION” on page 138](#)
- [“CREATE FUNCTION \(Table Form\)” on page 161](#)
- [“DROP AUTHORIZATION” on page 553](#)
- [“DROP FUNCTION” on page 562“](#)
- [“HELP FUNCTION” on page 715](#)

See *SQL Functions, Operators, Expressions, and Predicates* for information about the standard SQL CAST function and its uses with predefined data types.

See *SQL External Routine Programming* for information about coding methods for external routines to support UDMs and UDFs.

See the following Teradata Tools and Utilities manuals for details about how the software they document deals with UDTs:

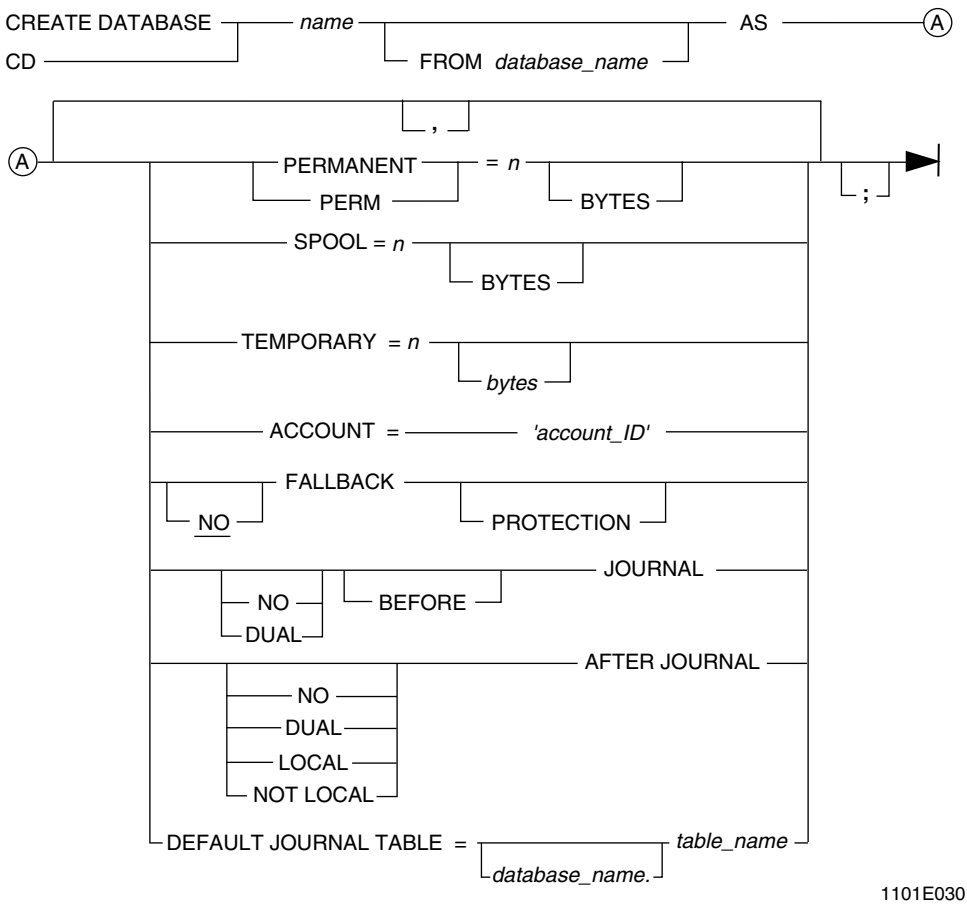
- *Teradata Archive/Recovery Utility Reference*
- *Teradata FastExport Reference*
- *Teradata FastLoad Reference*
- *Teradata JDBC Driver User Guide*
- *Teradata MultiLoad Reference*
- *ODBC Driver for Teradata User Guide*
- *Teradata Preprocessor2 for Embedded SQL Programmer Guide*
- *Teradata Parallel Data Pump Reference*
- *Teradata Parallel Transporter Reference*

# CREATE DATABASE

## Purpose

Creates a database in which other database objects can be created.

## Syntax



1101E030

where:

| Syntax Element ...   | Specifies ...                                                                                                        |
|----------------------|----------------------------------------------------------------------------------------------------------------------|
| <i>name</i>          | the name of the new database.                                                                                        |
| <i>database_name</i> | the name of the immediate owning user or database. The default is the user name associated with the current session. |

| Syntax Element ...                                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PERMANENT = <i>n</i> BYTES                              | <p>the total number of bytes to be reserved for permanent storage of the new database. The space is taken from unallocated space in the database of the immediate owner.</p> <p>The number of bytes can be entered as an integer, decimal, or floating point value.</p> <p>This option must be specified. There is no default.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| SPOOL = <i>n</i> BYTES                                  | <p>the number of bytes to be allowed for spool and volatile temporary files. The default is the largest value that is not greater than the owner spool space and that is a multiple of the number of AMPs on the system. <i>n</i> must not exceed the owner spool space.</p> <p>The number of bytes can be entered as an integer, decimal, or floating point value.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| TEMPORARY = <i>n</i>                                    | <p>a definition for how many bytes are to be allowed by default for creating materialized global temporary tables by users within this database. Note that temporary space is reserved prior to spool space for any user defined with this characteristic.</p> <p>Also note that each materialized global temporary table requires a minimum of 512 bytes of PERM space to contain its table header.</p> <p>Disk usage for a materialized global temporary table is charged to the temporary space allocation of the user who referenced the table.</p> <p>The number of bytes can be entered as an integer, decimal, or floating point value.</p> <p>If no default temporary space is defined for a database, then the space allocated for any materialized global temporary tables created in that database is set to the maximum temporary space allocated for its immediate owner.</p> |
| ACCOUNT =<br>' <i>account_ID</i> '                      | <p>the account to be charged for the space used by this database. If not specified, it defaults to the account identifier of the immediate owner database.</p> <p>An account ID is a Teradata Database reserved word and can contain up to 30 APOSTROPHE-delimited characters.</p> <p>See <i>SQL Fundamentals</i>, for a description of Teradata Database reserved words and a list of the valid characters they can contain.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| FALLBACK<br>PROTECTION<br><br>NO FALLBACK<br>PROTECTION | <p>whether to create and store a duplicate copy of each table created in the new database. The default value is NO FALLBACK. This setting can be overridden for a particular data table when the table is created.</p> <p>The FALLBACK keyword used alone implies PROTECTION.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

| Syntax Element ...                                            | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NO<br>DUAL<br>BEFORE<br>JOURNAL                               | <p>the number of before change images to be maintained by default for each data table created in the new database.</p> <p>The JOURNAL keyword without NO or DUAL implies single copy journaling.</p> <p>If journaling is specified, a DUAL journal is maintained for data tables with FALLBACK protection.</p> <p>The JOURNAL keyword without BEFORE implies both types (BEFORE and AFTER) of images.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| NO<br>DUAL<br>LOCAL<br>NOT LOCAL<br>AFTER JOURNAL             | <p>the type of image to be maintained by default for data tables created in the new database.</p> <p>If journaling is specified, a DUAL journal is maintained for data tables with FALLBACK protection.</p> <p>NOT LOCAL and LOCAL specify whether single after-image journal rows for non-fallback data tables are written on the same virtual AMP (LOCAL) as the changed data rows, or on another virtual AMP in the cluster (NOT LOCAL). See also the CREATE DATABASE “Local Journaling” topic in <i>SQL Data Definition Language Detailed Topics</i>.</p> <p>The JOURNAL keyword without AFTER implies both types (BEFORE and AFTER) of images.</p> <p>The default is no journaling.</p> <p>If only AFTER JOURNAL is specified, then a before change image is not maintained. If both types are specified, the two specifications must not conflict.</p> <p>This setting can be overridden for a particular data table when the table is created (see “CREATE TABLE” in <i>SQL Data Definition Language Syntax and Examples</i>).</p> |
| DEFAULT JOURNAL<br>TABLE =<br><i>database_name.table_name</i> | <p>the default table that is to receive the journal images of data tables created in the new database.</p> <p><i>table_name</i> must be defined if journaling is requested, but it need not reside in the new database.</p> <p><i>table_name</i> is automatically created in the new database if <i>database_name</i> is not specified, or the new database is specified.</p> <p>If a different database is specified, then that database must exist and <i>table_name</i> must have been defined as its default journal table.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## ANSI Compliance

CREATE DATABASE is a Teradata extension to the ANSI SQL:2008 standard.

CREATE DATABASE is functionally equivalent to the ANSI CREATE SCHEMA statement.

## Required Privileges

To create a database, you must have the CREATE DATABASE privilege on the immediate owner database.

No privilege is needed to specify a DEFAULT JOURNAL TABLE in a database other than the database being created. However, when a table is created that specifies a journal, then the user creating the table must have INSERT privilege on the journal table.

## Privileges Granted Automatically

The privileges granted to the creator and owner on the new database are WITH GRANT OPTION.

The following privileges are automatically granted to a database when it is created:

- |                        |                      |             |
|------------------------|----------------------|-------------|
| • CHECKPOINT           | • DROP AUTHORIZATION | • DROP VIEW |
| • CREATE AUTHORIZATION | • DROP DATABASE      | • DUMP      |
| • CREATE DATABASE      | • DROP FUNCTION      | • EXECUTE   |
| • CREATE MACRO         | • DROP MACRO         | • INSERT    |
| • CREATE TABLE         | • DROP TABLE         | • RESTORE   |
| • CREATE TRIGGER       | • DROP PROCEDURE     | • REVOKE    |
| • CREATE USER          | • DROP TABLE         | • SELECT    |
| • CREATE VIEW          | • DROP TRIGGER       | • UPDATE    |
| • DELETE               | • DROP USER          |             |

The following privileges on itself are *not* automatically granted to a database when it is created:

- |                             |                     |
|-----------------------------|---------------------|
| • ALTER EXTERNAL PROCEDURE  | • CREATE PROCEDURE  |
| • ALTER FUNCTION            | • CREATE USER       |
| • ALTER PROCEDURE           | • DROP DATABASE     |
| • CREATE DATABASE           | • DROP USER         |
| • CREATE EXTERNAL PROCEDURE | • EXECUTE FUNCTION  |
| • CREATE FUNCTION           | • EXECUTE PROCEDURE |

## Example 1

The following statement creates a database named *personnel* from database *administration*:

```
CREATE DATABASE personnel FROM administration
  AS PERMANENT = 5000000 BYTES, FALLBACK, BEFORE JOURNAL,
  DUAL AFTER JOURNAL, DEFAULT JOURNAL TABLE = personnel.fin_copy;
```

The FALLBACK keyword specifies that for each table created in the *personnel* database, the default is to store a secondary, duplicate copy in addition to the primary copy.

The JOURNAL option specifies that the default journaling for each data table is to maintain a single copy of the before change image and dual copies of the after change image. A duplicate before change image is maintained automatically for any table in this database that uses both the fallback and the journal defaults.

The DEFAULT JOURNAL TABLE clause is required because journaling is requested. This clause specifies that a new journal table named *fin\_copy* is to be created in the new database.

Permanent journaling is activated because you specified the BEFORE JOURNAL and AFTER JOURNAL options. Either option, by itself, is sufficient to activate journaling.

## Example 2

To create a new database for the Finance department, use the CREATE DATABASE statement as follow.

```
CREATE DATABASE finance FROM sysadmin
  AS PERMANENT = 60000000
  ,SPOOL = 120000000
  ,FALLBACK PROTECTION
  ,AFTER JOURNAL
  ,BEFORE JOURNAL
  ,DEFAULT JOURNAL TABLE = finance.journals
  ,ACCOUNT = 'ACCTG';
```

The *finance* database is created from the space available in *sysadmin*. The 60,000,000 value represents that many bytes of storage. To create a database, the initiator must have CREATE DATABASE privileges on the FROM user or database. The new database receives all privileges that have been granted to the initiator.

In the example, the FROM clause allocates space for *finance* from the *sysadmin* space rather than from user space; therefore, *sysadmin* is the immediate owner of *finance*, and *marks* is not in the hierarchy of ownership. However, *marks* is granted automatic creator privileges on *finance*, which include the privilege to create other objects in the space owned by *finance*.

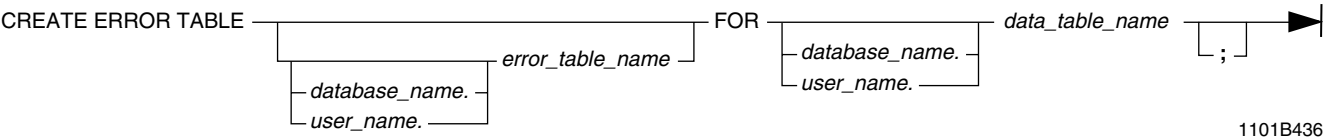
The CREATE DATABASE statement does not include the PASSWORD and STARTUP clauses or the DEFAULT DATABASE and COLLATION options. Because these clauses and options affect the session environment, and only a user can establish a session, they do not apply to a database.

# CREATE ERROR TABLE

## Purpose

Defines the name and containing database of a new error table and specifies the name of the data table with which it is associated.

## Syntax



where:

| Syntax element ...                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | the name of the database or user in which the error table is to be contained if not in the current database or user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <i>error_table_name</i>                 | <p>the name of the new error table.</p> <p>If you do not explicitly specify an error table name, the system generates one in the form ET_<i>data_table_name</i>, where the characters ET_ are a literal string.</p> <p>If <i>data_table_name</i> is longer than 27 characters, the system truncates it at the end and does not return a warning message.</p> <p>The system returns an error message if the ET_<i>data_table_name</i> default name duplicates an existing table name. You can then specify an explicit unique error table name in place of the duplicate error table name.</p> |
| <i>database_name</i>   <i>user_name</i> | the name of the database or user in which the data table is contained if not in the current database or user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <i>data_table_name</i>                  | <p>the name of the data table for which this error table is being created.</p> <p><i>data_table_name</i> cannot specify a NoPI table.</p> <p>The name must correspond to either a permanent base data table or a queue table; otherwise, the system aborts the request and returns an error message to the requestor.</p>                                                                                                                                                                                                                                                                     |

## ANSI Compliance

CREATE ERROR TABLE FOR is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have the CREATE TABLE privilege on the database or user in which the error table is created.

To access an error table that contains UDT columns, you must have at least one of the following privileges:

- UDTUSAGE on the specified UDT
- UDTUSAGE on the *SYSUDTLIB* database
- UDTTYPE on the *SYSUDTLIB* database
- UDTMETHOD on the *SYSUDTLIB* database

## Privileges Granted Automatically

The creator receives all the following privileges on the newly created error table:

- DELETE
- SELECT
- DROP TABLE
- UPDATE
- INSERT

## Example 1

The following example creates an error table with a default name of *et\_t* for data table *t*.

```
CREATE ERROR TABLE FOR t;
```

## Example 2

The following example creates an error table named *e* for data table *t*.

```
CREATE ERROR TABLE e FOR t;
```



## Related Topics

For further information about error tables, see the following topics and manuals:

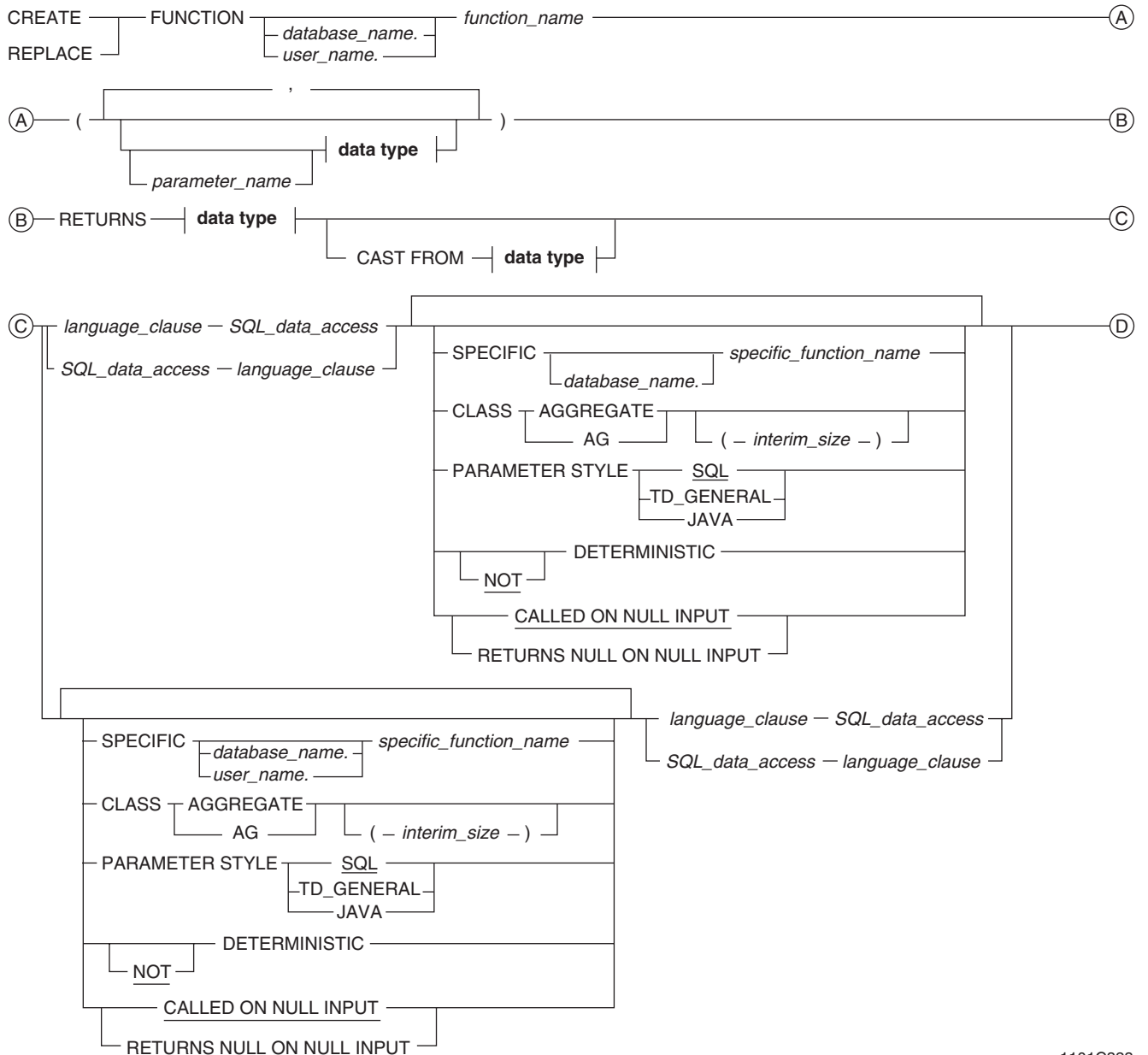
- [“ALTER TABLE” on page 33](#)
- [“CREATE TABLE” on page 382](#)
- [“CREATE TABLE \(Queue Table Form\)” on page 462](#)
- [“DELETE DATABASE/ DELETE USER” on page 551](#)
- [“DROP ERROR TABLE” on page 560](#)
- [“DROP MACRO/ DROP PROCEDURE/ DROP TABLE/ DROP TRIGGER/ DROP VIEW” on page 574](#)
- [“HELP ERROR TABLE” on page 713](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)
- [“INSERT/INSERT ... SELECT” in \*SQL Data Manipulation Language\*](#)
- [“MERGE” in \*SQL Data Manipulation Language\*](#)
- [Teradata Archive/Recovery Utility Reference](#)
- [Teradata FastLoad Reference](#)
- [Teradata MultiLoad Reference](#)
- [Teradata Parallel Data Pump Reference](#)
- Maurice Ho, *Teradata 12.0 SQL Bulk Loading Complex Error Handling User's Guide*, Teradata Database Orange Book 541-0006649, 2007.

## CREATE FUNCTION/ REPLACE FUNCTION

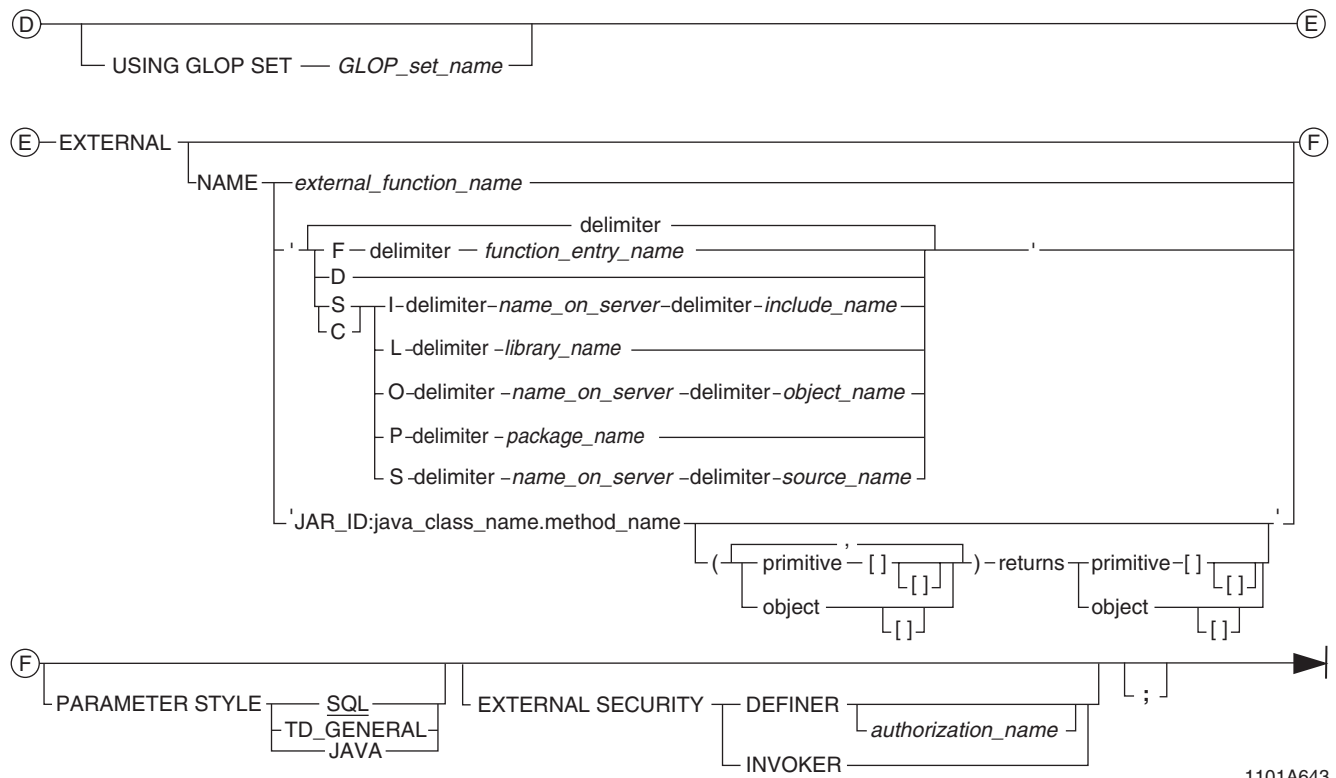
### Purpose

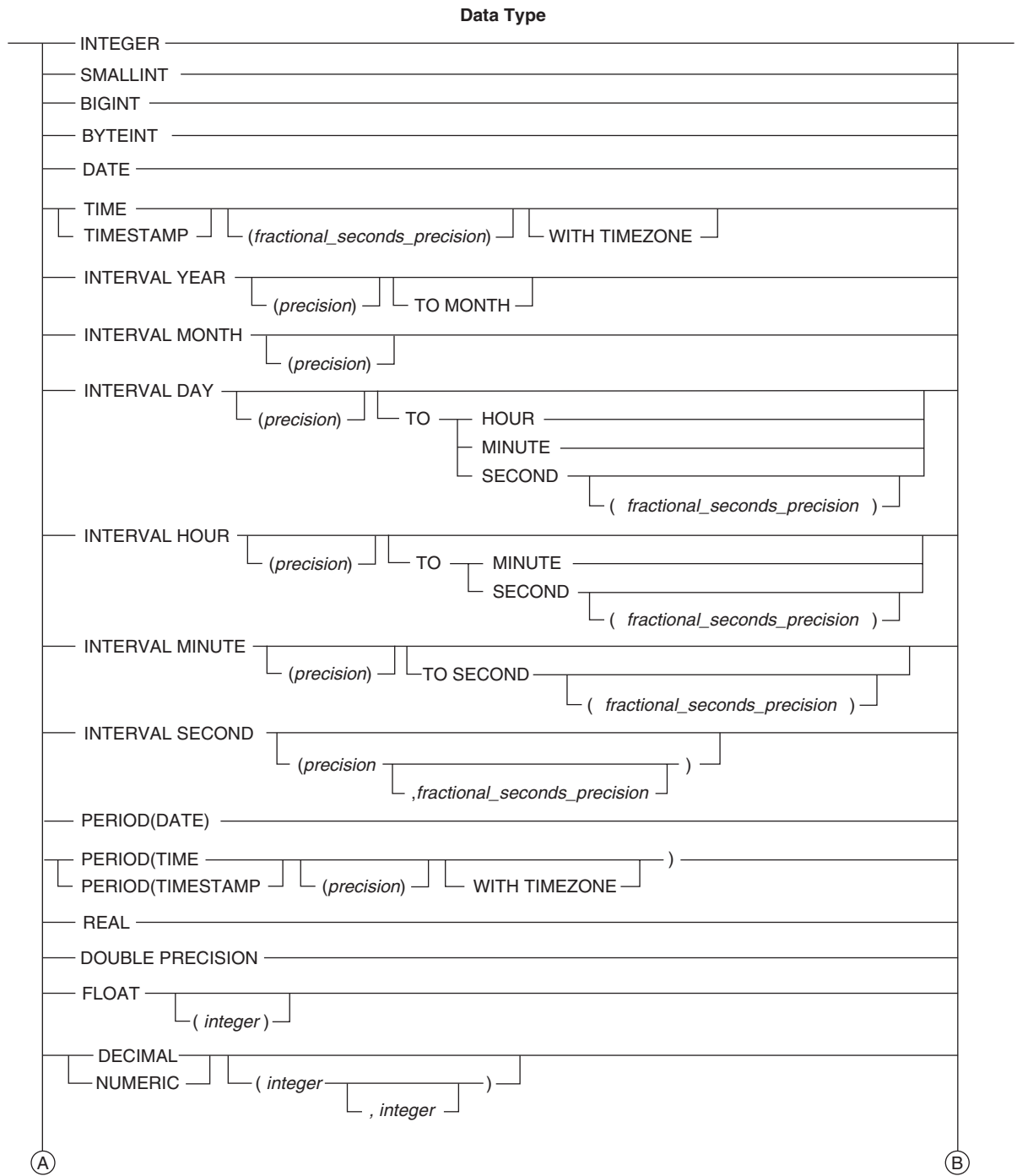
Compiles and installs a UDF and creates the SQL function definition used to invoke that UDF.

## Syntax

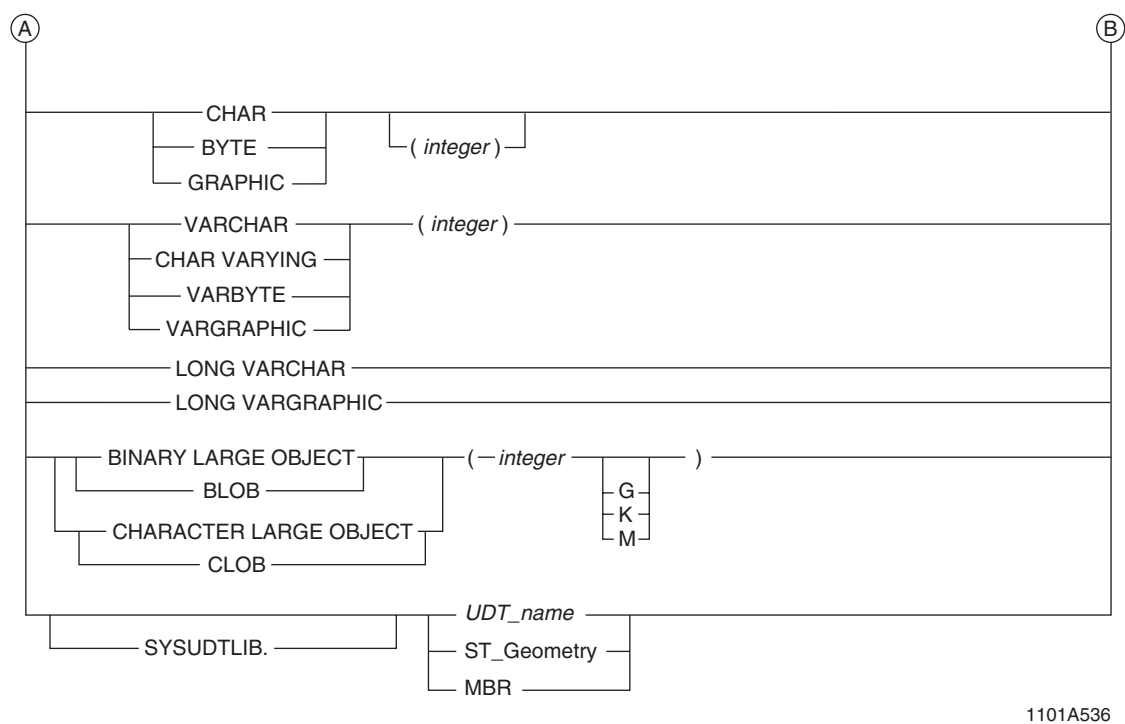


1101C323





1101A535



where:

| Syntax element ...                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | <p>an optional database or user name specified if the function is to be created or replaced in a nondefault database or user.</p> <p>If you use the recommended <i>SYSLIB</i> database as your UDF depository, you must modify the size of its permanent space and grant appropriate access rights on it because it is created with 0 permanent space and without access privileges.</p> <p>Users must have the EXECUTE FUNCTION privilege on any UDF they run from <i>SYSLIB</i>.</p> <p>A UDF used as a cast, ordering, or transform routine for a UDT must be created in the <i>SYSUDTLIB</i> database.</p> <p>If you do not specify a database name, then the system creates or replaces the function within the current database.</p> |

| Syntax element ...   | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>function_name</i> | <p>the calling name for the function.</p> <p>If your Teradata Database runs on the UNIX MP-RAS operating system, you should keep the function name as short as possible.</p> <p>You cannot give a UDF the same name as an existing Teradata Database-supplied function (also known as an intrinsic function) unless you enclose the name in double quotation marks. For example, "TRIM" ( ). Using the names of intrinsic functions for UDFs is a poor programming practice and should be avoided. See the topic on naming conventions for details about avoiding other naming conflicts with methods and UDTs.</p> <p><i>function_name</i> must match the spelling and case of the C or C++ function name exactly if you do not specify a <i>specific_function_name</i> or <i>external_function_name</i>. This applies only to the definition of the function, not to its use.</p> <p>SQL supports function name overloading within the same function class (see "CLASS function_class" in this table), so <i>function_name</i> need not be unique within its class; however, you cannot give the same name to both a scalar and an aggregate function within the same database.</p> <p>Parameter data types and number of parameters are used to distinguish among different functions within the same class that have the same <i>function_name</i>.</p> <p>See <i>SQL External Routine Programming</i> for further information about function overloading.</p> |

| Syntax element ...                                                              | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>[<i>parameter_name</i>] <i>data_type</i><br/>[<i>locator_indication</i>]</p> | <p>a parenthetical comma-separated list of data types, including UDTs and the VARIANT_TYPE UDT type (for INPUT parameters in non-Java UDFs only), and optional parameter names and locators for the variables to be passed to the function.</p> <p>The VARIANT_TYPE UDT is not supported for parameters in a Java function.</p> <p>Parameter names must be unique within a UDF definition.</p> <p>You cannot use the keyword SELF to name UDF parameters.</p> <p>The maximum number of parameters a UDF accepts is 128.</p> <p>BLOB and CLOB types must be represented by a locator (see <i>SQL Data Manipulation Language</i> for a description of locators). The Teradata Database does not support in-memory LOB parameters: an AS LOCATOR phrase must be specified for each LOB parameter and return value.</p> <p>Note, however, that whenever a LOB that requires data type conversion is passed to a UDF, the LOB must be materialized for the conversion to take place.</p> <p>You must specify opening and closing parentheses even if no parameters are to be passed to the function.</p> <p>If you specify one parameter name, then you must specify names for all the parameters passed to the function.</p> <p>If you do not specify parameter names, the system assigns unique names to them in the form P1, P2, ..., Pn. These names are used in the COMMENT statement (see <a href="#">“COMMENT (Comment Placing Form)” on page 112</a>) and displayed in the report produced by the HELP FUNCTION statement (see <a href="#">“HELP FUNCTION” on page 715</a>), and appear in the text of error messages.</p> <p>The data type associated with each parameter is the type of the parameter or returned value. All Teradata Database data types are valid. Character data can also specify a CHARACTER SET clause.</p> <p>For data types that take a length or size specification, like BYTE, CHARACTER, DECIMAL, VARCHAR, and so on, the size of the parameter indicates the largest number of bytes that can be passed.</p> |



| Syntax element ...                         | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |                                                 |   |   |     |     |      |      |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-------------------------------------------------|---|---|-----|-----|------|------|
| RETURNS <i>return_data_type</i>            | <p>the data type for the value returned by the external function.</p> <p>The function is responsible for providing the returned data with the correct type. If the return type is difficult for the function to create, you should also specify a CAST FROM clause so the system can perform the appropriate data type conversion (see <i>SQL Functions, Operators, Expressions, and Predicates</i> for more information about using CAST expressions).</p> <p>The result type has a dictionary entry in <i>DBC.TVFields</i> under the name RETURN0[<i>n</i>], where <i>n</i> is a sequence of digits appended to RETURN0 rows to make each value unique, ensuring that no user-defined parameter names are duplicated. The value of <i>n</i> is incremented until it no longer duplicates a parameter name.</p> <p>The <i>n</i> subscript is not used if there is no parameter name of RETURN0.</p> |                                            |                                                 |   |   |     |     |      |      |
| CAST FROM<br><i>data_type</i>              | <p>the result type returned by the external function that is to be converted to the type specified by the RETURNS clause.</p> <p>Example:</p> <pre>...RETURNS DECIMAL(9,5) CAST FROM FLOAT...</pre> <p>Whenever a LOB that requires data type conversion is passed to a UDF, the LOB must first be materialized for the conversion to take place.</p> <p>The value for <i>data_type</i> can be a UDT.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                            |                                                 |   |   |     |     |      |      |
| <i>language_clause</i>                     | <p>a code that represents the programming language in which the external function is written.</p> <p>The valid languages for writing UDFs are C and C++.</p> <table border="1"> <thead> <tr> <th>IF the UDF is written in this language ...</th><th>THEN the code for <i>language_clause</i> is ...</th></tr> </thead> <tbody> <tr> <td>C</td><td>C</td></tr> <tr> <td>C++</td><td>CPP</td></tr> <tr> <td>Java</td><td>JAVA</td></tr> </tbody> </table> <p>For C and C++ functions, this must be specified as LANGUAGE C or LANGUAGE CPP even if the external function is supplied in object form.</p> <p>If the external function object is not written in C or C++, it must be compatible with C or C++ object code.</p> <p>This clause is mandatory.</p>                                                                                                                                          | IF the UDF is written in this language ... | THEN the code for <i>language_clause</i> is ... | C | C | C++ | CPP | Java | JAVA |
| IF the UDF is written in this language ... | THEN the code for <i>language_clause</i> is ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                            |                                                 |   |   |     |     |      |      |
| C                                          | C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                            |                                                 |   |   |     |     |      |      |
| C++                                        | CPP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                            |                                                 |   |   |     |     |      |      |
| Java                                       | JAVA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                            |                                                 |   |   |     |     |      |      |
| SQL_ <i>data_access</i>                    | <p>whether the external function body accesses the database or contains SQL statements</p> <p>This must be specified as NO SQL.</p> <p>This clause is mandatory.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                            |                                                 |   |   |     |     |      |      |

| Syntax element ...                                                                                  | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          |                             |      |         |           |            |
|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------------------|------|---------|-----------|------------|
| <code>SPECIFIC</code> [ <i>database_name</i>   <i>user_name</i> .]<br><i>specific_function_name</i> | <p>the specific name for the function.</p> <p>If your Teradata Database runs on the UNIX MP-RAS operating system, you should keep the specific function name as short as possible.</p> <p>Unlike <i>function_name</i> (see “function_name” in this table), <i>specific_function_name</i> must be unique within the database. This name is stored in <i>DBC.TVM</i> as the name of the UDF database object.</p> <p>This clause is mandatory for overloaded <i>function_names</i>, but otherwise optional and can only be specified once per function definition.</p> |                          |                             |      |         |           |            |
| <code>CLASS</code> <i>function_class</i>                                                            | <p>the class of the function being defined.</p> <table><tr><th>Specify this keyword ...</th><th>For this function class ...</th></tr><tr><td>none</td><td>scalar.</td></tr><tr><td>AGGREGATE</td><td>aggregate.</td></tr></table> <p>Do not specify this clause for scalar functions.</p> <p>This clause is optional and can only be specified once per function definition.</p>                                                                                                                                                                                    | Specify this keyword ... | For this function class ... | none | scalar. | AGGREGATE | aggregate. |
| Specify this keyword ...                                                                            | For this function class ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                          |                             |      |         |           |            |
| none                                                                                                | scalar.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                          |                             |      |         |           |            |
| AGGREGATE                                                                                           | aggregate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |                             |      |         |           |            |
| <i>interim_size</i>                                                                                 | <p>the size of the aggregate cache allocated for an aggregate UDF.</p> <p>The minimum value is 1 byte.</p> <p>The maximum value is 64,000 bytes.</p> <p>The default value is 64 bytes.</p>                                                                                                                                                                                                                                                                                                                                                                          |                          |                             |      |         |           |            |

| Syntax element ...         | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |             |     |                                                                                                                             |            |                                                                                     |      |                                                                                                                                                                                                                                                  |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------------|-----|-----------------------------------------------------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PARAMETER STYLE            | <p>the parameter passing convention to be used when passing parameters to the function.</p> <p>The specified parameter style must match the parameter passing convention of the external function.</p> <table border="1"> <thead> <tr> <th>Style</th><th>Description</th></tr> </thead> <tbody> <tr> <td>SQL</td><td>Uses indicator variables to pass arguments.<br/>As a result, you can always pass nulls as inputs and return them in results.</td></tr> <tr> <td>TD_GENERAL</td><td>Uses parameters to pass arguments.<br/>Can neither be passed nulls nor return nulls.</td></tr> <tr> <td>JAVA</td><td>If the Java function must accept null arguments, then the EXTERNAL NAME clause must include the list of parameters and specify data types that map to Java objects.<br/><br/>PARAMETER STYLE JAVA <i>must</i> be specified for all Java functions.</td></tr> </tbody> </table> <p>If you do not specify a parameter style at this point, you can specify one with the external body reference.</p> <p>You cannot specify parameter styles more than once in the same CREATE/REPLACE FUNCTION statement.</p> <p>The default is SQL.</p> <p>This clause is optional and can only be specified once per function definition.</p> | Style | Description | SQL | Uses indicator variables to pass arguments.<br>As a result, you can always pass nulls as inputs and return them in results. | TD_GENERAL | Uses parameters to pass arguments.<br>Can neither be passed nulls nor return nulls. | JAVA | If the Java function must accept null arguments, then the EXTERNAL NAME clause must include the list of parameters and specify data types that map to Java objects.<br><br>PARAMETER STYLE JAVA <i>must</i> be specified for all Java functions. |
| Style                      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |             |     |                                                                                                                             |            |                                                                                     |      |                                                                                                                                                                                                                                                  |
| SQL                        | Uses indicator variables to pass arguments.<br>As a result, you can always pass nulls as inputs and return them in results.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |             |     |                                                                                                                             |            |                                                                                     |      |                                                                                                                                                                                                                                                  |
| TD_GENERAL                 | Uses parameters to pass arguments.<br>Can neither be passed nulls nor return nulls.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |             |     |                                                                                                                             |            |                                                                                     |      |                                                                                                                                                                                                                                                  |
| JAVA                       | If the Java function must accept null arguments, then the EXTERNAL NAME clause must include the list of parameters and specify data types that map to Java objects.<br><br>PARAMETER STYLE JAVA <i>must</i> be specified for all Java functions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |             |     |                                                                                                                             |            |                                                                                     |      |                                                                                                                                                                                                                                                  |
| [NOT] DETERMINISTIC        | <p>whether the function returns identical results for identical inputs.</p> <p>For example, if the function calls a random number generator as part of its processing, then the results of a function call cannot be known in advance of making the call and the function is NOT DETERMINISTIC.</p> <p>The default is NOT DETERMINISTIC.</p> <p>This clause is optional and can only be specified once per function definition.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |             |     |                                                                                                                             |            |                                                                                     |      |                                                                                                                                                                                                                                                  |
| RETURNS NULL ON NULL INPUT | <p>that if any parameters are null at the time the function is to be called, a null result is returned without evaluating the function.</p> <p>You cannot specify this option for aggregate functions.</p> <p>This clause is optional and can only be specified once per function definition.</p> <p>The default is CALLED ON NULL INPUT.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |             |     |                                                                                                                             |            |                                                                                     |      |                                                                                                                                                                                                                                                  |

| Syntax element ...                             | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |              |   |                                                                              |   |                                                                                                                         |   |                                                                                                                         |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|--------------|---|------------------------------------------------------------------------------|---|-------------------------------------------------------------------------------------------------------------------------|---|-------------------------------------------------------------------------------------------------------------------------|
| <p>CALLED ON NULL INPUT</p>                    | <p>that the function is always evaluated whether parameters are null at the time the function is to be called or not.</p> <p>If the PARAMETER STYLE for the function is TD_GENERAL, nulls generate an exception condition.</p> <p>This clause is optional and can only be specified once per function definition.</p> <p>The default is CALLED ON NULL INPUT.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                              |              |   |                                                                              |   |                                                                                                                         |   |                                                                                                                         |
| <p>USING GLOP SET<br/><i>GLOP_set_name</i></p> | <p>the name of the GLOP set this function is associated with.</p> <p>It is not mandatory that the specified GLOP set exist at the time the function is created.</p> <p>You can specify this clause anywhere between the RETURNS clause and the EXTERNAL clause.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                              |              |   |                                                                              |   |                                                                                                                         |   |                                                                                                                         |
| <p>EXTERNAL</p>                                | <p>the introduction to the mandatory external function body reference clause.</p> <p>This clause can specify 3 different things:</p> <ul style="list-style-type: none"> <li>• The keyword EXTERNAL only.</li> <li>• The keywords EXTERNAL NAME plus an external function name (with optional Parameter Style specification)</li> <li>• The keywords EXTERNAL NAME plus a set of external string literals.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                              |              |   |                                                                              |   |                                                                                                                         |   |                                                                                                                         |
| <p>NAME<br/><i>external_function_name</i></p>  | <p>the entry point for the function object.</p> <p>Case is significant and must match the C or C++ function name.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                              |              |   |                                                                              |   |                                                                                                                         |   |                                                                                                                         |
| <p>NAME<br/><i>external_string_literal</i></p> | <p>a string that specifies the source and object components needed to build the function and, optionally, whether to compile the UDF C or C++ object code with debug symbols.</p> <p>Depending on the initial code in the sequence, the string specifies either the C/C++ function object name for the UDF or an encoded name or path for the components needed to create the function.</p> <p>The following table briefly documents the codes used to specify component locations:</p> <table> <tr> <th>IF you specify this code ...</th><th>THEN the ...</th></tr> <tr> <td>F</td><td>string that follows is the entry point name of the C or C++ function object.</td></tr> <tr> <td>C</td><td>source or object code for the function is stored on the client and the string that follows is the path to its location.</td></tr> <tr> <td>S</td><td>source or object code for the function is stored on the server and the string that follows is the path to its location.</td></tr> </table> | IF you specify this code ... | THEN the ... | F | string that follows is the entry point name of the C or C++ function object. | C | source or object code for the function is stored on the client and the string that follows is the path to its location. | S | source or object code for the function is stored on the server and the string that follows is the path to its location. |
| IF you specify this code ...                   | THEN the ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                              |              |   |                                                                              |   |                                                                                                                         |   |                                                                                                                         |
| F                                              | string that follows is the entry point name of the C or C++ function object.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                              |              |   |                                                                              |   |                                                                                                                         |   |                                                                                                                         |
| C                                              | source or object code for the function is stored on the client and the string that follows is the path to its location.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                              |              |   |                                                                              |   |                                                                                                                         |   |                                                                                                                         |
| S                                              | source or object code for the function is stored on the server and the string that follows is the path to its location.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                              |              |   |                                                                              |   |                                                                                                                         |   |                                                                                                                         |

| Syntax element ...                                    | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |        |                 |                                    |         |                                      |           |        |         |                       |        |                                     |         |                       |        |                                     |            |                                                  |                      |                                                                                         |                             |                                      |
|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------|-----------------|------------------------------------|---------|--------------------------------------|-----------|--------|---------|-----------------------|--------|-------------------------------------|---------|-----------------------|--------|-------------------------------------|------------|--------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------|-----------------------------|--------------------------------------|
| NAME<br><i>external_string_literal</i><br>(continued) | <p>The following table briefly documents the path specifications for the external function. The character ; represents an arbitrary user-defined delimiter.</p> <p>You must use the same delimiter throughout the string specification.</p> <table> <tr> <th>File Type</th><th>Syntax</th></tr> <tr> <td>Function object</td><td><i>F;function_entry_point_name</i></td></tr> <tr> <td>Include</td><td><i>I;name_on_server;include_name</i></td></tr> </table><br><table> <tr> <th>File Type</th><th>Syntax</th></tr> <tr> <td>Library</td><td><i>L;library_name</i></td></tr> <tr> <td>Object</td><td><i>O;name_on_server;object_name</i></td></tr> <tr> <td>Package</td><td><i>P;package_name</i></td></tr> <tr> <td>Source</td><td><i>S;name_on_server;source_name</i></td></tr> </table> <p>To compile the C or C++ object code with debug symbols for core dump analysis, specify the delimited character D at any point in the external string literal. This feature does not produce a useful .so or .dll file with debug symbols for Linux and Windows systems.</p> <table> <tr> <th>IF you ...</th><th>THEN the system compiles the UDF source code ...</th></tr> <tr> <td>specify the D option</td><td>and produces debug symbols.<br/>Generates a core file when a protected mode UDF crashes.</td></tr> <tr> <td>do not specify the D option</td><td>but does not generate debug symbols.</td></tr> </table> <p>The purpose of the D option is to provide debug symbol information for the UDF when examining a UDF core file with gdb (see <i>SQL External Routine Programming</i>).</p> | File Type | Syntax | Function object | <i>F;function_entry_point_name</i> | Include | <i>I;name_on_server;include_name</i> | File Type | Syntax | Library | <i>L;library_name</i> | Object | <i>O;name_on_server;object_name</i> | Package | <i>P;package_name</i> | Source | <i>S;name_on_server;source_name</i> | IF you ... | THEN the system compiles the UDF source code ... | specify the D option | and produces debug symbols.<br>Generates a core file when a protected mode UDF crashes. | do not specify the D option | but does not generate debug symbols. |
| File Type                                             | Syntax                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |        |                 |                                    |         |                                      |           |        |         |                       |        |                                     |         |                       |        |                                     |            |                                                  |                      |                                                                                         |                             |                                      |
| Function object                                       | <i>F;function_entry_point_name</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |        |                 |                                    |         |                                      |           |        |         |                       |        |                                     |         |                       |        |                                     |            |                                                  |                      |                                                                                         |                             |                                      |
| Include                                               | <i>I;name_on_server;include_name</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           |        |                 |                                    |         |                                      |           |        |         |                       |        |                                     |         |                       |        |                                     |            |                                                  |                      |                                                                                         |                             |                                      |
| File Type                                             | Syntax                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |        |                 |                                    |         |                                      |           |        |         |                       |        |                                     |         |                       |        |                                     |            |                                                  |                      |                                                                                         |                             |                                      |
| Library                                               | <i>L;library_name</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |        |                 |                                    |         |                                      |           |        |         |                       |        |                                     |         |                       |        |                                     |            |                                                  |                      |                                                                                         |                             |                                      |
| Object                                                | <i>O;name_on_server;object_name</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |           |        |                 |                                    |         |                                      |           |        |         |                       |        |                                     |         |                       |        |                                     |            |                                                  |                      |                                                                                         |                             |                                      |
| Package                                               | <i>P;package_name</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |        |                 |                                    |         |                                      |           |        |         |                       |        |                                     |         |                       |        |                                     |            |                                                  |                      |                                                                                         |                             |                                      |
| Source                                                | <i>S;name_on_server;source_name</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |           |        |                 |                                    |         |                                      |           |        |         |                       |        |                                     |         |                       |        |                                     |            |                                                  |                      |                                                                                         |                             |                                      |
| IF you ...                                            | THEN the system compiles the UDF source code ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           |        |                 |                                    |         |                                      |           |        |         |                       |        |                                     |         |                       |        |                                     |            |                                                  |                      |                                                                                         |                             |                                      |
| specify the D option                                  | and produces debug symbols.<br>Generates a core file when a protected mode UDF crashes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |        |                 |                                    |         |                                      |           |        |         |                       |        |                                     |         |                       |        |                                     |            |                                                  |                      |                                                                                         |                             |                                      |
| do not specify the D option                           | but does not generate debug symbols.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           |        |                 |                                    |         |                                      |           |        |         |                       |        |                                     |         |                       |        |                                     |            |                                                  |                      |                                                                                         |                             |                                      |

| Syntax element ...                                    | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |            |               |                                                                    |                        |                                                                                                   |                    |                                                           |                  |                                                                                                                                                                                     |               |                                                                                  |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------|---------------|--------------------------------------------------------------------|------------------------|---------------------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------------------------------------------------------------|
| NAME<br><i>external_string_literal</i><br>(continued) | <p>See the user documentation for your C or C++ compiler and debugger for debugging information.</p> <p>A side effect of specifying the D option is that linked libraries become larger because they must also contain all the symbol information.</p> <p>The following variables apply to Java functions only:</p> <table><tr><th>Variable</th><th>Definition</th></tr><tr><td><i>JAR_ID</i></td><td>The registered name of the JAR file associated with this function.</td></tr><tr><td><i>java_class_name</i></td><td>The name of the Java class contained within the JAR that contains the Java method to be executed.</td></tr><tr><td><i>method_name</i></td><td>The name of the method executed when the UDF is executed.</td></tr><tr><td><i>primitive</i></td><td>A primitive parameter class.<br/>The following types are valid:<ul style="list-style-type: none"><li>• byte</li><li>• double</li><li>• int</li><li>• long</li><li>• short</li></ul></td></tr><tr><td><i>object</i></td><td>An object parameter class definition in the format <code>java.pkg.class</code>.</td></tr></table> | Variable | Definition | <i>JAR_ID</i> | The registered name of the JAR file associated with this function. | <i>java_class_name</i> | The name of the Java class contained within the JAR that contains the Java method to be executed. | <i>method_name</i> | The name of the method executed when the UDF is executed. | <i>primitive</i> | A primitive parameter class.<br>The following types are valid: <ul style="list-style-type: none"><li>• byte</li><li>• double</li><li>• int</li><li>• long</li><li>• short</li></ul> | <i>object</i> | An object parameter class definition in the format <code>java.pkg.class</code> . |
| Variable                                              | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |            |               |                                                                    |                        |                                                                                                   |                    |                                                           |                  |                                                                                                                                                                                     |               |                                                                                  |
| <i>JAR_ID</i>                                         | The registered name of the JAR file associated with this function.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |            |               |                                                                    |                        |                                                                                                   |                    |                                                           |                  |                                                                                                                                                                                     |               |                                                                                  |
| <i>java_class_name</i>                                | The name of the Java class contained within the JAR that contains the Java method to be executed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |            |               |                                                                    |                        |                                                                                                   |                    |                                                           |                  |                                                                                                                                                                                     |               |                                                                                  |
| <i>method_name</i>                                    | The name of the method executed when the UDF is executed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |            |               |                                                                    |                        |                                                                                                   |                    |                                                           |                  |                                                                                                                                                                                     |               |                                                                                  |
| <i>primitive</i>                                      | A primitive parameter class.<br>The following types are valid: <ul style="list-style-type: none"><li>• byte</li><li>• double</li><li>• int</li><li>• long</li><li>• short</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |            |               |                                                                    |                        |                                                                                                   |                    |                                                           |                  |                                                                                                                                                                                     |               |                                                                                  |
| <i>object</i>                                         | An object parameter class definition in the format <code>java.pkg.class</code> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          |            |               |                                                                    |                        |                                                                                                   |                    |                                                           |                  |                                                                                                                                                                                     |               |                                                                                  |
| EXTERNAL SECURITY                                     | <p>keywords introducing the external security clause.</p> <p>This clause is recommended for UDFs that perform operating system I/O operations because it permits you to specify a particular OS user under whom the function runs. Otherwise, a protected mode UDF runs under the generic user <i>tdatuser</i>.</p> <p>Also see <a href="#">“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120.</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |          |            |               |                                                                    |                        |                                                                                                   |                    |                                                           |                  |                                                                                                                                                                                     |               |                                                                                  |

| Syntax element ...                   | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|-------------------------------|-----------------------------------------------------------------------------------------|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DEFINER                              | <p>that the UDF runs in the client user context of the associated security authorization object created for this purpose, which is contained within the same database as the function.</p> <table> <tr> <th>IF you ...</th><th>THEN ...</th></tr> <tr> <td>specify an authorization name</td><td>an authorization object with that name must be defined before you can run the function.</td></tr> <tr> <td>do not specify an authorization name</td><td> <p>you must define a default DEFINER authorization object.</p> <p>The default authorization object must be defined before a user can run the function.</p> </td></tr> </table> <p>The system reports a warning if the specified authorization name does not exist at the time the UDF is created, stating that no authorization name exists.</p> <p>If you then attempt to execute the function, the statement aborts and the system returns an error to the requestor.</p> | IF you ... | THEN ... | specify an authorization name | an authorization object with that name must be defined before you can run the function. | do not specify an authorization name | <p>you must define a default DEFINER authorization object.</p> <p>The default authorization object must be defined before a user can run the function.</p> |
| IF you ...                           | THEN ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |
| specify an authorization name        | an authorization object with that name must be defined before you can run the function.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |
| do not specify an authorization name | <p>you must define a default DEFINER authorization object.</p> <p>The default authorization object must be defined before a user can run the function.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |
| <i>authorization_name</i>            | <p>an optional identifier for this DEFINER.</p> <p>See <a href="#">“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120.</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |
| INVOKER                              | <p>that the function runs using the INVOKER authorization associated with the logged on user who is running the function.</p> <p>See <a href="#">“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120.</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |
| PARAMETER STYLE                      | <p>See “PARAMETER STYLE” earlier in this table.</p> <p>If you do not specify a parameter style at this point, you can specify one after you specify a language clause and an SQL data access clause.</p> <p>You cannot specify parameter styles more than once in the same CREATE/REPLACE FUNCTION statement.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |

## ANSI Compliance

CREATE FUNCTION is ANSI SQL:2008-compliant with extensions.

REPLACE FUNCTION is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

The privileges required to perform CREATE FUNCTION and REPLACE FUNCTION are different.

- You must have explicit CREATE FUNCTION privileges on the database, including *SYSUDTLIB* for UDFs associated with UDTs, in which the function is to be contained to perform the CREATE FUNCTION statement.

The system does not grant the CREATE FUNCTION privilege automatically when you create a database or user: you must grant that privilege explicitly.

CREATE FUNCTION is not granted implicitly on the databases and functions owned by a database or user unless the owner also has an explicit WITH GRANT OPTION privilege defined for itself.

- You must have explicit DROP FUNCTION privileges on the function or on the database in which the function is contained to perform the REPLACE FUNCTION statement on an existing function. You do not need the CREATE FUNCTION privilege to replace a function.
- You must have explicit CREATE FUNCTION privileges on the database in which the function is to be contained to perform the REPLACE FUNCTION statement to create a new function.

If a UDT is specified as an input parameter or the function result, the current user must have one of the following privileges:

- UDTUSAGE on the *SYSUDTLIB* database.
- UDTUSAGE on the specified UDT.

## Privileges Granted Automatically

The following privileges are granted automatically to the creator of a function:

- DROP FUNCTION
- EXECUTE FUNCTION

## Example 1

This request creates a user-defined C function on a UNIX system. The UDF looks for the C source code file named *find\_text.c* on the client system in the current directory of the logged on user. The function name must be *find\_text*, which is its entry point name.

The example creates a function that searches for a user-specified test pattern within a user-specified character string. The maximum length search string and pattern string the function allows is 500 bytes. The result is a character value of either T or F, representing true (the test pattern is found in the searched string) or false (the test pattern is not found in the searched string).



```
CREATE FUNCTION find_text (
  searched_string VARCHAR(500),
  pattern VARCHAR(500))
RETURNS CHARACTER
LANGUAGE C
NO SQL
EXTERNAL
PARAMETER STYLE SQL;

*** Function has been created.
*** Warning: 5607 Check output for possible warnings encountered in
compiling XSP/UDF.
*** Total elapsed time was 5 seconds.
```

Check output for possible compilation warnings.

```
-----
/usr/bin/cc -Xc -I /tpasw/etc -c -o find_text.o find_text.c
Teradata High Performance C Compiler R3.0c
(c) Copyright 1994-98, Teradata Corporation
(c) Copyright 1987-98, MetaWare Incorporated
/usr/bin/cc -Xc -I /tpasw/etc -c -o pre_another.o pre_another.c
Teradata High Performance C Compiler R3.0c
(c) Copyright 1994-98, Teradata Corporation
(c) Copyright 1987-98, MetaWare Incorporated
/usr/bin/cc -G -Xc -I /tpasw/etc -o libudf_03ee_11.so
find_text.o pre_find_text.o pre_really_long_function_name.o
long_name.o pre_udf_scalar_substr.o substr.o pre_Find_Text.o
pattern.o pre_char2hexint.o char2hexint.o -ludf -lmw -lm
```

The following SELECT request that searches for a specific text description in documents having a date not less than a specified age shows how the function *find\_text* might be used:

```
USING (age DATE, look_for VARCHAR(500))
SELECT doc_number, text
FROM documents
WHERE (:age <= doc_copyright
AND (find_text(text, :look_for) = 'T');
```

## Example 2: Parsing an XML Document

One example where scalar UDFs are useful is scanning an XML document and returning specified content, after that document has been stored inside the database. The following example is of a UDF that uses XPath, which is a set of syntax rules that allow you to navigate an XML document. XPath, which has a function similar to substring, uses path expressions to identify nodes in an XML document.

Depending on your requirements, the XML document could be stored as a CLOB (Character Large Object) or as a VARCHAR column. The former is illustrated in the graphic below, while the following prototype uses the latter.

In this example, the XML document is stored inside Teradata Database as one VARCHAR column, *XMLOrder*. The base table, *OrderLog*, contains only two columns, *PONum* and the VARCHAR column. Here is the XML document:

```

<?xml version="1.0"?>
<ROOT>
<ORDER>
  <DATE>8/22/2004</DATE>
  <PO_NUMBER>101</PO_NUMBER>
  <BILLTO>Mike</BILLTO>
  <ITEMS>
    <ITEM>
      <PARTNUM>101</PARTNUM>
      <DESC>Partners Conference Ticket</DESC>
      <USPRICE>1200.00</USPRICE>
    </ITEM>
    <ITEM>
      <PARTNUM>147</PARTNUM>
      <DESC>V2R5.1 UDF Programming</DESC>
      <USPRICE>28.95</USPRICE>
    </ITEM>
  </ITEMS>
</ORDER>
</ROOT>
<?xml version="1.0"?>
<ROOT>
<ORDER>
  <DATE>08/12/2004</DATE>
  <PO_NUMBER>108</PO_NUMBER>
  <BILLTO>Rick</BILLTO>
  <ITEMS>
    <ITEM>
      <PARTNUM>101</PARTNUM>
      <DESC>Partners Conference Ticket</DESC>
      <USPRICE>1200.00</USPRICE>
    </ITEM>
    <ITEM>
      <PARTNUM>148</PARTNUM>
      <DESC>V2R5.1 Stored Procedures and Embedded SQL</DESC>
      <USPRICE>28.95</USPRICE>
    </ITEM>
  </ITEMS>
</ORDER>
</ROOT>

```

The DDL for the orderlog table looks like this:

```

CREATE SET TABLE orderlog, NO FALLBACK,
NO BEFORE JOURNAL,
NO AFTER JOURNAL,
CHECKSUM = DEFAULT (
  PONum      INTEGER NOT NULL,
  XMLOrder   VARCHAR(63,000) )
UNIQUE PRIMARY INDEX ( PONum );

```

The following SELECT request references the *XpathValue* UDF that uses XPath to extract element and attribute content from the XML document. The arguments passed within the SELECT statement, such as the BILLTO name, are then used by XPath to search each document in the table. When a document having that specific billing name is identified, then the associated PO number and date are returned as output arguments.

```
SELECT XPathValue(O.xmlOrder, '//ORDER/PO_NUMBER/*') AS PO_Number,
       XPathValue(O.xmlOrder, '//ORDER/DATE/*') AS theDate
FROM OrderLog O
WHERE XPathValue(O.xmlOrder, '//ORDER/BILLTO/*') = 'Mike';
```

And the output of the query that uses *XPathValue* UDF looks like this:

| PO_Number | TheDate   |
|-----------|-----------|
| 101       | 8/22/2004 |

### Example 3

This example creates a C scalar UDF that writes a message to an external queue. The function calls an MQ access module, identical to the access module a TPump job or other utility might use when processing from a queue.

The SQL is a simple SELECT request that contains nothing in the select list but the scalar UDF and the arguments it expects. When this statement is performed, it produces the message, 'Hello World,' which is placed on an MQ queue on the client:

```
SELECT WriteMQ('queue.manager.1','QUEUE1','CHANNEL1/TCP/
              153.64.119.177', 'Hello World');
```

The parameters passed are the queue manager (*qmgr*), queue name (*qnm*), client communication channel (*channel*), and the message itself (*vcmsg*), respectively.

The following is the DDL used to replace or create the function:

```
CREATE FUNCTION WriteMQ(
  qmgr    VARCHAR(256),
  qnm     VARCHAR(256),
  channel VARCHAR(256),
  vcmsg   VARCHAR(32000))
RETURNS INTEGER
LANGUAGE C
NO SQL
PARAMETER STYLE SQL
EXTERNAL NAME 'F:emruwmq:SI:cmqc:/usr/include/cmqc.h:SL:mqic
              :SL:mqmcs:SS:emruwmq:/home/rmh/projects/emruwmq/emruwmq.c';
```

### Example 4

Now consider a somewhat broader use of the UDF defined in “[Example 3](#)” on page 155. In this example, you retrieve dictionary information from within Teradata Database and write it to an external MQ queue on a client system.

To do this, you invoke the *WriteMQ* UDF for each row found in *DBC.Tables* that meets the requirements specified in the SELECT request WHERE clause. The SELECT request concatenates the database and table names, creating a VARCHAR string that becomes the input argument to the UDF, which then writes the concatenated *databasename.tablename* text as a message to the MQ queue.

```
SELECT COUNT(*) AS SentMsgs
FROM
  (SELECT WriteMQ
   ('queue.manager.1', 'QUEUE1', 'CHANNEL1/TCP/153.64.119.177',
    Trim(databasename)||'.'||trim(TableName)) AS c1
  FROM DBC.Tables
  WHERE TableKind = 'T')T;
```

What this example illustrates is the ease of sending an entire result set of an arbitrary SQL statement to a queue that is completely outside Teradata Database.

## Example 5: EXTERNAL SECURITY Clause

Suppose you have defined the following external authorization object:

```
CREATE AUTHORIZATION DEFINER sales
USER 'salesdept'
PASSWORD 'secret';
```

You now create the following C UDF:

```
CREATE FUNCTION sales_collect(
  store_number INTEGER,
  item_no INTEGER)
RETURNS INTEGER
LANGUAGE C
NO SQL
EXTERNAL 'cs!salecol!salecollector.c'
PARAMETER STYLE SQL
EXTERNAL SECURITY DEFINER sales;
```

This function collects data associated with sales for a given store for a given item number (*item\_no*) and returns the number of items sold. One possible, albeit contrived, scenario would have the function communicating with the store via a network interface. The function is created using the DEFINER context. This means that when a user logs onto its database account and executes an SQL request that invokes this function, it uses the logon ID associated with the sales authorization object, *not* the user that is executing the invoking SQL request. In this example, OS user *salesdept* has access to the external data the function reads to obtain the information it needs.

## Example 6: UDT Input Parameter Data Type in Scalar UDF Definition

This example creates a C aggregate UDF defined with a UDT input parameter and then uses it to select a UDT column from a table.

First create a new distinct type named *VARCHARUDT*:

```
CREATE TYPE VARCHARUDT AS VARCHAR(20000) FINAL;
```

Now create a new function named *udf\_agch002002udt* that uses the input parameter *parameter\_1* with the distinct UDT data type *VARCHARAUDT*:

```
CREATE FUNCTION udf_agch002002udt (
    parameter_1 VARCHARUDT)
RETURNS VARCHARUDT
CLASS AGGREGATE (20000)
LANGUAGE C
NO SQL
EXTERNAL NAME 'CS!udf_agch002002udt!udf_agch002002udt.c'
PARAMETER STYLE SQL;
```

Suppose you have created the following table:

```
CREATE TABLE aggr_data_table (
    a INTEGER,
    b VARCHARUDT);
```

You then insert one row into *aggr\_data\_table*:

```
INSERT INTO aggr_data_table VALUES (1, 'george');
```

You can now select the UDT column from *aggr\_date\_table* using the aggregate UDF *udf\_agch002002udt*:

```
SELECT udf_agch002002udt(aggr_data_table.b)
FROM aggr_data_table;
```

See *SQL External Routine Programming* for information about how to code external functions like *udf\_agch002002udt*.

## Example 7: VARIANT\_TYPE Input Parameter Data Type in UDF Definition

This example creates a C aggregate UDF defined with an input parameter of type *VARIANT\_TYPE*.

First create a new distinct data type named *INTEGERUDT*:

```
CREATE TYPE INTEGERUDT AS INTEGER FINAL;
```

Now create a new aggregate function named *udf\_agch002002dynudt* that uses the input parameter *parameter\_1* with a dynamic UDT type of *VARIANT\_TYPE*:

```
CREATE FUNCTION udf_agch002002dynudt (parameter_1 VARIANT_TYPE)
RETURNS INTEGERUDT CLASS AGGREGATE (4)
LANGUAGE C
NO SQL
EXTERNAL NAME 'CS!udf_agch002002dynudt!udf_agch002002dynudt.c'
PARAMETER STYLE SQL;
```

You can then use `udf_agch002002dynudt` in a SELECT request with the NEW VARIANT\_TYPE constructor expression as follows:

```
SELECT udf_agch002002dynudt (NEW VARIANT_TYPE (tbl1.a AS a,
      (tbl1.b + tbl1.c) AS b))
FROM Tbl1;
```

This SELECT request creates a dynamic UDT with two attributes named *a* and *b*.

See the CREATE FUNCTION/REPLACE FUNCTION topic “Function Name Overloading” in the *SQL Data Definition Language Detailed Topics* for an explanation of how writing UDFs using VARIANT\_TYPE can reduce or eliminate the overhead of creating multiple UDFs to handle function name overloading.

See *SQL Data Manipulation Language* for information about the NEW VARIANT\_TYPE constructor expression.

## Example 8: Java Scalar Function

The following request creates a Java scalar UDF named `judf_cref012003`:

```
CREATE FUNCTION judf_cref012003 (
    par1 BIGINT)
RETURNS BIGINT
CAST FROM INTEGER
SPECIFIC judf_cref012003
LANGUAGE JAVA
NO SQL
PARAMETER STYLE JAVA
NOT DETERMINISTIC
CALLED ON NULL INPUT
EXTERNAL NAME 'UDF_JAR:UserDefinedFunctions.mybigint(long)
      returns int';
```

## Example 9: Java Aggregate Function

The following request creates a Java aggregate UDF named `std_dev`:

```
CREATE FUNCTION std_dev (
    x FLOAT)
RETURNS FLOAT
CLASS AGGREGATE (79)
LANGUAGE JAVA
NO SQL
PARAMETER STYLE JAVA
EXTERNAL NAME 'UDF_JAR:UserDefinedFunctions.std_dev(
      com.teradata.fnc.Phase,
      com.teradata.fnc.Context[],
      double)
      returns java.lang.Double';
```

For aggregate UDFs, you must specify two extra object type parameters as part of the Java method: `com.teradata.fnc.Phase`, which specifies the current aggregate phase, and `com.teradata.fnc.Context`, which enables you to get or set the context during the execution. For details about these two parameters, see *SQL External Routine Programming*.

You can store the intermediate result of aggregate UDFs using either a byte-based or an object-based approach. The byte-based approach consumes less memory and provides better performance, but you must encode and decode the byte array stored in the intermediate storage yourself rather than the system doing the encoding and decoding for you automatically. The object-based method is more user-friendly because the encoding and decoding is done by Java object serialization, but it also affects performance negatively.

The object-based approach for Java aggregate functions requires you to specify a number of bytes with the CLASS AGGREGATE phrase whenever the number of bytes required by intermediate aggregate storage exceeds the default value of 64.

The specified CLASS AGGREGATE value is the maximum number of bytes that the intermediate aggregate storage can occupy in memory. Always set the value as small as possible, because its negative affect on the performance of the function is positively correlated with the class aggregate size.

For Java aggregate functions, the intermediate result is stored as an object that is serialized to a byte array. To keep the size of the intermediate storage small, it is a good practice to avoid using inner classes and to choose short names for the class and its data members. You should also calculate the number of bytes that is required to store the intermediate result for the object, then specify that number in the CLASS AGGREGATE clause. The following code fragment shows how to calculate the serialized size of an object in bytes:

```
public static int getSize(Object obj){
    int size=0;
    try{
        ByteArrayOutputStream barr = new ByteArrayOutputStream();
        ObjectOutputStream s = new ObjectOutputStream(barr);
        s.writeObject(obj);
        s.close();
        size=barr.toByteArray().length;
        System.out.println("obj="+obj+", size="+size);
    }catch(IOException e){
        e.printStackTrace();
    }
    return size;
}
```

## Related Topics

See the following statements for more information about user-defined functions and external authorization:

- [“ALTER FUNCTION” on page 16](#)
- [“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120](#)
- [“CREATE GLOBAL TEMPORARY TRACE TABLE” on page 186](#)
- [“DROP AUTHORIZATION” on page 553](#)
- [“DROP FUNCTION” on page 562](#)
- [“RENAME FUNCTION” on page 634](#)
- [“SET SESSION FUNCTION TRACE” on page 676](#)
- [“HELP FUNCTION” on page 715](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)

Also see *SQL External Routine Programming* for guidelines about coding external user-defined functions.

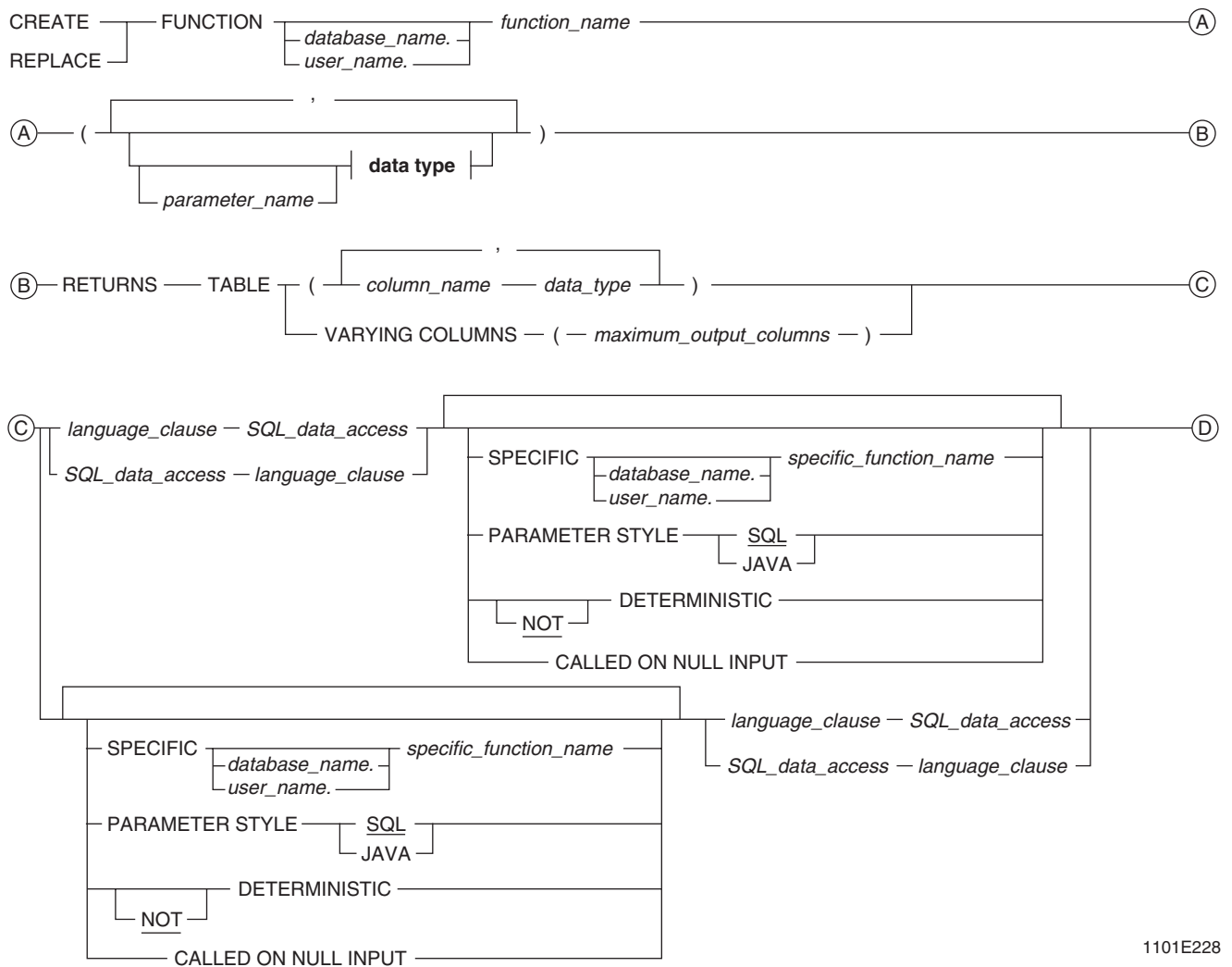


# CREATE FUNCTION (Table Form)

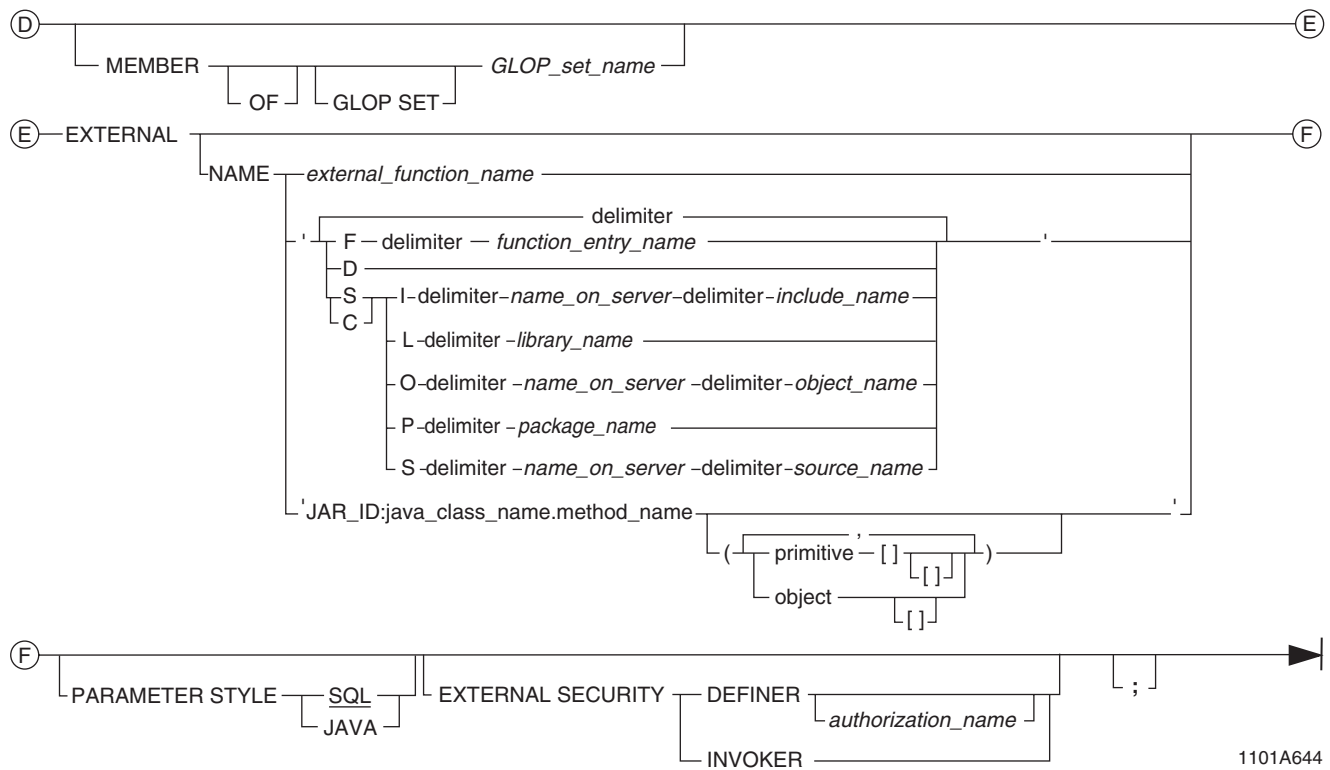
## Purpose

Creates a table function definition.

## Syntax



1101E228

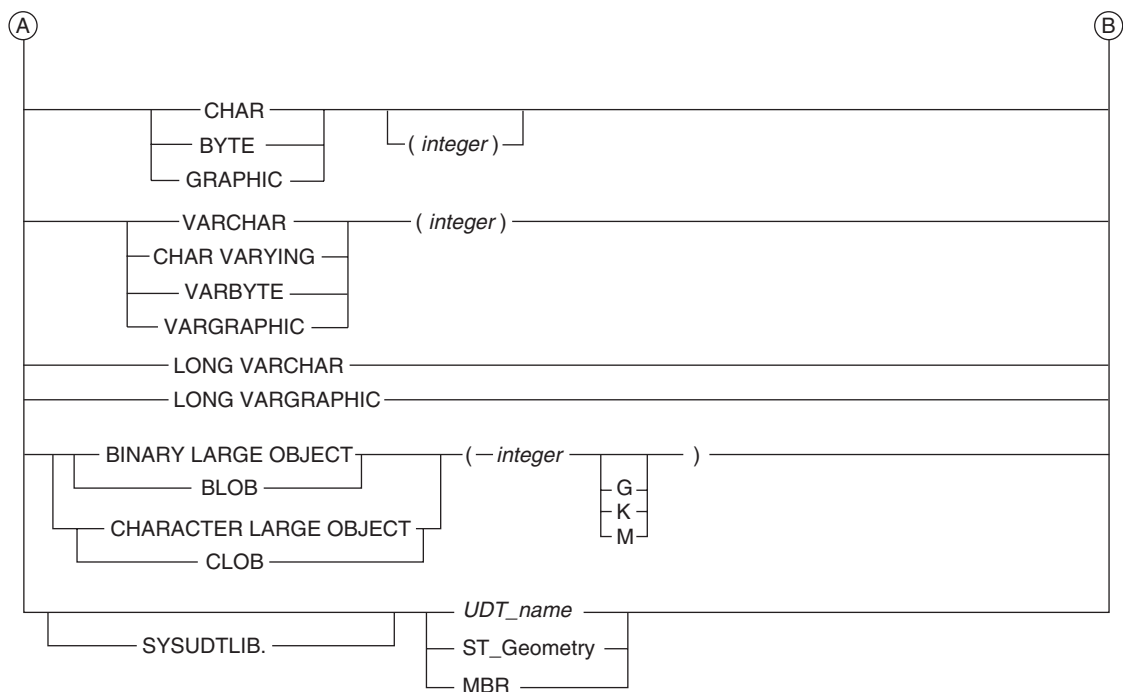


| Data Type        |                                                                        |
|------------------|------------------------------------------------------------------------|
| INTEGER          |                                                                        |
| SMALLINT         |                                                                        |
| BIGINT           |                                                                        |
| BYTEINT          |                                                                        |
| DATE             |                                                                        |
| TIME             |                                                                        |
| TIMESTAMP        | (fractional_seconds_precision) WITH TIMEZONE                           |
| INTERVAL YEAR    | (precision) TO MONTH                                                   |
| INTERVAL MONTH   | (precision)                                                            |
| INTERVAL DAY     | (precision) TO HOUR<br>MINUTE<br>SECOND (fractional_seconds_precision) |
| INTERVAL HOUR    | (precision) TO MINUTE<br>SECOND (fractional_seconds_precision)         |
| INTERVAL MINUTE  | (precision) TO SECOND (fractional_seconds_precision)                   |
| INTERVAL SECOND  | (precision, fractional_seconds_precision)                              |
| PERIOD(          | DATE)                                                                  |
| PERIOD(          | TIME (precision) WITH TIMEZONE)                                        |
| PERIOD(          | TIMESTAMP (precision) WITH TIMEZONE)                                   |
| REAL             |                                                                        |
| DOUBLE PRECISION |                                                                        |
| FLOAT            | (integer)                                                              |
| DECIMAL          |                                                                        |
| NUMERIC          | (integer, integer)                                                     |

(A)

(B)

1101A535



1101A536

where:

| Syntax element ...                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | <p>an optional database name specified if the function is to be created or replaced in a non-default database.</p> <p>If you use the recommended <i>SYSLIB</i> database as your UDF depository (see the CREATE FUNCTION/REPLACE FUNCTION topic “Function Calling Argument” in the <i>SQL Data Definition Language Detailed Topics</i>), you must modify the size of its permanent space and grant appropriate access rights on it because it is created with 0 permanent space and without access privileges.</p> <p>Users must have the EXECUTE FUNCTION privilege on any UDF they run from <i>SYSLIB</i>.</p> <p>If you do not specify a database name, then the system creates or replaces the function within the current database.</p> |

| Syntax element ...   | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>function_name</i> | <p>the calling name for the function.</p> <p>If your Teradata Database runs on the MP-RAS operating system, you should keep the function name as short as possible (see the CREATE FUNCTION/REPLACE FUNCTION topic “Maximum Size of UNIX MP-RAS Command Line Argument Affects Names and Number of External Routines in a Database” in <i>SQL Data Definition Language Detailed Topics</i>).</p> <p>You cannot give a UDF the same name as an existing Teradata Database-supplied function (also known as an intrinsic function) unless you enclose the name in double quotation marks. For example, “TRIM” ( ). Using the names of intrinsic functions for UDFs is a poor programming practice and should be avoided.</p> <p><i>function_name</i> must match the spelling and case of the C function name exactly if you do not specify a <i>specific_function_name</i> or <i>external_function_name</i>. This applies only to the definition of the function, not to its use.</p> <p>SQL supports function name overloading within the same function class (see the CREATE FUNCTION/REPLACE FUNCTION topic “CLASS function_class” in <i>SQL Data Definition Language Detailed Topics</i>), so <i>function_name</i> need not be unique within its class; however, you cannot give the same name to both a scalar and an aggregate function within the same database.</p> <p>Parameter data types and number of parameters are used to distinguish among different functions within the same class that have the same <i>function_name</i>.</p> <p>See <i>SQL External Routine Programming</i> for further information about function overloading.</p> <p>See the following CREATE FUNCTION/REPLACE FUNCTION topics in <i>SQL Data Definition Language Detailed Topics</i> for further information:</p> <ul style="list-style-type: none"> <li>• “Function Identifiers”</li> <li>• “Function Name”</li> <li>• “Function Calling Argument”</li> <li>• “Function Name Overloading”</li> <li>• “Parameter Names and Data Types”</li> </ul> |

| Syntax element ...         | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [parameter_name] data_type | <p>a parenthetical comma-separated list of data types, including UDTs and the VARIANT_TYPE UDT type, and optional parameter names for the variables to be passed to the function. The data types are required to define overloaded functions that have the same name and to discriminate among them.</p> <p>The VARIANT_TYPE UDT is not supported for parameters in a Java table function.</p> <p>The maximum number of parameters a UDF accepts is 128.</p> <p>BLOB and CLOB parameter data types <i>must</i> be represented by a locator (see <i>SQL Data Manipulation Language</i> for a description of locators), in contrast with RETURN TABLE clause LOB column data types, which must <i>not</i> be represented by locators. Also see <a href="#">“Example 8: Different LOB Specifications for Parameter and RETURNS TABLE Clauses” on page 182</a>).</p> <p>The Teradata Database does not support in-memory LOB parameters: an AS LOCATOR phrase must be specified for each LOB parameter.</p> <p>Note, however, that whenever a LOB that requires data type conversion is passed to a UDF, the LOB must be materialized for the conversion to take place.</p> <p>You must specify opening and closing parentheses even if no parameters are to be passed to the function.</p> <p>If you specify one parameter name, then you must specify names for all the parameters passed to the function.</p> <p>If you do not specify parameter names, the system assigns unique names to them in the form P1, P2, ..., Pn. These names are used in the COMMENT statement (see <a href="#">“COMMENT (Comment Placing Form)” on page 112</a>) and displayed in the report produced by the HELP FUNCTION statement (see <a href="#">“HELP” on page 684</a>), and appear in the text of error messages.</p> <p>The data type associated with each parameter is the type of the parameter or returned value. All Teradata Database data types are valid. Character data can also specify a CHARACTER SET clause.</p> <p>For data types that take a length or size specification, like BYTE, CHARACTER, DECIMAL, VARCHAR, and so on, the size of the parameter indicates the largest number of bytes that can be passed (see CREATE FUNCTION/REPLACE FUNCTION topic <a href="#">“Parameter Names and Data Types” in SQL Data Definition Language Detailed Topics</a>).</p> |
| RETURNS TABLE              | that the function returns a set of rows in a standard relational table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

| Syntax element ...                                   | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>column_name</i>                                   | <p>the name of a column in the set of rows to be returned by the function. You must define at least one column name and its data type for any table function definition.</p> <p>Each column name is limited to a maximum of 30 characters, with the same restrictions as other object identifiers. See <i>SQL Fundamentals</i> for a description of Teradata Database identifiers and a list of the characters they can contain.</p> <p>The maximum number of columns you can specify is 2,048.</p> <p>You cannot specify a <i>column_name</i> having a UDT type.</p> <p>If one of the specified columns has a LOB data type, then you must define at least one other non-LOB column.</p> <p>The complete set of column names and their accompanying data types defines the structure of the table the function returns to the caller.</p> |
| <i>data_type</i>                                     | <p>a data type for each column name you specify.</p> <p>If the type is one of the CHARACTER family, then you can also specify a CHARACTER SET clause.</p> <p>If the data type for a returned column is either BLOB or CLOB, then you <i>cannot</i> specify it with an AS LOCATOR phrase. Such a specification aborts the request and returns an error to the requestor.</p> <p>This is in direct contrast with the specification of LOB parameter data types, which <i>must</i> be specified with an AS LOCATOR phrase. Also see <a href="#">“Example 8: Different LOB Specifications for Parameter and RETURNS TABLE Clauses”</a> on page 182).</p> <p>You cannot specify any other attributes for a column other than its data type and a CHARACTER SET clause for character data types.</p>                                             |
| VARYING COLUMNS<br>( <i>maximum_output_columns</i> ) | <p>that the number of output columns to be returned by the function is not known before it is invoked, so limit them to a maximum of <i>maximum_output_columns</i> columns.</p> <p>The upper limit is 2,048 columns.</p> <p>There is no default value.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

| Syntax element ...                         | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                            |                                                 |   |   |     |     |      |      |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-------------------------------------------------|---|---|-----|-----|------|------|
| <i>language_clause</i>                     | <p>a code that represents the programming language in which the table function is written.</p> <p>The valid languages for writing UDFs are C and C++.</p> <table><tr><th>IF the UDF is written in this language ...</th><th>THEN the code for <i>language_clause</i> is ...</th></tr><tr><td>C</td><td>C</td></tr><tr><td>C++</td><td>CPP</td></tr><tr><td>Java</td><td>JAVA</td></tr></table> <p>For C and C++ functions, this must be specified as LANGUAGE C or LANGUAGE CPP even if the table function is supplied in object form.</p> <p>If the table function object is not written in C or C++, it must be compatible with C or C++ object code.</p> <p>This clause is mandatory.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Language Clause” in <i>SQL Data Definition Language Detailed Topics</i>.</p> | IF the UDF is written in this language ... | THEN the code for <i>language_clause</i> is ... | C | C | C++ | CPP | Java | JAVA |
| IF the UDF is written in this language ... | THEN the code for <i>language_clause</i> is ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                            |                                                 |   |   |     |     |      |      |
| C                                          | C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                            |                                                 |   |   |     |     |      |      |
| C++                                        | CPP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                            |                                                 |   |   |     |     |      |      |
| Java                                       | JAVA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                            |                                                 |   |   |     |     |      |      |
| <i>SQL_data_access</i>                     | <p>whether the external function body accesses the database or contains SQL statements</p> <p>This must be specified as NO SQL.</p> <p>This clause is mandatory.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “SQL Data Access Clause” in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                            |                                                 |   |   |     |     |      |      |



| Syntax element ...                                                                        | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |             |     |                                                                                                                             |      |                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------------|-----|-----------------------------------------------------------------------------------------------------------------------------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SPECIFIC [ <i>database_name</i>  <br><i>user_name</i> .]<br><i>specific_function_name</i> | <p>the specific name for the function.</p> <p>If your Teradata Database runs on the MP-RAS operating system, you should keep the specific function name as short as possible (see the CREATE FUNCTION/REPLACE FUNCTION topic “Maximum Size of UNIX MP-RAS Command Line Argument Affects Names and Number of External Routines in a Database” in <i>SQL Data Definition Language Detailed Topics</i>).</p> <p>Unlike <i>function_name</i> (see CREATE FUNCTION/REPLACE FUNCTION topic “function_name” in <i>SQL Data Definition Language Detailed Topics</i>), <i>specific_function_name</i> must be unique within the database.</p> <p>This name is stored in <i>DBC.TVM</i> as the name of the UDF database object (see the CREATE FUNCTION/REPLACE FUNCTION topics: “Function Identifiers” and “External Body Reference Clause” in <i>SQL Data Definition Language Detailed Topics</i>).</p> <p>This clause is mandatory for overloaded <i>function_names</i>, but otherwise optional and can only be specified once per function definition.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Specific Function Name Clause” in <i>SQL Data Definition Language Detailed Topics</i>.</p>                              |       |             |     |                                                                                                                             |      |                                                                                                                                                                                                                                                    |
| PARAMETER STYLE                                                                           | <p>the parameter passing convention to be used when passing parameters to the function.</p> <p>The specified parameter style must match the parameter passing convention of the external function.</p> <p>If you do not specify a parameter style at this point, you can specify one with the external body reference.</p> <p>This clause is optional for SQL table functions and can only be specified once per function definition. It is mandatory for Java table functions.</p> <table border="1"> <thead> <tr> <th>Style</th><th>Description</th></tr> </thead> <tbody> <tr> <td>SQL</td><td>Uses indicator variables to pass arguments.<br/>As a result, you can always pass nulls as inputs and return them in results.</td></tr> <tr> <td>JAVA</td><td>If the Java function must accept null arguments, then the EXTERNAL NAME clause must include the list of parameters and specify data types that map to Java objects.<br/>PARAMETER STYLE JAVA <i>must</i> be specified for all Java table functions.</td></tr> </tbody> </table> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Parameter Style Clause” in <i>SQL Data Definition Language Detailed Topics</i> for more information on parameter styles.</p> | Style | Description | SQL | Uses indicator variables to pass arguments.<br>As a result, you can always pass nulls as inputs and return them in results. | JAVA | If the Java function must accept null arguments, then the EXTERNAL NAME clause must include the list of parameters and specify data types that map to Java objects.<br>PARAMETER STYLE JAVA <i>must</i> be specified for all Java table functions. |
| Style                                                                                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |             |     |                                                                                                                             |      |                                                                                                                                                                                                                                                    |
| SQL                                                                                       | Uses indicator variables to pass arguments.<br>As a result, you can always pass nulls as inputs and return them in results.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |             |     |                                                                                                                             |      |                                                                                                                                                                                                                                                    |
| JAVA                                                                                      | If the Java function must accept null arguments, then the EXTERNAL NAME clause must include the list of parameters and specify data types that map to Java objects.<br>PARAMETER STYLE JAVA <i>must</i> be specified for all Java table functions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |             |     |                                                                                                                             |      |                                                                                                                                                                                                                                                    |

| Syntax element ...                             | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [NOT] DETERMINISTIC                            | <p>whether the function returns identical results for identical inputs.</p> <p>For example, if the function calls a random number generator as part of its processing, then the results of a function call cannot be known in advance of making the call and the function is NOT DETERMINISTIC.</p> <p>The default is NOT DETERMINISTIC.</p> <p>This clause is optional and can only be specified once per function definition.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Deterministic Characteristics Clause” in <i>SQL Data Definition Language Detailed Topics</i>.</p> |
| CALLED ON NULL INPUT                           | <p>that the function is always evaluated whether parameters are null at the time the function is to be called or not.</p> <p>This clause is optional and can only be specified once per function definition.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Null Call Clause” in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                        |
| MEMBER [OF] [GLOP SET]<br><i>GLOP_set_name</i> | <p>the name of the GLOP set this table function is associated with.</p> <p>It is not mandatory that the specified GLOP set exist at the time the table function is created.</p> <p>You can specify this clause anywhere between the RETURNS clause and the EXTERNAL clause.</p>                                                                                                                                                                                                                                                                                                          |
| EXTERNAL                                       | <p>the introduction to the mandatory external function body reference clause.</p> <p>This clause can specify two different things:</p> <ul style="list-style-type: none"> <li>• The keyword EXTERNAL only.</li> <li>• The keywords EXTERNAL NAME plus an external function name (with optional Parameter Style specification)</li> </ul> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “External Body Reference Clause” in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                  |
| NAME<br><i>external_function_name</i>          | <p>the entry point for the function object.</p> <p>Case is significant and must match the C or C++ function name.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “External Name Clause” in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                                                                                                               |

| Syntax element ...                     | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |              |   |                                                                                                                                                                                                                                |   |                                                                                                                                                                                                                                                                                     |   |                                                                                                                                                                                                                                                                                                |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|--------------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NAME<br><i>external_string_literal</i> | <p>a string that specifies the source and object components needed to build the function and, optionally, whether to compile the UDF C or C++ object code with debug symbols.</p> <p>Depending on the initial code in the sequence, the string specifies either the C/C++ function object name for the UDF or an encoded name or path for the components needed to create the function.</p> <p>The following table briefly documents the codes used to specify component locations:</p> <table> <tr> <th>IF you specify this code ...</th><th>THEN the ...</th></tr> <tr> <td>F</td><td> <p>string that follows is the entry point name of the C or C++ function object.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Function Entry Name Clause” in <i>SQL Data Definition Language Detailed Topics</i>.</p> </td></tr> <tr> <td>C</td><td> <p>source or object code for the function is stored on the client and the string that follows is the path to its location.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Client-Server UDF Code Specification” in <i>SQL Data Definition Language Detailed Topics</i>.</p> </td></tr> <tr> <td>S</td><td> <p>source or object code for the function is stored on the Teradata platform and the string that follows is the path to its location.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Client-Server UDF Code Specification” in <i>SQL Data Definition Language Detailed Topics</i>.</p> </td></tr> </table> | IF you specify this code ... | THEN the ... | F | <p>string that follows is the entry point name of the C or C++ function object.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Function Entry Name Clause” in <i>SQL Data Definition Language Detailed Topics</i>.</p> | C | <p>source or object code for the function is stored on the client and the string that follows is the path to its location.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Client-Server UDF Code Specification” in <i>SQL Data Definition Language Detailed Topics</i>.</p> | S | <p>source or object code for the function is stored on the Teradata platform and the string that follows is the path to its location.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Client-Server UDF Code Specification” in <i>SQL Data Definition Language Detailed Topics</i>.</p> |
| IF you specify this code ...           | THEN the ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                              |              |   |                                                                                                                                                                                                                                |   |                                                                                                                                                                                                                                                                                     |   |                                                                                                                                                                                                                                                                                                |
| F                                      | <p>string that follows is the entry point name of the C or C++ function object.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Function Entry Name Clause” in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                              |              |   |                                                                                                                                                                                                                                |   |                                                                                                                                                                                                                                                                                     |   |                                                                                                                                                                                                                                                                                                |
| C                                      | <p>source or object code for the function is stored on the client and the string that follows is the path to its location.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Client-Server UDF Code Specification” in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                              |              |   |                                                                                                                                                                                                                                |   |                                                                                                                                                                                                                                                                                     |   |                                                                                                                                                                                                                                                                                                |
| S                                      | <p>source or object code for the function is stored on the Teradata platform and the string that follows is the path to its location.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Client-Server UDF Code Specification” in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                              |              |   |                                                                                                                                                                                                                                |   |                                                                                                                                                                                                                                                                                     |   |                                                                                                                                                                                                                                                                                                |

| Syntax element ...                                    | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |        |                 |                                                                                                                                                                                                   |         |                                                                                                                                                                                  |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NAME<br><i>external_string_literal</i><br>(continued) | <p>The following table briefly documents the path specifications for the external function. The character ; represents an arbitrary user-defined delimiter.</p> <p>You must use the same delimiter throughout the string specification.</p> <table> <tr> <th>File Type</th><th>Syntax</th></tr> <tr> <td>Function object</td><td> <i>F;function_entry_point_name</i><br/> See the CREATE FUNCTION/REPLACE FUNCTION topic “Function Entry Name Clause” on page 342 in <i>SQL Data Definition Language Detailed Topics</i> for details. </td></tr> <tr> <td>Include</td><td> <i>I;name_on_server;include_name</i><br/> See the CREATE FUNCTION/REPLACE FUNCTION topic “Include Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. </td></tr> <tr> <td>Library</td><td> <i>L;library_name</i><br/> See the CREATE FUNCTION/REPLACE FUNCTION topic “Library Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. </td></tr> <tr> <td>Object</td><td> <i>O;name_on_server;object_name</i><br/> See the CREATE FUNCTION/REPLACE FUNCTION topic “Object File Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. </td></tr> <tr> <td>Package</td><td> <i>P;package_name</i><br/> See the CREATE FUNCTION/REPLACE FUNCTION topic “Package Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. </td></tr> <tr> <td>Source</td><td> <i>S;name_on_server;source_name</i><br/> See the CREATE FUNCTION/REPLACE FUNCTION topic “Source File Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. </td></tr> </table> | File Type | Syntax | Function object | <i>F;function_entry_point_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Function Entry Name Clause” on page 342 in <i>SQL Data Definition Language Detailed Topics</i> for details. | Include | <i>I;name_on_server;include_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Include Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. | Library | <i>L;library_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Library Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. | Object | <i>O;name_on_server;object_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Object File Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. | Package | <i>P;package_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Package Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. | Source | <i>S;name_on_server;source_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Source File Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. |
| File Type                                             | Syntax                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           |        |                 |                                                                                                                                                                                                   |         |                                                                                                                                                                                  |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |
| Function object                                       | <i>F;function_entry_point_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Function Entry Name Clause” on page 342 in <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |        |                 |                                                                                                                                                                                                   |         |                                                                                                                                                                                  |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |
| Include                                               | <i>I;name_on_server;include_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Include Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           |        |                 |                                                                                                                                                                                                   |         |                                                                                                                                                                                  |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |
| Library                                               | <i>L;library_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Library Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |        |                 |                                                                                                                                                                                                   |         |                                                                                                                                                                                  |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |
| Object                                                | <i>O;name_on_server;object_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Object File Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |        |                 |                                                                                                                                                                                                   |         |                                                                                                                                                                                  |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |
| Package                                               | <i>P;package_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Package Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |        |                 |                                                                                                                                                                                                   |         |                                                                                                                                                                                  |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |
| Source                                                | <i>S;name_on_server;source_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Source File Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |        |                 |                                                                                                                                                                                                   |         |                                                                                                                                                                                  |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |

| Syntax element ...                                    | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |                                                  |                      |                                                                                         |                             |                                      |          |            |               |                                                                    |                        |                                                                                                   |                    |                                                           |                  |                                                                                                                                                                                           |               |                                                                                  |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------|-----------------------------|--------------------------------------|----------|------------|---------------|--------------------------------------------------------------------|------------------------|---------------------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------------------------------------------------------------|
| NAME<br><i>external_string_literal</i><br>(continued) | <p>To compile the C or C++ object code with debug symbols for core dump analysis, specify the delimited character D at any point in the external string literal. This feature does not produce a useful .so or .dll file with debug symbols for Linux and Windows systems.</p> <table> <tr> <th>IF you ...</th><th>THEN the system compiles the UDF source code ...</th></tr> <tr> <td>specify the D option</td><td>and produces debug symbols.<br/>Generates a core file when a protected mode UDF crashes.</td></tr> <tr> <td>do not specify the D option</td><td>but does not generate debug symbols.</td></tr> </table> <p>The purpose of the D option is to provide debug symbol information for the UDF when examining a UDF core file with gdb (see <i>SQL External Routine Programming</i>).</p> <p>See the user documentation for your C or C++ compiler and debugger for debugging information.</p> <p>A side effect of specifying the D option is that linked libraries become larger because they must also contain all the symbol information.</p> <p>The following variables apply to Java functions only:</p> <table> <tr> <th>Variable</th><th>Definition</th></tr> <tr> <td><i>JAR_ID</i></td><td>The registered name of the JAR file associated with this function.</td></tr> <tr> <td><i>java_class_name</i></td><td>The name of the Java class contained within the JAR that contains the Java method to be executed.</td></tr> <tr> <td><i>method_name</i></td><td>The name of the method executed when the UDF is executed.</td></tr> <tr> <td><i>primitive</i></td><td>A primitive parameter class.<br/>The following types are valid: <ul style="list-style-type: none"> <li>• byte</li> <li>• double</li> <li>• int</li> <li>• long</li> <li>• short</li> </ul> </td></tr> <tr> <td><i>object</i></td><td>An object parameter class definition in the format <code>java.pkg.class</code>.</td></tr> </table> | IF you ... | THEN the system compiles the UDF source code ... | specify the D option | and produces debug symbols.<br>Generates a core file when a protected mode UDF crashes. | do not specify the D option | but does not generate debug symbols. | Variable | Definition | <i>JAR_ID</i> | The registered name of the JAR file associated with this function. | <i>java_class_name</i> | The name of the Java class contained within the JAR that contains the Java method to be executed. | <i>method_name</i> | The name of the method executed when the UDF is executed. | <i>primitive</i> | A primitive parameter class.<br>The following types are valid: <ul style="list-style-type: none"> <li>• byte</li> <li>• double</li> <li>• int</li> <li>• long</li> <li>• short</li> </ul> | <i>object</i> | An object parameter class definition in the format <code>java.pkg.class</code> . |
| IF you ...                                            | THEN the system compiles the UDF source code ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |            |                                                  |                      |                                                                                         |                             |                                      |          |            |               |                                                                    |                        |                                                                                                   |                    |                                                           |                  |                                                                                                                                                                                           |               |                                                                                  |
| specify the D option                                  | and produces debug symbols.<br>Generates a core file when a protected mode UDF crashes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |            |                                                  |                      |                                                                                         |                             |                                      |          |            |               |                                                                    |                        |                                                                                                   |                    |                                                           |                  |                                                                                                                                                                                           |               |                                                                                  |
| do not specify the D option                           | but does not generate debug symbols.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |            |                                                  |                      |                                                                                         |                             |                                      |          |            |               |                                                                    |                        |                                                                                                   |                    |                                                           |                  |                                                                                                                                                                                           |               |                                                                                  |
| Variable                                              | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |                                                  |                      |                                                                                         |                             |                                      |          |            |               |                                                                    |                        |                                                                                                   |                    |                                                           |                  |                                                                                                                                                                                           |               |                                                                                  |
| <i>JAR_ID</i>                                         | The registered name of the JAR file associated with this function.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |                                                  |                      |                                                                                         |                             |                                      |          |            |               |                                                                    |                        |                                                                                                   |                    |                                                           |                  |                                                                                                                                                                                           |               |                                                                                  |
| <i>java_class_name</i>                                | The name of the Java class contained within the JAR that contains the Java method to be executed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |                                                  |                      |                                                                                         |                             |                                      |          |            |               |                                                                    |                        |                                                                                                   |                    |                                                           |                  |                                                                                                                                                                                           |               |                                                                                  |
| <i>method_name</i>                                    | The name of the method executed when the UDF is executed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            |                                                  |                      |                                                                                         |                             |                                      |          |            |               |                                                                    |                        |                                                                                                   |                    |                                                           |                  |                                                                                                                                                                                           |               |                                                                                  |
| <i>primitive</i>                                      | A primitive parameter class.<br>The following types are valid: <ul style="list-style-type: none"> <li>• byte</li> <li>• double</li> <li>• int</li> <li>• long</li> <li>• short</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            |                                                  |                      |                                                                                         |                             |                                      |          |            |               |                                                                    |                        |                                                                                                   |                    |                                                           |                  |                                                                                                                                                                                           |               |                                                                                  |
| <i>object</i>                                         | An object parameter class definition in the format <code>java.pkg.class</code> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |            |                                                  |                      |                                                                                         |                             |                                      |          |            |               |                                                                    |                        |                                                                                                   |                    |                                                           |                  |                                                                                                                                                                                           |               |                                                                                  |

| Syntax element ...                   | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|-------------------------------|-----------------------------------------------------------------------------------------|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EXTERNAL SECURITY                    | <p>keywords introducing the external security clause.</p> <p>This clause is mandatory for external UDFs that perform operating system I/O operations.</p> <p>If you do not specify an external security clause, but the UDF being defined performs OS I/O, then the results of that I/O are unpredictable. The most likely outcome is crashing the database, and perhaps crashing the entire system.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “External Security Clause” in <i>SQL Data Definition Language Detailed Topics</i> for information about the EXTERNAL SECURITY clause and how it is used for UDFs.</p> <p>See <a href="#">“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120</a> for information about creating authorizations for external routines.</p>                                                                                                                                                    |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |
| DEFINER                              | <p>that the UDF runs in the client user context of the associated security authorization object created for this purpose, which is contained within the same database as the function.</p> <table border="1"> <thead> <tr> <th>IF you ...</th><th>THEN ...</th></tr> </thead> <tbody> <tr> <td>specify an authorization name</td><td>an authorization object with that name must be defined before you can run the function.</td></tr> <tr> <td>do not specify an authorization name</td><td> <p>you must define a default DEFINER authorization object.</p> <p>The default authorization object must be defined before a user can run the function.</p> </td></tr> </tbody> </table> <p>The system reports a warning if the specified authorization name does not exist at the time the UDF is created, stating that no authorization name exists.</p> <p>See <a href="#">“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120</a>.</p> | IF you ... | THEN ... | specify an authorization name | an authorization object with that name must be defined before you can run the function. | do not specify an authorization name | <p>you must define a default DEFINER authorization object.</p> <p>The default authorization object must be defined before a user can run the function.</p> |
| IF you ...                           | THEN ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |
| specify an authorization name        | an authorization object with that name must be defined before you can run the function.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |
| do not specify an authorization name | <p>you must define a default DEFINER authorization object.</p> <p>The default authorization object must be defined before a user can run the function.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |
| <i>authorization_name</i>            | <p>an optional authorization name.</p> <p>The specified authorization object must already be defined (see <a href="#">“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120</a> for further information) or the system reports an error.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |
| INVOKER                              | <p>that the function runs in the OS user context with the associated default authorization object that exists for this purpose.</p> <p>See <a href="#">“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120</a>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |

| Syntax element ... | Specifies ...                                                                                                                                                                                                                                                                                              |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PARAMETER STYLE    | See “PARAMETER STYLE” earlier in this table.<br><br>If you do not specify a parameter style at this point, you can specify one after you specify a language clause and an SQL data access clause.<br><br>You cannot specify parameter styles more than once in the same CREATE/REPLACE FUNCTION statement. |

## ANSI Compliance

CREATE FUNCTION (Table Form) is compliant with the ANSI SQL:2008 standard.

## Required Privileges

You must have explicit CREATE FUNCTION privileges on the database in which the table function is to be contained to perform the CREATE FUNCTION statement.

The system does not grant the CREATE FUNCTION privilege automatically when you create a database or user: you must grant that privilege explicitly.

CREATE FUNCTION is not granted implicitly on the databases and functions owned by a database or user unless the owner also has an explicit WITH GRANT OPTION privilege defined for itself.

## Privileges Granted Automatically

The following privileges are granted automatically to the creator of a table function:

- DROP FUNCTION
- EXECUTE FUNCTION

## Example 1

This example takes variable input arguments based on input from a previous correlated subquery in the FROM clause of a SELECT statement, which is not shown. The function definition inputs XML text, which it then parses to extract a customer ID, store number, and the set of items purchased. The output produces one row per item purchased, with the columns being based on existing columns in the table defined in the function definition.

```
CREATE FUNCTION xml_extract( xml_text VARCHAR(64000))
  RETURNS TABLE (cust_id INTEGER,
                  store   INTEGER,
                  item     INTEGER)
LANGUAGE C
NO SQL
EXTERNAL;
```

## Example 2

Assume you have the following table function definition:

```
CREATE FUNCTION xml_extract( xml_text LOCATOR CLOB)
  RETURNS TABLE (cust_id INTEGER,
                  store    INTEGER,
                  item      INTEGER)
  LANGUAGE C
  NO SQL
  EXTERNAL;
```

This function extracts all items from the CLOB *xml\_text* that have been ordered from a particular store by a particular customer by means of a web application. It then produces one result row for each item ordered.

The XML data is already in a database table with the following table definition:

```
CREATE TABLE xml_tbl (
  store_no INTEGER,
  refnum    INTEGER,
  xml_store_text CLOB)
  UNIQUE PRIMARY INDEX (store_no, refnum);
```

Here are the assumptions underlying the analysis of the XML data by means of the *xml\_extract* table function:

- Table *xml\_tbl* contains the following columns:
  - A store number column named *store\_no*.
  - A reference number column named *refnum*.
  - An XML text column named *xml\_store\_text*.
- The *xml\_store\_text* column contains the XML-formatted text for customers who ordered web-based items from the store.
- Each XML text data column contains information for the customer who placed the order as well as the items that customer ordered.

The purpose of the table function is to extract all items the customer ordered from the XML document. One XML row is created for each order placed by the online web-based system. Because the XML text could consist of several items, a table function is the natural approach to extracting the data, with one row being extracted for each item ordered. If there were 10 items in the XML text, then the table function would return a 10-row table.

The following SELECT request shows a possible application for the *xml\_extract* table function:

```
SELECT l.customer_id l.store, l.item,
  FROM (SELECT xml_store_text
        FROM xml_tbl AS x
        WHERE store_no = 25), TABLE(xml_extract(x.xml_text_store))
        AS l (cust_id, store, item);
```

This SELECT request produces one row for each item bought by all customers from store 25. Its first derived table produces the XML test field from all rows with a store number of 25. The second derived table is the result of evaluating table function *xml\_extract*.



**Aside**

This query specifies two tables in the FROM clause: table *x* and table *l*, where table *l* is the result of the table function. The qualifying rows of the *xml\_tbl* aliased as *x* are combined as a Cartesian Product with the rows produced by the table function as table *l*. This is *probably* not the desired result.<sup>2</sup>

You can rewrite this query to return just the distinct rows as follows:

```
SELECT DISTINCT l.customer_id l.store, l.item,
FROM (SELECT xml_store_text
      FROM xml_tbl AS x
      WHERE store_no = 25), TABLE(xml_extract(x.xml_store_text))
      AS l;
```

**End of Aside**

The logical process followed by the original SELECT operation is as follows:

- 1 Create the first derived table from the first subquery in the FROM clause with the table correlation name *x*.
- 2 Evaluate the table function.

The function has an input argument that references column *x.xml\_text\_store* from the derived table. This means that the database must invoke the table function repeatedly in a loop for each row produced by table *x*. The loop ends when the table function returns with the "no more data" message.

The process followed by the loop is as follows:

- a Read a row for table *x* where *store\_no* = 25.
- b Determine whether such a row is found.

| IF a matching row is ... | THEN ...             |
|--------------------------|----------------------|
| found                    | continue processing. |
| not found                | stop processing.     |

- c Call the table function *xml\_extract(x.xml\_text\_store)*.
- d Determine whether there is more data to process.

| IF the call ...                                                | THEN ...             |
|----------------------------------------------------------------|----------------------|
| does not return with a SQLSTATE code of '02000' (no more data) | continue processing. |
| returns with a SQLSTATE code of '02000'                        | go to Stage g.       |

2. It is also true that the process used to achieve the result is not quite what the ANSI SQL:2008 standard specifies, because the subquery is processed as a noncorrelated subquery, while the ANSI standard requires it to be processed as a correlated subquery.

- e Write the new row produced by the *xml\_extract* table function.
  - f Go to Stage c.
  - g End of process.
- 3 Return results to requestor.
  - 4 End of process.

To elaborate further from yet another perspective, Teradata Database undertakes the following process when solving this problem:

- 1 The system passes the *x.xml\_text\_store* result produced by the derived table SELECT request as input to the table function *xml\_extract*.
- 2 The system invokes the table function repeatedly for the same row.  
Each time the table function is called, it produces one row containing the *cust\_id*, *store*, and *item* columns.
- 3 When the table function has exhausted everything from that *xml\_text\_store* CLOB, it returns with an SQLSTATE of “no data” (‘02000’).
- 4 This “no more data” result causes the system to read the next row produced by the first derived table.
- 5 The system repeats the process for another customer, generating more rows for the next *xml\_text\_store*.
- 6 End of process.

### Example 3: Constant Reference Table Function

This example shows a constant reference table function equijoined to another table.

Note the following things about this example:

- The table function is sent to all AMPs with the same constant data; therefore, it is a constant mode table function (see “Constant Mode Table Function Body” in *SQL External Routine Programming*)
- The table function *tudf1* produce all the rows selected.

After that, the WHERE condition selects a subset from those produced. Only the qualifying rows are returned to the requestor.

```
SELECT  *
FROM    tbl_1, TABLE(tudf1(28.8, 109)) AS tf2
WHERE   tbl_1.c1 = tf2.c1;
```

### Example 4: Variable Reference Table Function

This example shows a variable reference table function equijoined to another table.

Note the following things about this example:

- The table function is sent to all AMPs and is passed *tbl.c1* from all rows in *tbl1*; therefore it is a variable mode table function (see “Variable Mode Table Function Body” in *SQL External Routine Programming*).
- The designer of this table function added a third argument to demonstrate that the function can provide some intelligence by not producing any rows unless the condition “equal” is met. For example, if the input argument *tbl\_l.c1* and the row for value *tf2.c1* are not equal, the function does not produce any rows. This code eliminates the need for a subsequent step to filter rows produced by the table function resulting from the WHERE clause condition.

```
SELECT *
FROM tbl_1, TABLE(tudf1(28.8, tbl_1.c1, 'equal')) AS tf2
WHERE tbl_1.c1 = tf2.c1;
```

### Example 5: Variable Reference Table Function Called From a Derived Table

This example shows a variable reference table function (see “Variable Mode Table Function Body” in *SQL External Routine Programming*) equijoined to a derived table.

The derived table *dt1* is created first as a subset of *tbl1*, then a column *dt1.c1* for each row is passed to the table function. The resultant rows of the table function are combined with the selected rows of the derived table by means of the WHERE condition.

The relevant function definition is as follows:

```
CREATE FUNCTION tudf1 (FLOAT, INTEGER, INTEGER)
RETURN TABLE (
  c1 DECIMAL,
  c2 INTEGER,
  c3 INTEGER)
... ;
```

The SELECT request that uses this table function is as follows:

```
SELECT dt1.c1, tf2.c2, tf2.c3
FROM (SELECT c1, c2
      FROM tbl1
      WHERE c1 < 500) AS dt1,
      TABLE (tudf1(45.6, 193, dt1.c1)) AS tf2 (nc1, nc2, nc3)
WHERE dt1.c1 = tf2.nc1);
```

### Example 6: Ordering Input Parameters to a Table Function

The following simple example illustrates the use of the HASH BY and LOCAL ORDER BY clauses for a table UDF. Table function *add2int* takes two integer values as input and returns both of them and their sum.

Query Q1 selects all columns from *add2int*, which requests its input, *dt*, to be hashed by *dt.y1* and value-ordered on each AMP by *dt.x1*. Note that the specified hashing and local ordering might not be relevant to the *add2int* function and is only used for illustration.

The expected outcome of Q1 is that *dt* is first spooled and then hashed by *y1* among the AMPs. On each AMP, the rows are sorted by the value of *x1*. The final hashed and sorted spool is used as the input to *add2int*.

```
CREATE TABLE t1 (  
    a1 INTEGER,  
    b1 INTEGER);  
  
CREATE TABLE t2 (  
    a2 INTEGER,  
    b2 INTEGER);  
  
REPLACE FUNCTION add2int (  
    a INTEGER,  
    b INTEGER)  
RETURNS TABLE (  
    addend1 INTEGER,  
    addend2 INTEGER,  
    mysum INTEGER)  
SPECIFIC add2int  
LANGUAGE C  
NO SQL  
PARAMETER STYLE SQL  
NOT DETERMINISTIC  
CALLED ON NULL INPUT  
EXTERNAL NAME 'CS!add3int!add2int.c';  
  
/* Query Q1 */  
WITH dt(x1,y1) AS (SELECT a1,b1  
                      FROM t1)  
  
SELECT *  
FROM TABLE (add2int(dt.x1,dt.y1)  
HASH BY y1  
LOCAL ORDER BY x1) AS tf;
```

## Example 7:

If you are running a dual active Teradata system, or if you have a second Teradata system for a development or test machine, there might be times when you would need to pass data between the two platforms. For example, it might be useful to query the dictionary tables from one system so they can be correlated with the other. This example illustrates how you might do that.

The following SELECT statement uses a table function named *tdat* that executes a query on a remote Teradata system and then returns the answer set to the requesting system. In this example, the UDF returns all the database names in the dictionary tables of the other system.

```
SELECT *  
FROM table(rdg.tdat(2,1,'adw1/rdg,rdg', 'SELECT databasename FROM  
    dbc.databasesV'));
```

This SELECT statement is passed as a fixed input argument of the table function from the requesting system and is executed on the target system, as is the logon string for that system.

The DDL to create the table function is as follows:

```
CREATE FUNCTION rdg.tdat
  (rowc          INTEGER,
   InLineNum     INTEGER,
   logonstr      VARCHAR(50)    CHARACTER SET LATIN,
   sqlRqst       VARCHAR(512)   CHARACTER SET LATIN)
RETURNS TABLE (
  ampId         INTEGER,
  cnt           INTEGER,
  OutLineNum    INTEGER,
  str1          VARCHAR(256)    CHARACTER SET LATIN,
  .
  .
  .
  str20         VARCHAR(256)    CHARACTER SET LATIN)
SPECIFIC tdat
LANGUAGE C
NO SQL
PARAMETER STYLE SQL
NOT DETERMINISTIC
CALLED ON NULL INPUT
EXTERNAL NAME 'SS:tdat:/home/rdg/tdat/Tdat.c:SL:cliv2';
```

By creating a view across two Teradata systems you can compare dictionary content across both platforms and compare detailed data such as table space or access rights.

The following view compares the rows that appear in the *DBC.Tables* view of each system:

```
CREATE VIEW allTables AS
  SELECT 'Local System' AS system, databasename, tablename, version,
         tablekind, protectionType, JournalFlag, CreatorName,
         requesttext(VARCHAR(100))
  FROM DBC.tables
UNION
  SELECT 'Remote System', str1 (CHAR(30)), str2 (CHAR(30)),
         str3 (INTEGER), str4 (CHAR(1)), str5 (CHAR(1)),
         str6 (CHAR(2)), str7 (CHAR(30)), str8 (VARCHAR(100))
  FROM table(rdg.tdat(2,1,'adw1/rdg,rdg', 'SELECT databasename,
         tablename, version, tablekind, protectionType,
         JournalFlag, CreatorName, requesttext(VARCHAR(100))
         FROM DBC.tables')) T;
```

A sampling of data returned from the remotely performed SELECT query, when ordered by tablename (for easy cross comparison, looks like this:

| System        | DatabaseName | TableName    | Version | TableKind |
|---------------|--------------|--------------|---------|-----------|
| -----         | -----        | -----        | -----   | -----     |
| Remote System | test         | a            | 1       | T         |
| Local System  | DBC          | AccessRights | 1       | T         |
| Remote System | DBC          | AccessRights | 1       | T         |
| Remote System | DBC          | AllSpaceV    | 1       | V         |
| Local System  | DBC          | AllSpaceV    | 1       | V         |
| Local System  | rdg          | allamp       | 1       | T         |
| Remote System | test         | allamp       | 1       | T         |

## Example 8: Different LOB Specifications for Parameter and RETURNS TABLE Clauses

The following example indicates the different ways you must specify LOB data types for function parameters and table columns, respectively. Notice how the parameter type specifications require the specification of an AS LOCATOR phrase, while the table column specifications prohibit the use of an AS LOCATOR phrase.

```
CREATE FUNCTION lobtf_concat3 (  
    NumRows INTEGER,  
    A      BLOB AS LOCATOR,  
    B      VARBYTE(64000),  
    C      BLOB AS LOCATOR)  
RETURNS TABLE (ampnum  INTEGER,  
                 a_out   BLOB(10),  
                 b_out   VARBYTE(10),  
                 c_out   BLOB(10),  
                 myresult BLOB(30))  
  
LANGUAGE C  
NO SQL  
PARAMETER STYLE SQL  
EXTERNAL NAME 'SS!lobtf_concat3!/home/i18n/hsf/tf/c/  
lobtf_concat3.c';
```

## Example 9: Dynamic Result Row Specification

The following example defines a table function named *extract\_store\_data* that has variable output columns.

The SELECT request following the function definition uses *extract\_store\_data* to parse the input text string and extract store sales data into the *store\_data* table.

```
CREATE FUNCTION extract_store_data (  
    text      VARCHAR(32000),  
    from_store INTEGER)  
RETURNS TABLE VARYING COLUMNS (10)  
SPECIFIC extract_store_data  
LANGUAGE C  
NO SQL  
PARAMETER STYLE SQL  
NOT DETERMINISTIC  
EXTERNAL NAME 'SS!extract_store_data!extract_store_data.c';  
  
INSERT INTO store_data  
SELECT *  
FROM (TABLE(extract_store_data('...', 1000)  
RETURNS store_data) AS store_sales;
```

## Example 10: Running a Table Function With a Dynamic Result Row Specification and Loading the Resulting Data Into a Base Data Table

The following example shows a table function being called from a SELECT request to return a set of rows from an external source. The function is defined with a maximum number of 256 output parameters.

```
CREATE FUNCTION sales_retrieve(store_no INTEGER)
RETURNS TABLE VARYING COLUMNS (256)
LANGUAGE C
NO SQL
PARAMETER STYLE SQL
EXTERNAL NAME '...';
```

The *sales\_retrieve* function reads some data from an external source and produce rows based on the data it reads.

Both of the following INSERT ... SELECT requests accomplish the job of inserting all rows produced by *sales\_retrieve* into the table named *sales\_table*, which is defined as follows:

```
CREATE TABLE sales_table (
    store    INTEGER,
    item     INTEGER,
    quantity INTEGER);
```

The following requests are equivalent INSERT ... SELECT requests for loading the output of *sales\_retrieve* into *sales\_table*:

```
INSERT INTO sales_table
SELECT *
FROM TABLE (sales_retrieve(9005)
RETURNS (store    INTEGER,
         item     INTEGER,
         quantity INTEGER)) AS s;

INSERT INTO sales_table
SELECT *
FROM TABLE (sales_retrieve(9005)
RETURNS sales_table) AS s;
```

## Example 11: Table Function With a UDT Parameter That Returns a Column With a UDT Data Type

This example creates a table UDF with a UDT parameter that returns a distinct UDT column named *udtc4*.

First create a new distinct data type named *TABLEINT*:

```
CREATE TYPE TABLEINT AS INTEGER FINAL;
```

Now create a new table function named *fnc\_tbf001udt* that declares the input parameter *p2* with a data type of *TABLEINT*:

```
CREATE FUNCTION fnc_tbf001udt(  
    p1 INTEGER,  
    p2 TABLEINT)  
RETURNS TABLE (c1    INTEGER,  
                 c2    INTEGER,  
                 c3    VARCHAR(3),  
                 udtc4 TABLEINT)  
  
LANGUAGE C  
NO SQL  
PARAMETER STYLE SQL  
EXTERNAL NAME 'CS!fnc_tbf001udt!fnc_tbf001udt.c';
```

Now use the table function in a *SELECT* request to return results in the form of a table:

```
SELECT *  
FROM TABLE(fnc_tbf001udt(1, 1)) AS t1  
WHERE t1.c2 IN (0,1);
```

See *SQL External Routine Programming* for information about how to code external functions similar to *fnc\_tbf001udt*.

## Example 12: Java Table UDF

The following example shows two different ways to create a definition for a table function. The functions behave identically.

Note the void return type and usage of return parameter types for the Java method signature in this example, which is different from that of scalar and aggregate UDFs. The difference is necessary because of the possibility of multiple returned column values from the table UDF.

```
CREATE FUNCTION mytableudf (  
    p1 INTEGER )  
RETURNS TABLE (c1 INTEGER,  
                 c2 INTEGER)  
  
LANGUAGE JAVA  
NO SQL  
PARAMETER STYLE JAVA  
EXTERNAL NAME 'UDF_JAR:UserDefinedFunctions.mytableudf';  
  
public static void mytableudf(int i, int[] ret1,  
                               int[] ret2) throws SQLException
```



```
CREATE FUNCTION mytableudf (
    p1 INTEGER )
RETURNS TABLE (c1 INTEGER,
                c2 INTEGER)
LANGUAGE JAVA
NO SQL
PARAMETER STYLE JAVA
EXTERNAL NAME 'UDF_JAR:UserDefinedFunctions.mytableudf(int,
int[],int[])';

public static void mytableudf(int i, int[] ret1,
                             int[] ret2) throws SQLException
```

## Related Topics

See the following for information related to table functions:

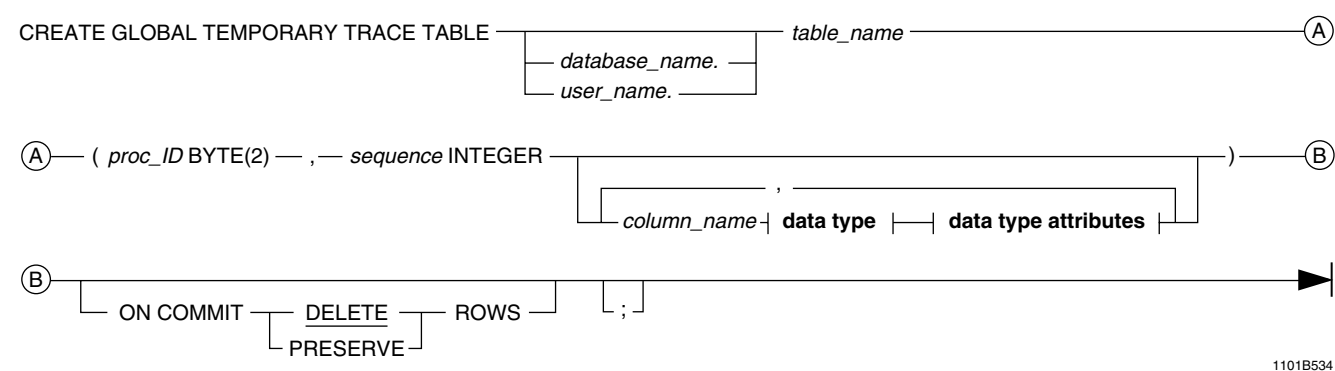
- [“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120](#) for information about creating external authorization objects.
- [“CREATE FUNCTION/ REPLACE FUNCTION” on page 138](#) for usage notes about the UDF clauses that are not fully explained here.
- [“CREATE GLOBAL TEMPORARY TRACE TABLE” on page 186](#).
- [“DROP AUTHORIZATION” on page 553](#)
- “HASH BY Clause” in *SQL Data Manipulation Language*
- “LOCAL ORDER BY Clause” in *SQL Data Manipulation Language*
- *SQL External Routine Programming* for information about coding external table functions.

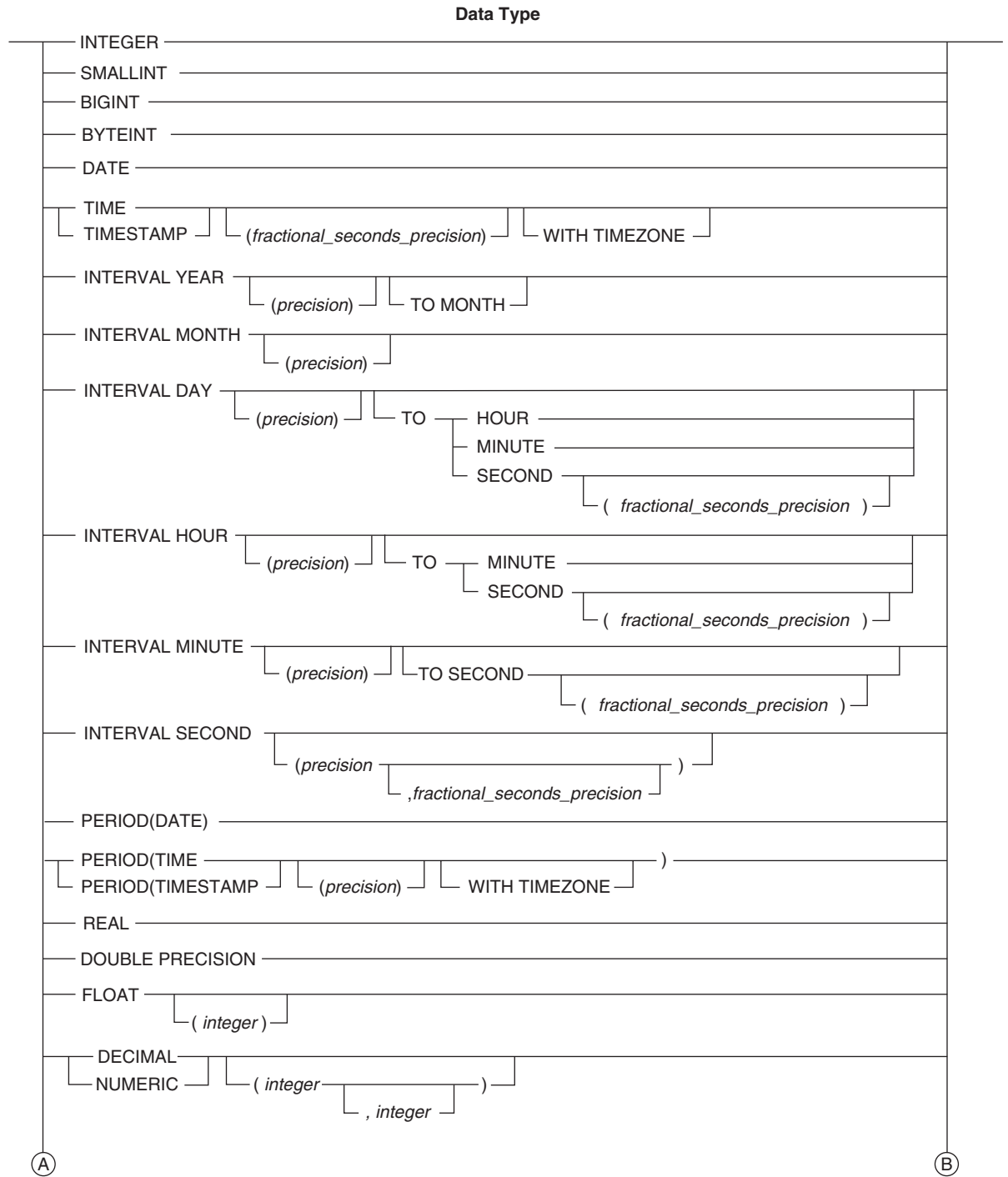
# CREATE GLOBAL TEMPORARY TRACE TABLE

## Purpose

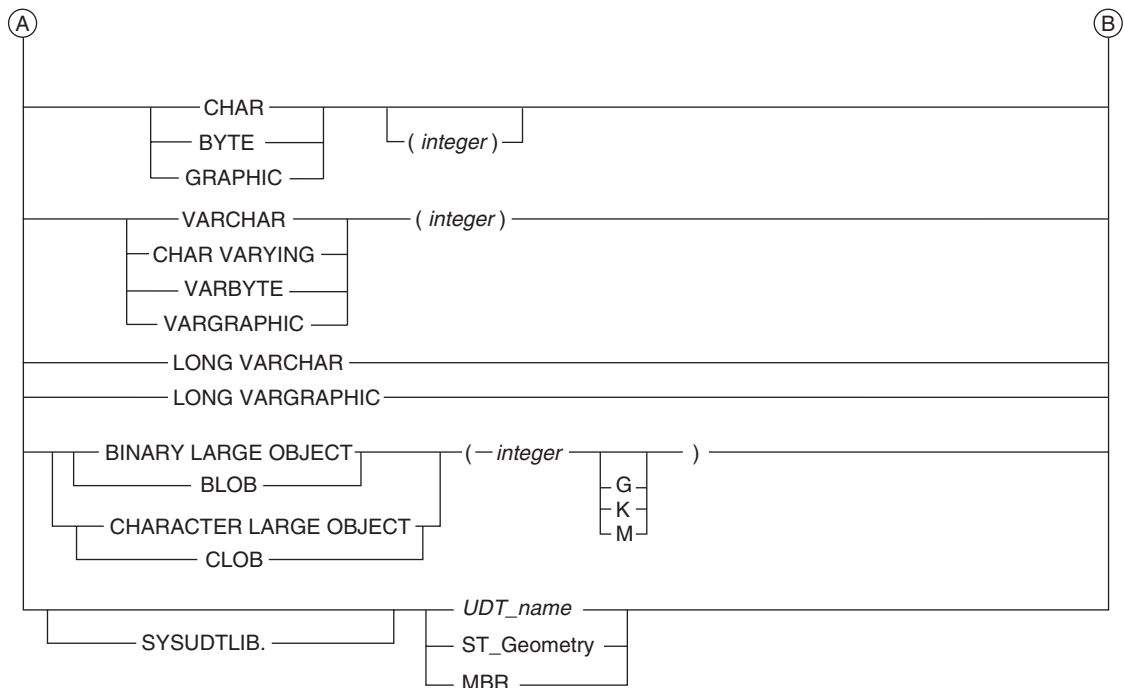
Creates a global temporary trace table to support the UDF- and external stored procedure-related trace option of the SET SESSION statement (see [“SET SESSION FUNCTION TRACE” on page 676](#)).

## Syntax



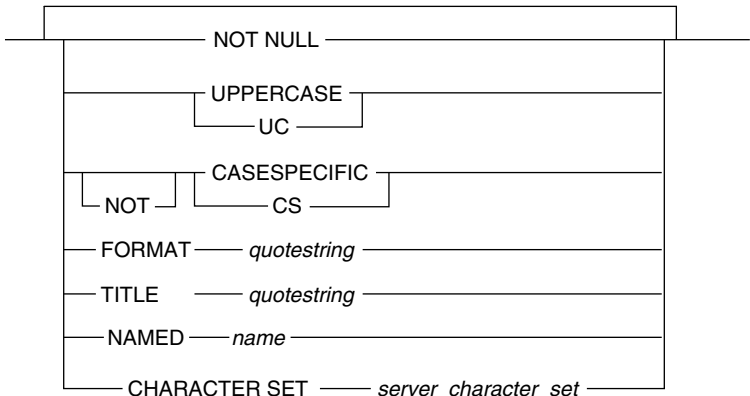


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Data Type Attributes



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where:

| Syntax element ...                      | Specifies ...                                                                                                                                           |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | the name of the database or user in which <i>table_name</i> is to be contained if something other than the current database or user.                    |
| <i>table_name</i>                       | the name of the new table.<br><br>If the name is not fully qualified, then the system assigns the name of the default database for the current session. |

| Syntax element ...                              | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>proc_ID</i> BYTE(2)                          | <p>the mandatory first column and data type for all global temporary trace tables.</p> <p>This column records the number of the AMP on which the UDF that wrote the row is running.</p> <p>The column can have any name, but it must be declared as BYTE(2).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <i>sequence</i> INTEGER                         | <p>the mandatory second column and data type for all global temporary trace tables.</p> <p>This column records a sequence number to indicate the order in which the function trace rows in the table were written for the logged AMP.</p> <p>The column can have any name, but it must be declared as INTEGER.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <i>column_name</i>                              | <p>specifies the name of one or more optional columns, in the order in which they and their attributes are to be defined for the table. Up to 2,048 columns can be defined for a table.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <i>data_type</i><br><i>data_type_attributes</i> | <p>one or more data definition phrases that define data for the column.</p> <p>You must specify a single data type for each <i>column_name</i>.</p> <p>You cannot specify a UDT or Period type for any column in a global temporary trace table. You <i>can</i> dump all the predefined attributes of a UDT into a trace table using FNC calls, however (see <i>SQL External Routine Programming</i> for information about how to use FNC calls).</p> <p>You cannot write Java strings into a global temporary trace table column defined with any of the following data types because the Java language does not support the types:</p> <ul style="list-style-type: none"> <li>• GRAPHIC</li> <li>• VARGRAPHIC</li> <li>• LONG GRAPHIC</li> </ul> <p>Column data type attribute specifications are optional. If you specify attributes for a column, you should define its data type prior to defining the attributes.</p> <p>The only valid constraints for global temporary trace table columns are NULL and NOT NULL.</p> <p>If you specify NOT NULL, but the UDF does not return data, then that column is padded with appropriate values, depending on the data type.</p> <p>You cannot specify DEFAULT or WITH DEFAULT column attributes for global temporary trace table columns.</p> <p>If you do not specify explicit formatting, a column assumes the default format for the data type, which can be specified by a custom data formatting specification (SDF) defined by the tdlocaledef utility (see <i>Utilities</i>). Explicit formatting applies both to the parsing and to the retrieval of character strings.</p> <p>Data types and data type attributes are described in detail in <i>SQL Data Types and Literals</i>.</p> |

| Syntax element ...                   | Specifies ...                                                                                                                          |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| ON COMMIT<br>PRESERVE/DELETE<br>ROWS | to delete or preserve the contents of a global temporary or volatile table when a transaction completes.<br><br>DELETE is the default. |

## ANSI Compliance

Global temporary trace tables are a Teradata extension to the ANSI SQL:2008 standard definition of global temporary tables.

## Required Privileges

You must have the CREATE TABLE privilege on the database in which the table is created.

The creator receives all the following privileges on the newly created table:

- DROP TEMPORARY TABLE
- DUMP
- REFERENCE
- RESTORE
- SELECT

## Privileges Granted Automatically

None.

## Example 1

This example defines the mandatory columns for a global temporary trace table as well as several optional, application-specific, columns. When the transaction that materializes *udf\_test* commits, its contents are to be deleted.

```
CREATE GLOBAL TEMPORARY TRACE TABLE udf_test
  (proc_ID      BYTE(2),
   sequence     INTEGER,
   udf_name     CHARACTER(15),
   in_quantity  INTEGER,
   trace_vall   FLOAT,
   trace_text   CHARACTER(30))
ON COMMIT DELETE ROWS;
```

A simple query to retrieve the results recorded in *udf\_test* might look like this:

```
SELECT *
FROM udf_test
ORDER BY proc_id ASC, sequence ASC;
```

## Example 2

The following example defines a simple trace table that has a single column variable length string to capture function output.

This single VARCHAR column approach lends itself to a flexible trace output that can be used by many different functions without having to resort to specific single-purpose trace table column definitions.

```
CREATE GLOBAL TEMPORARY TRACE TABLE udf_test, NO LOG
(proc_ID      BYTE(2),
 sequence     INTEGER,
 trace_string VARCHAR(256))
ON COMMIT DELETE ROWS;
```

## Example 3: Complete Function Traceback Scenario

The following simple stored procedure trace example is a complete scenario that shows the various aspects of using global temporary trace tables to debug a procedure.

The following CREATE FUNCTION request, returned by a SHOW FUNCTION request submitting using BTEQ, defines the traceback UDF that was used for this example. You can make the procedure as simple, or as complex, as your application requires. This particular trace UDF is fairly simple.

```
SHOW FUNCTION sptrace;

*** Text of DDL statement returned.
*** Total elapsed time was 1 second.

-----
CREATE FUNCTION sptrace (
  p1 VARCHAR(100) CHARACTER SET LATIN)
RETURNS INTEGER
SPECIFIC sptrace
LANGUAGE C
NO SQL
PARAMETER STYLE TD_GENERAL
NOT DETERMINISTIC
RETURNS NULL ON NULL INPUT
EXTERNAL NAME sptrace
  *** Text of DDL statement returned.
-----

#define SQL_TEXT Latin_Text
#include <sqltypes_td.h>
/*
  Install in SYSLIB for general use and change to NOT PROTECTED mode
ALTER FUNCTION sptrace EXECUTE NOT PROTECTED;
*/
/* Assumes that the following trace table has been created */
/*
```

```
CREATE MULTISET GLOBAL TEMPORARY TRACE TABLE tracetest,
NO FALLBACK, NO LOG (
    proc_id    BYTE(2),
    sequence   INTEGER,
    trace_str  VARCHAR(100))
ON COMMIT PRESERVE ROWS;
```

Turn on tracing with following SQL (decide what your options mean):

```
SET SESSION FUNCTION TRACE USING 'T' FOR TABLE tracetest;
*/
void sptrace(VARCHAR LATIN      *trace_text,
             INTEGER            *result,
             char                sqlstate[6])
{
    SQL_TEXT    trace_string[257];
    void        *argv[20]; /* only need 1 arg -- its an array */
    int         length[20]; /* one length for each argument */
    int         tracelen;
    /* read trace string */

    FNC_Trace_String(trace_string);
    /* Get length of string */
    tracelen = strlen(trace_string);
    /* Make sure tracing is turned on */
    if (tracelen == 0)
        return;
    if (trace_string[0] == 'T')

    {
        argv[0] = trace_text;
        length[0] = strlen(trace_text) + 1;
        /* Have something to trace */
        FNC_Trace_Write_DL(1, argv, length);
    }
}
```

The following SQL text defines the stored procedure that calls the trace function *sptrace*.

```
SHOW PROCEDURE sptracedemo;
*** Text of DDL statement returned.
*** Total elapsed time was 1 second.
-----
CREATE PROCEDURE sptracedemo (
    num_rows INTEGER )
BEGIN
-- Teradata mode stored procedure
    DECLARE dummy INTEGER;
    DECLARE start_val INTEGER;
    DECLARE fnum    FLOAT;

    SET dummy = sptrace('Start of sptrace demo');

    BEGIN
        DECLARE EXIT HANDLER FOR SQLSTATE '52010'
        BEGIN
            -- Table already exists, delete the contents
            DELETE  sp_demo1 ALL;
            SET dummy=sptrace('Deleted contents of sp_demo1 in handler');
```



```
-- Get error here and procedure will exit
END;
CREATE TABLE sp_demo1 (
  a INTEGER,
  b FLOAT);
SET dummy = sptrace('Table sp_demo1 created');
END;

SET start_val = 1;
SET fnum = 25.3;

WHILE start_val <= num_rows DO
  INSERT INTO sp_demo1 (start_val, fnum);
  SET dummy = sptrace('did: insert (' || start_val || ', ' || fnum
    || ');');
  SET start_val = start_val + 1;
  SET fnum = sqrt(fnum);
END WHILE;

SET dummy = sptrace('Got to end of sptrace demo'); END;
```

The remainder of the scenario constitutes the actual example.

Note that global temporary trace tables are user-defined except for first two columns, which are always fixed.

First show the definition of the global temporary trace table, *tracetst*, used for this example.

```
SHOW TABLE tracetst;

*** Text of DDL statement returned.
*** Total elapsed time was 1 second.

-----
CREATE MULTiset GLOBAL TEMPORARY TRACE TABLE tracetst, NO FALLBACK,
CHECKSUM = DEFAULT,
NO LOG (
  proc_id    BYTE(2),
  sequence   INTEGER,
  trace_str  VARCHAR(100) CHARACTER SET LATIN NOT CASESPECIFIC)
ON COMMIT PRESERVE ROWS;
```

The next request enables function traceback for the session (see [“SET SESSION FUNCTION TRACE” on page 676](#) for additional information). The variable *t* is a user-defined string, interpreted by your trace UDF, that can be up to 255 characters long.

```
SET SESSION FUNCTION TRACE USING 't' FOR TABLE tracetst;

*** Set SESSION accepted.
*** Total elapsed time was 1 second.
```

Function traceback has been enabled for the session.

Now select the contents of the global temporary trace table *tracetst* to ensure that it has no rows.

```
SELECT *
FROM tracetst
ORDER BY 1, 2;

*** Query completed. No rows found.
*** Total elapsed time was 1 second.
```

The trace table is empty.

Run the trace procedure *sptracedemo*, whose definition is indicated by the SHOW PROCEDURE request at the end of this example:

```
CALL sptracedemo(3);
*** Procedure has been executed.
*** Total elapsed time was 1 second.
```

Select the contents of your global temporary trace table *tracetst* after the procedure executes. Refer to the stored procedure definition to see exactly what it traces.

```
SELECT *
FROM tracetst
ORDER BY 1, 2;

*** Query completed. 6 rows found. 3 columns returned.
*** Total elapsed time was 1 second.
```

| proc_id | Sequence | trace_str                                 |
|---------|----------|-------------------------------------------|
| FF3F    | 1        | Start of sptrace demo                     |
| FF3F    | 2        | Table sp_demo1 created                    |
| FF3F    | 3        | did: insert ( 1, 2.530000000000000E 001); |
| FF3F    | 4        | did: insert ( 2, 5.02991053598372E 000);  |
| FF3F    | 5        | did: insert ( 3, 2.24274620409526E 000);  |
| FF3F    | 6        | Got to end of sptrace demo                |

Now call *sptracedemo* again.

```
CALL sptracedemo(3);

*** Procedure has been executed.
*** Total elapsed time was 1 second.
```

Select the contents of the global temporary trace table again. Note that it takes a different path because the global temporary trace table has already been populated with rows this time.

```
SELECT *
FROM tracetst
ORDER BY 1, 2;

*** Query completed. 12 rows found. 3 columns returned.
*** Total elapsed time was 1 second.
```

```
proc_id Sequence trace_str
-----
FF3F      1 Start of sptrace demo
FF3F      2 Table sp_demo1 created
FF3F      3 did: insert (          1, 2.530000000000000E 001);
FF3F      4 did: insert (          2, 5.02991053598372E 000);
FF3F      5 did: insert (          3, 2.24274620409526E 000);
FF3F      6 Got to end of sptrace demo
FF3F      7 Start of sptrace demo
FF3F      8 deleted contents of sp_demo1 in handler
FF3F      9 did: insert (          1, 2.530000000000000E 001);
FF3F     10 did: insert (          2, 5.02991053598372E 000);
FF3F     11 did: insert (          3, 2.24274620409526E 000);
FF3F     12 Got to end of sptrace demo
```

Disable function traceback to show that nothing additional is written to the trace table when the procedure is called, but function traceback is not enabled.

```
SET SESSION FUNCTION TRACE OFF;

*** Set SESSION accepted.
*** Total elapsed time was 1 second.

CALL sptracedemo(3);

*** Procedure has been executed.
*** Total elapsed time was 1 second.

SELECT *
FROM tracetst
ORDER BY 1, 2;

*** Query completed. 12 rows found. 3 columns returned.
*** Total elapsed time was 1 second.
```

```
proc_id Sequence trace_str
-----
FF3F      1 Start of sptrace demo
FF3F      2 Table sp_demo1 created
FF3F      3 did: insert (          1, 2.530000000000000E 001);
FF3F      4 did: insert (          2, 5.02991053598372E 000);
FF3F      5 did: insert (          3, 2.24274620409526E 000);
FF3F      6 Got to end of sptrace demo
FF3F      7 Start of sptrace demo
FF3F      8 deleted contents of sp_demo1 in handler
FF3F      9 did: insert (          1, 2.530000000000000E 001);
FF3F     10 did: insert (          2, 5.02991053598372E 000);
FF3F     11 did: insert (          3, 2.24274620409526E 000);
FF3F     12 Got to end of sptrace demo
```

The identical 12 rows are selected from *tracetst*, so function traceback was successfully disabled.

## Related Topics

See [“SET SESSION FUNCTION TRACE” on page 676](#) and *SQL Data Definition Language Detailed Topics* for information about enabling function traceback.

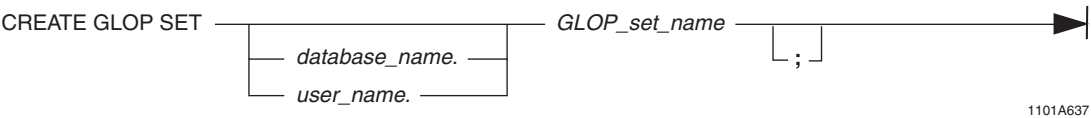
Also see “Global Temporary Tables” and “Volatile and Global Temporary Tables, Teradata Session Mode, and DML Performance” under “CREATE TABLE” in *SQL Data Definition Language Detailed Topics* for general information about global temporary tables and *SQL External Routine Programming* for information about coding external functions.

# CREATE GLOP SET

## Purpose

Creates the definition of a global persistent set.

## Syntax



where:

| Syntax element ...        | Specifies ...                                                                                                 |
|---------------------------|---------------------------------------------------------------------------------------------------------------|
| database_name   user_name | the name of the containing database or user for GLOP_set_name if different from the current database or user. |
| GLOP_set_name             | the name of the GLOP set being created.                                                                       |

## ANSI Compliance

CREATE GLOP SET is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have the CREATE GLOP privilege on the containing database or user.

## Privileges Granted Automatically

The creator of a GLOP set is automatically granted the following privileges on the created GLOP set:

- GLOP MEMBER
- DROP GLOP

## Example

This example creates a GLOP set named UDF\_glop\_1 in user df2.

```
CREATE GLOP SET df2.UDF_glop_1;
```

## Related Topics

See *SQL External Routine Programming* for information about how to use GLOPs with external routines.



## CHAPTER 3 **CREATE HASH INDEX - CREATE ORDERING**

---

DDL statements define, modify, and remove database object definitions.

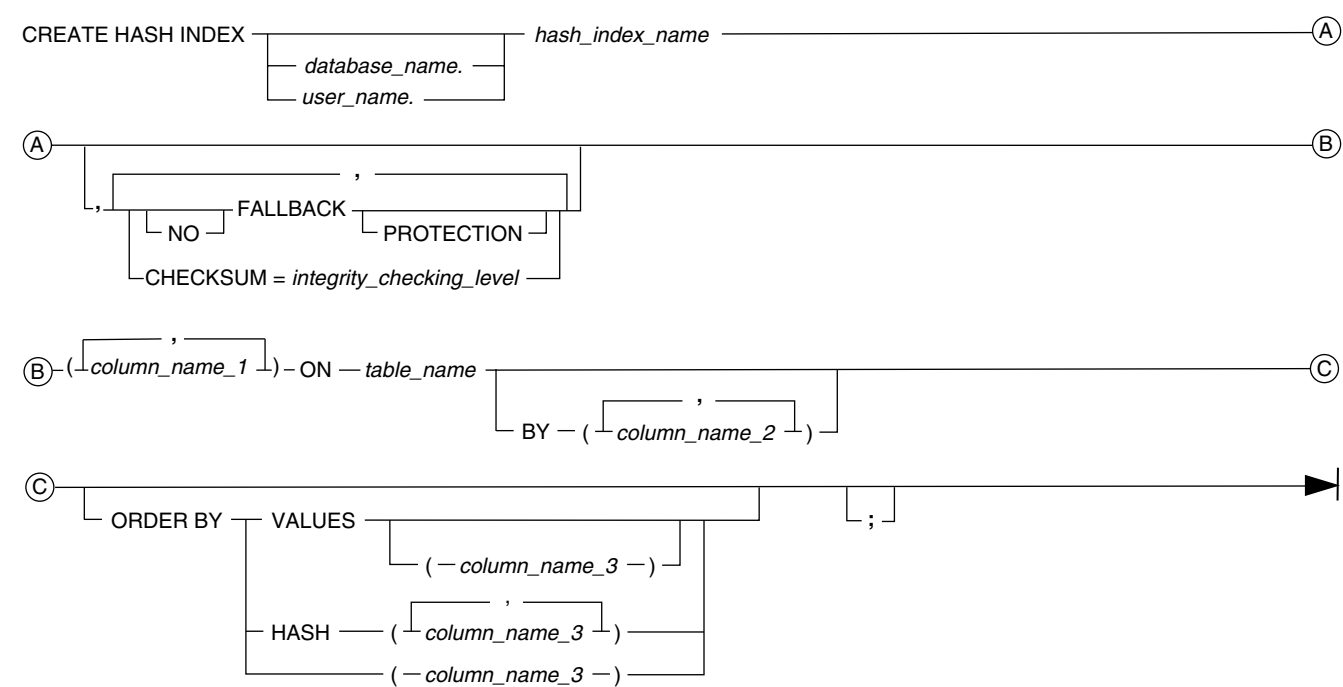
This chapter documents the syntax for, and provides examples of, the Teradata Database DDL statements from CREATE HASH INDEX to CREATE ORDERING.

# CREATE HASH INDEX

## Purpose

Creates a new hash index on a base table.

## Syntax



1101B431

where:

| Syntax element ...                      | Specifies ...                                                                                                                                                                                                                                                                                            |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | the name of the database or user that will contain <i>hash_index_name</i> if other than the current database or user.                                                                                                                                                                                    |
| <i>hash_index_name</i>                  | the name given to the hash index created by this statement.<br><br>Hash index names conform to the rules for naming tables, including explicit qualification with a database or user name.<br><br>A hash index need not be defined in the same database as the base table represented in its definition. |
| <i>FALLBACK</i> [ <i>PROTECTION</i> ]   | that the hash index uses fallback protection.<br><br><i>PROTECTION</i> is an optional noise keyword that has no effect on the hash index definition.                                                                                                                                                     |



| Syntax element ...              | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------------|-----|-----|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----|--------|----|-----|---|------|---------------------------------------------|
| NO FALLBACK<br>[PROTECTION]     | <p>that the hash index does not use fallback protection.</p> <p>The default if you do not make a specification is to use the fallback specification for the database in which the hash index is defined.</p> <p>PROTECTION is an optional noise keyword that has no effect on the hash index definition.</p> <p>Note that if a hash index is not fallback protected, an AMP failure prevents the following events from occurring:</p> <ul style="list-style-type: none"> <li>Processing queries on the hash index</li> <li>Updating the table on which the hash index is defined</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
| <i>integrity_checking_level</i> | <p>a table-specific disk I/O integrity checksum level.</p> <p>The checksum setting applies to primary and fallback data rows for the hash index.</p> <p>If you do not specify a value, then the system assumes the system-wide default value for this table type. The result is identical to specifying DEFAULT.</p> <p>If you are changing the checksum for this table to the system-wide default value, then specify DEFAULT.</p> <p>You can change the percentage of sampling for the system-wide default values for LOW, MEDIUM, and HIGH using the Checksum Level Definitions fields in the DBSControl utility (see <i>Utilities</i>). The values provided here for those checksum percentages are the defaults specified by the installation or upgrade.</p> <p>You cannot change the sampling percentage for the following:</p> <ul style="list-style-type: none"> <li>The system-wide default values ALL and NONE.</li> <li>Dictionary tables.</li> </ul> <p>The following table lists the different integrity checking levels and their meanings:</p> <table> <tr> <th>Level</th><th>Checksum Sample Count Percentage</th></tr> <tr> <td>ALL</td><td>100</td></tr> <tr> <td>DEFAULT</td><td>Percentage specified for this table type in the Checksum Levels fields of the Disk I/O Integrity Fields in the DBSControl utility (see <i>Utilities</i>).</td></tr> <tr> <td>HIGH</td><td>67</td></tr> <tr> <td>MEDIUM</td><td>33</td></tr> <tr> <td>LOW</td><td>2</td></tr> <tr> <td>NONE</td><td>Disable checksum disk I/O integrity checks.</td></tr> </table> | Level | Checksum Sample Count Percentage | ALL | 100 | DEFAULT | Percentage specified for this table type in the Checksum Levels fields of the Disk I/O Integrity Fields in the DBSControl utility (see <i>Utilities</i> ). | HIGH | 67 | MEDIUM | 33 | LOW | 2 | NONE | Disable checksum disk I/O integrity checks. |
| Level                           | Checksum Sample Count Percentage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
| ALL                             | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
| DEFAULT                         | Percentage specified for this table type in the Checksum Levels fields of the Disk I/O Integrity Fields in the DBSControl utility (see <i>Utilities</i> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
| HIGH                            | 67                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
| MEDIUM                          | 33                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
| LOW                             | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
| NONE                            | Disable checksum disk I/O integrity checks.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |

| Syntax element ...                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>column_name_1</i>                    | <p>the name of a column to be contained in the hash index.</p> <p>All columns defined in the <i>column_name_1</i> list must be drawn from the base table on which the hash index is defined.</p> <p>No column in a hash index can have a UDT, Period, BLOB, or CLOB data type.</p> <p>You cannot compress column values for a hash index.</p> <p>You cannot qualify the columns in the <i>column_name_1</i> list.</p> <p>You cannot specify the system-derived columns PARTITION, PARTITION#L1, PARTITION#L2, PARTITION#L3, PARTITION#L4, PARTITION#L5, PARTITION#L6, PARTITION#L7, PARTITION#L8, PARTITION#L9, PARTITION#L10, PARTITION#L11, PARTITION#L12, PARTITION#L13, PARTITION#L14, or PARTITION#L15 as part of the <i>column_name_1</i> list.</p> <p>The maximum number of columns you can specify, including the columns implicitly added to the hash index when it is created, is 64.</p> <p>Just as it does for secondary index definitions, the system extends the hash index definition transparently with additional elements that make it possible to provide an access path to the corresponding rows in the base table on which it is defined.</p> |
| <i>database_name</i>   <i>user_name</i> | the name of the containing database or user for <i>table_name</i> if other than the containing database or user specified for <i>hash_index_name</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <i>table_name</i>                       | <p>the name of the base table on which the hash index is defined.</p> <p>You <i>cannot</i> define a hash index on any of the following database objects:</p> <ul style="list-style-type: none"> <li>Global temporary tables</li> <li>Hash indexes</li> <li>Join indexes</li> <li>Journal tables</li> <li>NoPI tables</li> <li>Queue tables</li> <li>Trace tables</li> <li>Views (neither recursive nor nonrecursive)</li> <li>Volatile tables</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <i>column_name_2</i>                    | <p>An optional, explicitly specified column set on which the hash index rows are distributed across the AMPs.</p> <p>No column in a hash index can have a UDT, Period, BLOB, or CLOB data type.</p> <p>You cannot specify the system-derived columns PARTITION, PARTITION#L1, PARTITION#L2, PARTITION#L3, PARTITION#L4, PARTITION#L5, PARTITION#L6, PARTITION#L7, PARTITION#L8, PARTITION#L9, PARTITION#L10, PARTITION#L11, PARTITION#L12, PARTITION#L13, PARTITION#L14, or PARTITION#L15 as part of the <i>column_name_2</i> list.</p> <p>You can, however, specify a user-defined column named <i>PARTITION</i> or <i>PARTITION#Ln</i>, where <i>n</i> ranges from 1 - 15, inclusive.</p> <p>The column set you specify must be drawn from the columns specified by <i>column_name_1</i>.</p>                                                                                                                                                                                                                                                                                                                                                                     |

| Syntax element ...                                                                                                                         | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |          |             |                                                                           |                                            |                                                                                                                                                                                                                              |                                                                                                                                            |                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|-------------|---------------------------------------------------------------------------|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>column_name_2</i><br>(continued)                                                                                                        | <p>You cannot specify the same column twice in the <i>column_name_2</i> list.</p> <p>You cannot qualify any of the column names in the <i>column_name_2</i> list.</p> <p>You can, however, specify a user-defined column named <i>partition</i>.</p> <p>You cannot compress column values for a hash index.</p> <p>This column set acts as the primary index for the hash index: its rows are hashed on the column set that you specify.</p> <p>If you do not specify this column set, then the hash index rows are hashed on the primary index column set of the base table on which the index is defined, which makes it hash-local with respect to its base table.</p> <p>You cannot specify a partitioned column set. This means that you cannot create a PPI for hash indexes.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |          |             |                                                                           |                                            |                                                                                                                                                                                                                              |                                                                                                                                            |                                                                                                                                                                     |
| ORDER BY                                                                                                                                   | <p>the row ordering on each AMP: either value-ordered or hash-ordered.</p> <p>If you do not specify an ORDER BY clause, then the hash index rows have the same ordering as that specified for the base table on which the index is defined.</p> <p>You must specify an ORDER BY clause that includes an explicit column list for a hash index defined on a partitioned primary index table.</p> <p>Rules for using an ORDER BY clause are shown in the following two tables:</p> <table> <tr> <th>IF you specify ...</th><th>THEN ...</th></tr> <tr> <td>a BY clause</td><td>you <i>must</i> specify an ORDER BY clause for the hash index definition.</td></tr> <tr> <td>neither a BY clause nor an ORDER BY clause</td><td>the hash index rows are distributed by the hash of the primary index column set of the base table on which they are defined. As a result, the hash index is AMP-local and the rows are ordered by the hash of those columns.</td></tr> <tr> <td>the system-derived PARTITION column or the system-derived PARTITION#<i>Ln</i> columns, where <i>n</i> ranges between 1 and 15, inclusive.</td><td> <p>the request aborts and returns an error to the requestor.</p> <p>You <i>can</i> specify a user-defined column named <i>partition</i> or <i>partition#Ln</i>.</p> </td></tr> </table> | IF you specify ... | THEN ... | a BY clause | you <i>must</i> specify an ORDER BY clause for the hash index definition. | neither a BY clause nor an ORDER BY clause | the hash index rows are distributed by the hash of the primary index column set of the base table on which they are defined. As a result, the hash index is AMP-local and the rows are ordered by the hash of those columns. | the system-derived PARTITION column or the system-derived PARTITION# <i>Ln</i> columns, where <i>n</i> ranges between 1 and 15, inclusive. | <p>the request aborts and returns an error to the requestor.</p> <p>You <i>can</i> specify a user-defined column named <i>partition</i> or <i>partition#Ln</i>.</p> |
| IF you specify ...                                                                                                                         | THEN ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |          |             |                                                                           |                                            |                                                                                                                                                                                                                              |                                                                                                                                            |                                                                                                                                                                     |
| a BY clause                                                                                                                                | you <i>must</i> specify an ORDER BY clause for the hash index definition.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |          |             |                                                                           |                                            |                                                                                                                                                                                                                              |                                                                                                                                            |                                                                                                                                                                     |
| neither a BY clause nor an ORDER BY clause                                                                                                 | the hash index rows are distributed by the hash of the primary index column set of the base table on which they are defined. As a result, the hash index is AMP-local and the rows are ordered by the hash of those columns.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |          |             |                                                                           |                                            |                                                                                                                                                                                                                              |                                                                                                                                            |                                                                                                                                                                     |
| the system-derived PARTITION column or the system-derived PARTITION# <i>Ln</i> columns, where <i>n</i> ranges between 1 and 15, inclusive. | <p>the request aborts and returns an error to the requestor.</p> <p>You <i>can</i> specify a user-defined column named <i>partition</i> or <i>partition#Ln</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |          |             |                                                                           |                                            |                                                                                                                                                                                                                              |                                                                                                                                            |                                                                                                                                                                     |

| Syntax element ...      | Specifies ...                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ORDER BY<br>(continued) | IF you specify<br>ORDER BY ...                                                                                                                                                                                                                     | THEN ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                         | VALUES with a<br><i>column_name_3</i><br>list                                                                                                                                                                                                      | <p>the <i>column_name_3</i> list is limited to a single numeric column with a size of 4 or fewer bytes.</p> <p>In this case, the primary index of the base table must consist of a single column having a length of 4 or fewer bytes.</p> <p>The base table primary index column does <i>not</i> have to be included in the <i>column_name_1</i> set.</p> <p>The hash index rows are stored in ascending order by the values of the column specified as the primary index of the base table.</p> <p>The values specified for the <i>column_name_3</i> list must have one of the following data types:</p> <ul style="list-style-type: none"> <li>• BYTEINT</li> <li>• DATE</li> <li>• DECIMAL</li> <li>• INTEGER</li> <li>• SMALLINT</li> </ul> |
|                         | HASH                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>• you must specify a BY clause</li> <li>• the columns specified for the <i>column_name_2</i> and <i>column_name_3</i> sets must be identical.</li> </ul> <p>The hash index rows are ordered on the row hash value of these columns.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                         | without<br>specifying the<br>HASH or<br>VALUES<br>keywords                                                                                                                                                                                         | <p>the system orders the rows by VALUES by default.</p> <p>In this case, you must specify a <i>column_name_3</i> list.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| VALUES                  | <p>value-ordering for the ORDER BY column.</p> <p>Select VALUES to optimize queries that return a contiguous range of values, especially for a workload that requires a covering index or that commonly uses a nested join in its query plans.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| HASH                    | hash-ordering for the ORDER BY column.                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

| Syntax element ...   | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>column_name_3</i> | <p>the column set on which the index is to be ordered.</p> <p>If you specify ORDER BY VALUES, then you can specify only one column for <i>column_name_3</i>.</p> <p>The specified column set must be a subset of <i>column_name_1</i>.</p> <p>This means that you cannot specify the system-derived columns PARTITION, PARTITION#L1, PARTITION#L2, PARTITION#L3, PARTITION#L4, PARTITION#L5, PARTITION#L6, PARTITION#L7, PARTITION#L8, PARTITION#L9, PARTITION#L10, PARTITION#L11, PARTITION#L12, PARTITION#L13, PARTITION#L14, or PARTITION#L15 as part of the <i>column_name_3</i> list.</p> <p>You cannot specify the same column twice in the <i>column_name_3</i> list.</p> <p>You cannot compress column values for a hash index.</p> <p>You cannot order an index by a UDT, Period, BLOB, or CLOB column.</p> |

## ANSI Compliance

CREATE HASH INDEX is a Teradata extension to the ANSI SQL:2008 standard. ANSI does not define DDL for creating indexes.

## Required Privileges

You must have the CREATE TABLE privilege on the database in which the hash index is created.

You must have the INDEX or DROP TABLE privilege on the indexed base table or its containing database.

The creator of a hash index is granted the following table privileges on the index:

- DROP TABLE
- INDEX
- DUMP
- RESTORE

## Privileges Granted Automatically

None.

## Examples for Base Table With Unique Primary Index

The subsequent examples demonstrate hash indexes based on the following table definition:

```
CREATE TABLE Orders (  
  o_orderkey      INTEGER      NOT NULL,  
  o_custkey       INTEGER,  
  o_orderstatus   CHARACTER(1) CASESPECIFIC,  
  o_totalprice    DECIMAL(13,2) NOT NULL,  
  o_orderdate     DATE          FORMAT 'yyyy-mm-dd' NOT NULL,  
  o_orderpriority CHARACTER(21),  
  o_clerk         CHARACTER(16),  
  o_shippriority  INTEGER,  
  o_comment       VARCHAR(79))  
UNIQUE PRIMARY INDEX (o_orderkey);
```

### Example 1: UPI Base Table

The following hash index is distributed on its primary index *o\_orderdate* and stored in value order on *o\_orderdate*:

```
CREATE HASH INDEX OrdHIdx_1 (o_orderdate) ON orders  
BY (o_orderdate)  
ORDER BY (o_orderdate);
```

Equivalently, you could specify ORDER BY VALUES instead of ORDER BY.

Note that the ORDER BY column list complies with the rules that it be limited to a single column, that the column must be in the *column\_name\_1* list, must be a numeric type, and must be four or fewer bytes.

This creates an index that is equivalent in structure to the following single-table join index:

```
CREATE JOIN INDEX OrdJIdx1 AS  
  SELECT (o_orderdate), (o_orderkey, orders.ROWID)  
  FROM orders  
  ORDER BY o_orderdate  
  PRIMARY INDEX (o_orderdate);
```

### Example 2: UPI Base Table

The following hash index is distributed on its primary index *o\_custkey* and stored in row-hash order on *o\_custkey*:

```
CREATE HASH INDEX OrdHIdx_2 (o_custkey) ON orders  
BY (o_custkey)  
ORDER BY HASH (o_custkey);
```

This creates an index that is equivalent in structure to the following join index:

```
CREATE JOIN INDEX OrdJIdx2 AS  
  SELECT (o_custkey), (o_orderkey, orders.ROWID)  
  FROM orders  
  PRIMARY INDEX (o_custkey);
```

### Example 3: UPI Base Table

The following hash index is distributed on *o\_orderkey* (the primary index for the base table Orders) and stored in value order on *o\_orderkey* (the order key for the base table orders):

```
CREATE HASH INDEX OrdHIdx_3 (o_orderdate) ON orders
ORDER BY VALUES;
```

Note that the ordering column of the base table complies with the rules that it be limited to a single numeric column four or fewer bytes in length.

This creates an index that is equivalent in structure to the following join index:

```
CREATE JOIN INDEX OrdJIdx3 AS
SELECT o_orderkey, o_orderdate, orders.ROWID
FROM orders
ORDER BY o_orderkey
PRIMARY INDEX (o_orderkey);
```

### Example 4: UPI Base Table

The following hash index is distributed on *o\_orderkey* (the primary index for the base table Orders) and stored in hash order on *o\_orderkey*:

```
CREATE HASH INDEX OrdHIdx_4 (o_orderdate) ON orders;
```

This creates an index that is equivalent in structure to the following join index:

```
CREATE JOIN INDEX OrdJIdx4 AS
SELECT o_orderkey, o_orderdate, orders.ROWID
FROM orders
PRIMARY INDEX (o_orderkey);
```

### Example 5: UPI Base Table

The following hash index is distributed on *o\_orderkey* (the primary index for the base table Orders) and stored in value order on *o\_orderdate*:

```
CREATE HASH INDEX OrdHIdx_5 (o_orderdate) ON orders
ORDER BY (o_orderdate);
```

Equivalently, you could specify ORDER BY VALUES instead of ORDER BY.

This creates an index that is equivalent in structure to the following join index:

```
CREATE JOIN INDEX OrdJIdx5 AS
SELECT (o_orderdate), (o_orderkey, orders.ROWID)
FROM orders
ORDER BY o_orderdate
PRIMARY INDEX (o_orderkey);
```

### Example 6: UPI Base Table

The following hash index is distributed on its primary index *o\_orderdate* and stored in value order on *o\_orderkey* (the primary index for the base table orders):

```
CREATE HASH INDEX OrdHIdx_6 (o_orderdate) ON orders
BY (o_orderdate)
ORDER BY VALUES;
```

Note that the ordering column of the base table complies with the rules that it be limited to a single numeric column four or fewer bytes in length.

This creates an index that is equivalent in structure to the following join index:

```
CREATE JOIN INDEX OrdJIdx6 AS
  SELECT o_orderkey, o_orderdate, orders.ROWID
  FROM orders
  ORDER BY o_orderkey
  PRIMARY INDEX (o_orderdate);
```

## Examples for Base Table With Nonunique Primary Index

The subsequent examples demonstrate hash indexes based on the following table definition:

```
CREATE TABLE Lineitem (
  l_orderkey      INTEGER      NOT NULL,
  l_partkey       INTEGER      NOT NULL,
  l_suppkey       INTEGER,
  l_linenumbers   INTEGER,
  l_quantity      INTEGER      NOT NULL,
  l_extendedprice DECIMAL(13,2) NOT NULL,
  l_discount      DECIMAL(13,2),
  l_tax          DECIMAL(13,2),
  l_returnflag    CHARACTER(1),
  l_linestatus    CHARACTER(1),
  l_shipdate      DATE          FORMAT 'yyyy-mm-dd',
  l_commitdate    DATE          FORMAT 'yyyy-mm-dd',
  l_receiptdate   DATE          FORMAT 'yyyy-mm-dd',
  l_shipinstruct  VARCHAR(25),
  l_shipmode      VARCHAR(10),
  l_comment       VARCHAR(44))
  PRIMARY INDEX (l_orderkey);
```

### Example 7: NUPI Base Table

The following hash index is distributed explicitly on *l\_shipdate* and stored explicitly in value order on *l\_shipdate*:

```
CREATE HASH INDEX LineHIdx_1 (l_shipdate) ON lineitem
  BY (l_shipdate)
  ORDER BY (l_shipdate);
```

Equivalently, you could specify ORDER BY VALUES instead of ORDER BY.

This creates an index that is equivalent in structure to the following join index:

```
CREATE JOIN INDEX LineJIdx1 AS
  SELECT (l_shipdate), (l_orderkey, lineitem.ROWID)
  FROM lineitem
  ORDER BY l_shipdate
  PRIMARY INDEX (l_shipdate);
```



### Example 8: NUPI Base Table

The following hash index is distributed explicitly on *l\_partkey* and stored explicitly in row-hash order on *l\_partkey*:

```
CREATE HASH INDEX LineHIdx_2 (l_partkey) ON lineitem
BY (l_partkey)
ORDER BY HASH (l_partkey);
```

This creates an index that is equivalent in structure to the following join index:

```
CREATE JOIN INDEX LineJIdx2 AS
  SELECT (l_partkey), (l_orderkey, lineitem.ROWID)
  FROM lineitem
  PRIMARY INDEX (l_partkey);
```

### Example 9: NUPI Base Table

The following hash index is distributed implicitly on *l\_orderkey*, the primary index for the base table lineitem, and stored explicitly in value order on *l\_orderkey*:

```
CREATE HASH INDEX LineHIdx_3 (l_shipdate) ON lineitem
ORDER BY VALUES;
```

The ordering column of the base table complies with the rules that it be limited to a single numeric column four or fewer bytes in length.

This creates an index that is equivalent in structure to the following join index:

```
CREATE JOIN INDEX LineJIdx3 AS
  SELECT (l_orderkey), (l_shipdate, lineitem.ROWID)
  FROM lineitem
  ORDER BY l_orderkey
  PRIMARY INDEX (l_orderkey);
```

### Example 10: NUPI Base Table

The following hash index is distributed implicitly on *l\_orderkey*, the primary index for the base table lineitem, and also stored implicitly in hash order on *l\_orderkey*:

```
CREATE HASH INDEX LineHIdx_4 (l_shipdate) ON lineitem;
```

This creates an index that is equivalent in structure to the following join index:

```
CREATE JOIN INDEX LineJIdx4 AS
  SELECT (l_orderkey), (l_shipdate, lineitem.ROWID)
  FROM lineitem
  PRIMARY INDEX (l_orderkey);
```

### Example 11: NUPI Base Table

The following hash index is distributed implicitly on *l\_orderkey*, the primary index for the base table lineitem, and stored explicitly in value order on *l\_shipdate*:

```
CREATE HASH INDEX LineHIdx_5 (l_shipdate) ON lineitem
ORDER BY (l_shipdate);
```

Equivalently, you could specify ORDER BY VALUES instead of ORDER BY.

Note that the ORDER BY column list complies with the rules that it be limited to a single column, that the column must be in the *column\_name\_1* list, must be a numeric type, and must be four or fewer bytes.

This creates an index that is equivalent in structure to the following join index:

```
CREATE JOIN INDEX LineJIdx5 AS
  SELECT (l_shipdate), (l_orderkey, lineitem.ROWID)
  FROM lineitem
  ORDER BY l_shipdate
  PRIMARY INDEX (l_orderkey);
```

## Example 12: NUPI Base Table

The following hash index is distributed explicitly on *l\_shipdate* and stored implicitly in value order on *l\_orderkey*, the primary index for the base table lineitem:

```
CREATE HASH INDEX LineHIdx_6 (l_shipdate) ON lineitem
BY (l_shipdate)
ORDER BY VALUES;
```

Note that the ordering column of the base table complies with the rules that it be limited to a single numeric column four or fewer bytes in length.

This creates an index that is equivalent in structure to the following join index:

```
CREATE JOIN INDEX LineJIdx6 AS
  SELECT (l_orderkey), (l_shipdate, lineitem.ROWID)
  FROM lineitem
  ORDER BY l_orderkey
  PRIMARY INDEX (l_shipdate);
```

## Example 13: Hash Index With LOW Checksum Sampling

The following hash index is created with a disk I/O checksum level of LOW:

```
CREATE HASH INDEX LineHIdx_6, CHECKSUM = LOW
  (l_shipdate) ON lineitem
BY (l_shipdate)
ORDER BY VALUES;
```

This creates an index that is equivalent in structure to the following join index:

```
CREATE JOIN INDEX LineJIdx6, CHECKSUM = LOW AS
  SELECT (l_orderkey), (l_shipdate, lineitem.ROWID)
  FROM lineitem
  ORDER BY l_orderkey
  PRIMARY INDEX (l_shipdate);
```

## Related Topics

For an overview of Teradata Database hash indexes, see *SQL Fundamentals*.

For more examples and discussion of the functions and features of hash indexes, and for an overview of disk I/O integrity checking, see *Database Design*.

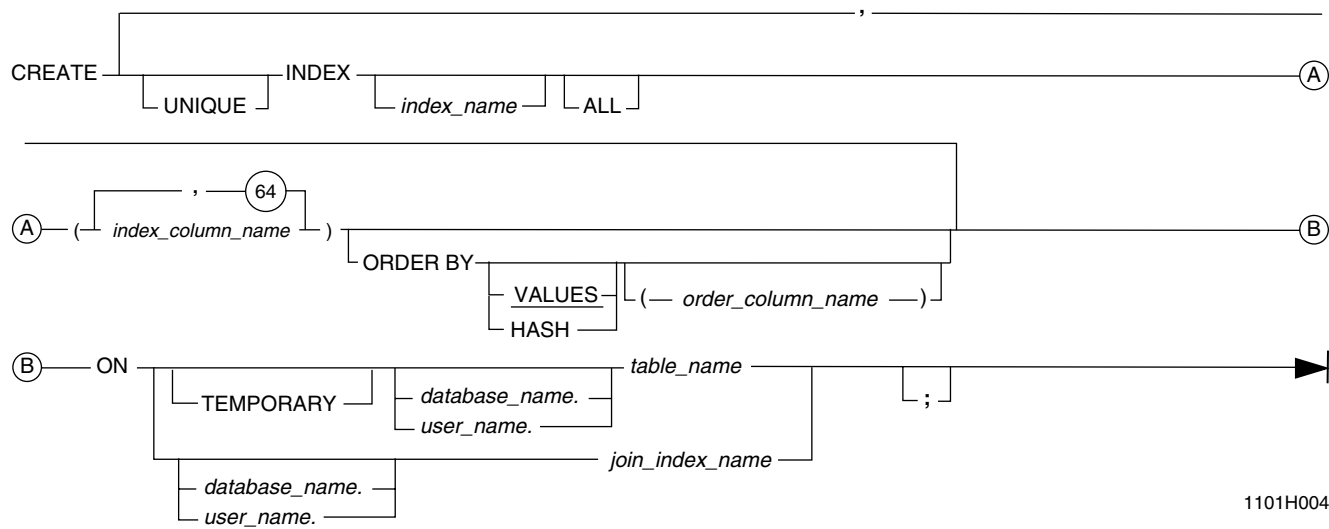
Also see [“CREATE JOIN INDEX” on page 216](#).

# CREATE INDEX

## Purpose

Creates one or more secondary indexes on an existing data table or join index.

## Syntax



1101H004

where:

| Syntax Element ... | Specifies ...                                                                                                                                                                                                                                                                                        |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UNIQUE             | that no two rows in the table can have the same value or combination of values in the indexed fields.<br>You cannot specify UNIQUE if you also specify ALL.<br>You cannot specify UNIQUE for a secondary index on a join index.<br>You cannot specify UNIQUE if you also specify an ORDER BY clause. |
| <i>index_name</i>  | an optional name for the secondary INDEX. The maximum number of characters an index name can contain is 30. See <i>SQL Fundamentals</i> for a description of Teradata Database identifiers and a list of the characters they can contain.                                                            |

| Syntax Element ...       | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ALL                      | <p>that a NUSI should maintain row ID pointers for each logical row of a join index, not just the compressed physical rows.</p> <p>You cannot specify the ALL option for primary or unique secondary indexes: it is used for secondary indexes created on join indexes <i>only</i>.</p> <p>The ALL option ignores the assigned case specificity for a column. This property enables a NUSI defined with the ALL option to do the following:</p> <ul style="list-style-type: none"> <li>• Include case-specific values.</li> <li>• Cover a table or join index on a NOT CASESPECIFIC column set.</li> </ul> <p>ALL enables a NUSI to cover a join index, enhancing performance by eliminating the need to access the join index itself when all columns needed by a query are contained in the NUSI.</p> <p>Be aware that specifying the ALL option might also require additional index storage space.</p> <p>Use this keyword when a NUSI is being defined for a join index and you want to make it eligible for the Optimizer to select when covering reduces access plan cost.</p> <p>You cannot specify multiple NUSIs that differ only by the presence or absence of the ALL option.</p>               |
| <i>index_column_name</i> | <p>the names of one or more columns whose values are to be indexed.</p> <p>No column in a secondary index can have a UDT, Period, BLOB, or CLOB data type.</p> <p>You cannot specify the system-derived columns PARTITION, PARTITION#L1, PARTITION#L2, PARTITION#L3, PARTITION#L4, PARTITION#L5, PARTITION#L6, PARTITION#L7, PARTITION#L8, PARTITION#L9, PARTITION#L10, PARTITION#L11, PARTITION#L12, PARTITION#L13, PARTITION#L14, or PARTITION#L15 as part of the <i>index_column_name</i> list.</p> <p>You can, however, specify a user-defined column named <i>PARTITION</i> or <i>PARTITION#Ln</i>, where <i>n</i> ranges from 1 - 15, inclusive.</p> <p>You can specify up to 64 columns for the new index. The index is based on the combined values of each column. Unless you specify the ORDER BY clause, the index is hash-ordered on all its columns.</p> <p>If you specify more than one column name, the index is created on the combined values of each column named. A maximum of 32 secondary indexes can be created for one table.<sup>a</sup></p> <p>Multiple indexes can be defined on the same columns as long as each index differs in its ordering option (VALUES versus HASH).</p> |
| ORDER BY                 | <p>row ordering on each AMP by a single NUSI column: either value-ordered or hash-ordered.</p> <p>If you specify HASH, then the rows are hash-ordered on the AMP; otherwise, the rows are value-ordered.</p> <p>Each multicolumn NUSI created with an ORDER BY clause counts as <i>two</i> consecutive indexes against the maximum of any mix of 32 secondary, hash, and join indexes that can be defined per table.<sup>a</sup></p> <p>If you do not specify an ORDER BY clause, the system automatically hash orders index rows on their columns.</p> <p>You cannot order by the system-derived PARTITION or PARTITION#Ln columns. You can, however, specify a user-defined column named <i>partition</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| VALUES                   | <p>value-ordering for the ORDER BY column.</p> <p>Select VALUES to optimize queries that return a contiguous range of values, especially for a covered index or a nested join.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| Syntax Element ...                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HASH                                    | <p>hash-ordering for the ORDER BY column.</p> <p>Select HASH to limit hash-ordering to one, rather than all, columns.</p> <p>Hash-ordering a multicolumn NUSI on one of its columns allows the NUSI to participate in a nested join where join conditions involve only that ordering column.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <i>order_column_name</i>                | <p>a column in the <i>index_column_name</i> list that specifies the sort order to be used.</p> <p>No column in a secondary index can have a UDT, Period, BLOB, or CLOB data type.</p> <p>You cannot specify the system-derived columns PARTITION, PARTITION#L1, PARTITION#L2, PARTITION#L3, PARTITION#L4, PARTITION#L5, PARTITION#L6, PARTITION#L7, PARTITION#L8, PARTITION#L9, PARTITION#L10, PARTITION#L11, PARTITION#L12, PARTITION#L13, PARTITION#L14, or PARTITION#L15 as part of the <i>order_column_name</i> list.</p> <p>You can, however, specify a user-defined column named <i>PARTITION</i> or <i>PARTITION#Ln</i>, where <i>n</i> ranges from 1 - 15, inclusive.</p> <p>Supported data types for a value-ordered, four-bytes-or-less <i>order_column_name</i> are:</p> <ul style="list-style-type: none"> <li>• BYTEINT</li> <li>• DATE</li> <li>• DECIMAL</li> <li>• INTEGER</li> <li>• SMALLINT</li> </ul> <p>If you specify ORDER BY without also specifying an explicit <i>order_column_name</i>, then the system uses the first column specified in the <i>index_column_name</i> list to order the rows in the index.</p> |
| TEMPORARY                               | <p>that the table is a global temporary table and the index is being created on its instance in the current session.</p> <p>If you do not specify TEMPORARY then the index is created on the base global temporary table definition. In this case, if there are materialized instances of the table you cannot create the index on the base global temporary table.</p> <p>If you specify TEMPORARY against a permanent table, the system returns an error.</p> <p>You cannot create indexes on a volatile table.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <i>database_name</i>   <i>user_name</i> | the name of the containing database or user for <i>table_name</i> if other than the current database or user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <i>table_name</i>                       | <p>the table for which an index is to be created.</p> <p>You cannot specify the name of any of the following:</p> <ul style="list-style-type: none"> <li>• Derived table</li> <li>• Hash index</li> <li>• Journal table</li> <li>• View (both forms)</li> <li>• Volatile table</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <i>database_name</i>   <i>user_name</i> | the name of the containing database or user for <i>join_index_name</i> if other than the current database or user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <i>join_index_name</i>                  | <p>the name of the join index on which this index is to be defined.</p> <p>You cannot define a USI on a join index. NUPIs are allowed.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

- a. Each multicolumn NUSI defined with an ORDER BY clause counts as *two* consecutive indexes in this calculation (see the CREATE INDEX topic “Why Consecutive Indexes Are Important For Value-Ordered NUSIs” in *SQL Data Definition Language Detailed Topics*).

## ANSI Compliance

CREATE INDEX is a Teradata extension to the ANSI SQL:2008 standard. ANSI does not define DDL for creating indexes.

The CREATE UNIQUE INDEX syntax is functionally equivalent to adding a UNIQUE NOT NULL or PRIMARY KEY NOT NULL constraint set to a column in ANSI SQL:2008.

## Required Privileges

You must have the INDEX or DROP TABLE privilege on the named table or join index.

## Privileges Granted Automatically

None.

## Example 1: Named Indexes

This example demonstrates a named secondary index.

```
CREATE UNIQUE INDEX Ident (Name, SocSecNo) ON Employee;
```

This definition allows the named index to be dropped by using its name:

```
DROP INDEX Ident ON Employee;
```

## Example 2: Creating a Named Unique Secondary Index

This example creates a named unique secondary index *index\_1*. Index *index\_1* must not be an existing name in table *table\_1*.

```
CREATE UNIQUE INDEX index_1 (field_1, field_2) ON table_1;
```

## Example 3: Creating a Named Nonunique Secondary Index

This example creates a named nonunique secondary index *index\_2*. Index *index\_2* must not be an existing name in table *table\_2*.

```
CREATE INDEX index_2 (field_1) ON table_2;
```

## Example 4: Creating an Unnamed Unique Secondary Index

This example creates an unnamed unique secondary index.

```
CREATE UNIQUE INDEX (field_1, field_2) ON table_3;
```

## Example 5: Creating an Unnamed Nonunique Secondary Index

The first example creates a nonunique secondary index on the *dept\_no* column of the *employee* table:

```
CREATE INDEX (dept_no) ON employee;
```

The UNIQUE option is not used in this statement because multiple rows contain the same department number. The index should be useful, however, because department numbers are often used for conditional retrievals and for ordering employee listings.

The second example creates an unnamed nonunique secondary index on the *field\_1* column of a table named *table\_4*.

```
CREATE INDEX (field_1) ON table_4;
```

## Example 6: Creating a Secondary Index On a Join Index

This example creates a secondary index on a join index defined in the example set for CREATE JOIN INDEX (see [“CREATE JOIN INDEX” on page 216](#)) and then shows the explanation for a query made against the base tables that uses both indexes.

Note that you cannot create a *unique* secondary index on a join index; any secondary index must be *nonunique*.

```
CREATE INDEX shipidx (l_shipdate) ON OrderJoinLine;
```

```
*** Index has been created.
*** Total elapsed time was 5 seconds.
```

```
EXPLAIN SELECT o_orderdate, o_custkey, l_partkey, l_quantity,
              l_extendedprice
FROM lineitem, order
WHERE l_orderkey = o_orderkey
AND   l_shipdate = '1997-09-18';
```

Explanation

- 
- 1) First, we lock a distinct LOUISB."pseudo table" for read on a RowHash to prevent global deadlock for LOUISB.OrderJoinLine.
  - 2) Next, we lock LOUISB.OrderJoinLine for read.
  - 3) We do an all-AMPS RETRIEVE step from join index table LOUISB.OrderJoinLine by way of index # 12 "LOUISB.OrderJoinLine.l shipdate = 970918" with a residual condition of ("(NOT (LOUISB.OrderJoinLine.o\_orderdate IS NULL )) AND (LOUISB.OrderJoinLine.l shipdate = 970918)") into Spool 1, which is built locally on the AMPS. The input table will not be cached in memory, but it is eligible for synchronized scanning. The result spool file will not be cached in memory. The size of Spool 1 is estimated to be 500 rows. The estimated time for this step is 0.37 seconds.
  - 4) Finally, we send out an END TRANSACTION step to all AMPS involved in processing the request.

## Related Topics

For an overview of Teradata Database secondary indexes, see the following manuals:

- *SQL Fundamentals*
- *Database Design*

*SQL Fundamentals* provides a brief overview of secondary indexes, while *Database Design* provides a detailed overview.

## CREATE JOIN INDEX

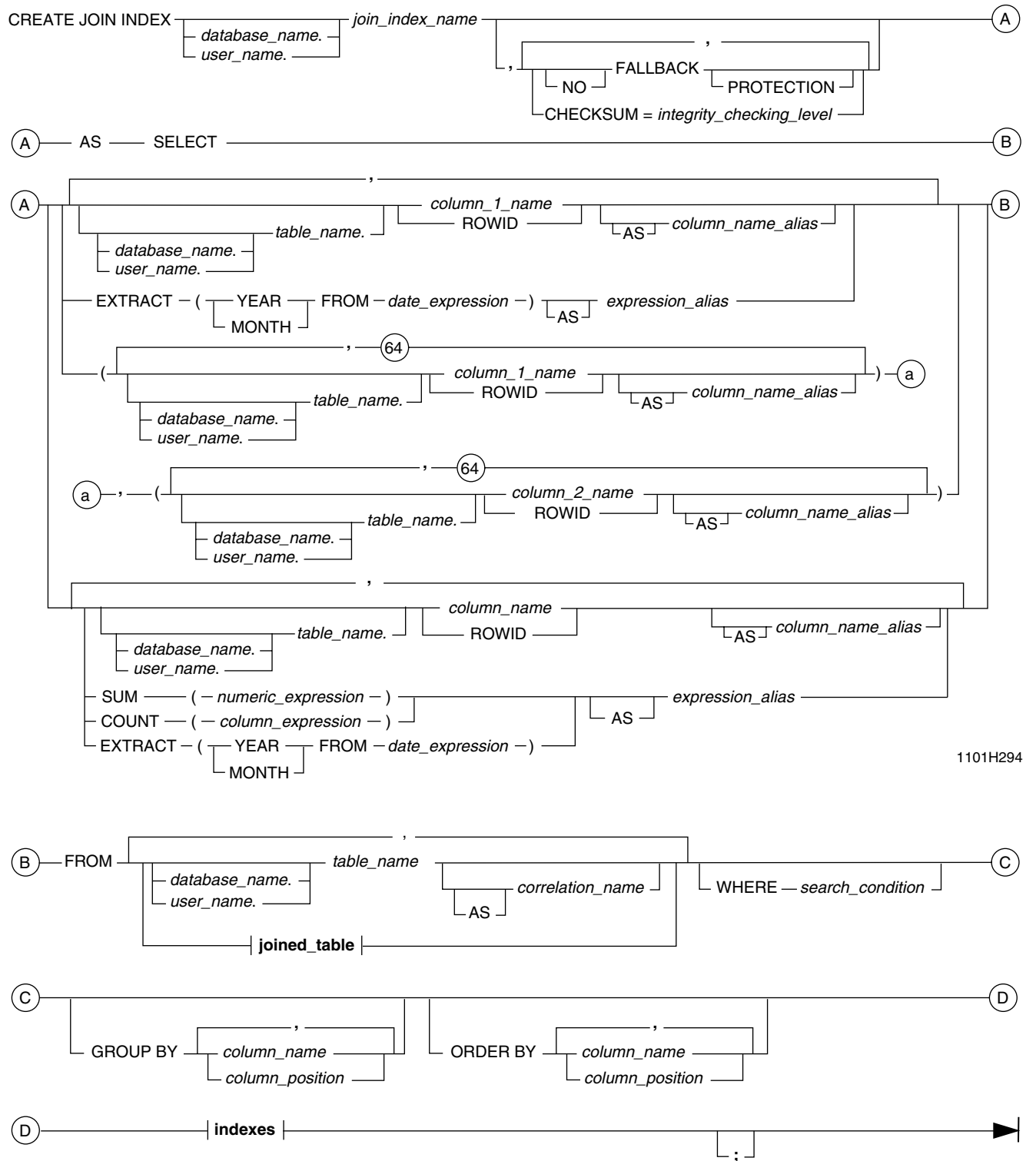
### Purpose

Creates a join index that has one of the following functions:

- Joins multiple tables, optionally with aggregation, in a prejoin table.
- Replicates all or a vertical subset of a single base table and distributes its rows by a primary index on a foreign key column to facilitate joins of very large tables by hashing them to the same AMP.
- Aggregates one or more columns of a single table or the join results of multiple tables in a summary table.
- Functions as a sparse join index subtable that contains only those rows that satisfy the conditions specified by its WHERE clause.



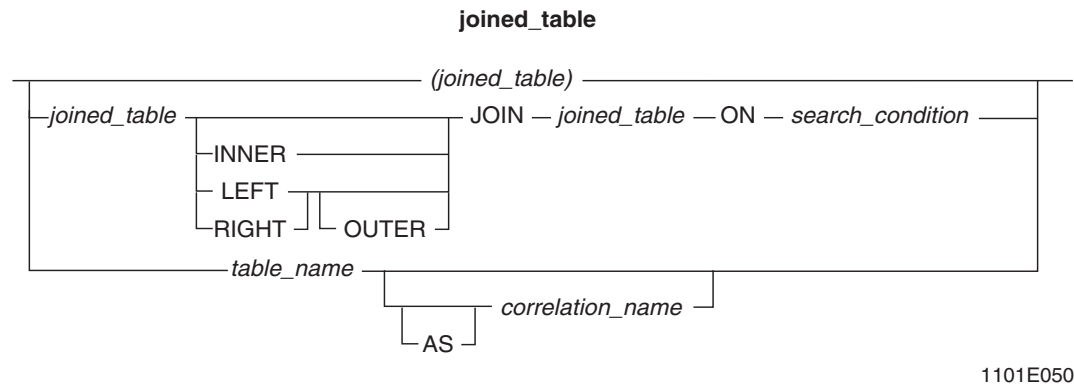
## Syntax



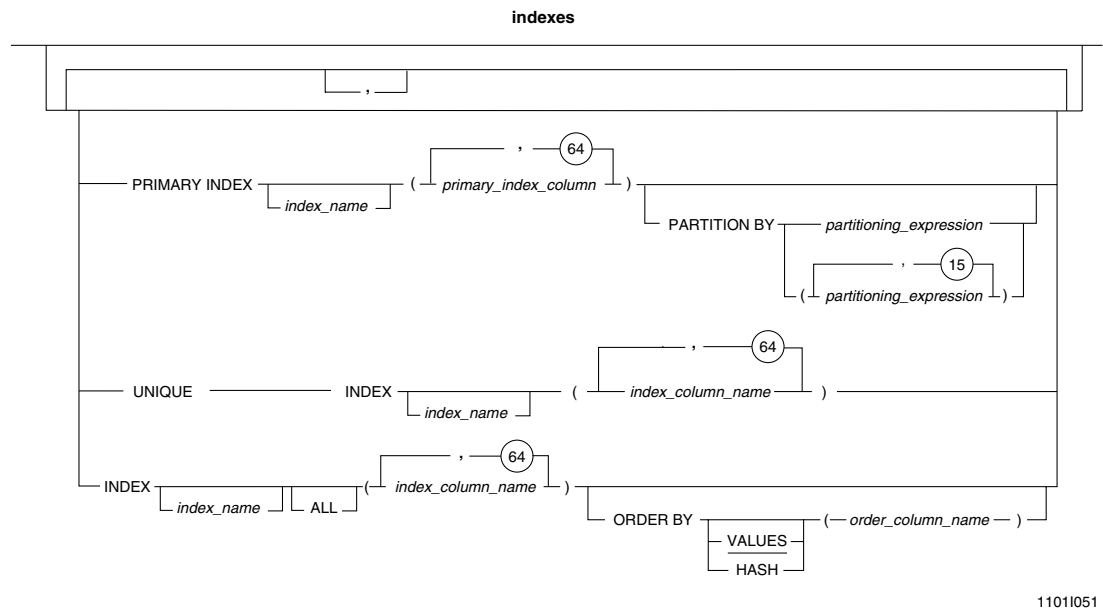
1101H294

1101A646

Joined\_Table Excerpt



Indexes Excerpt



where:

| Syntax Element ...                                                                                                                                                                                                | Specifies ...                                                                                                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Table Options Clause</b>                                                                                                                                                                                       |                                                                                                                                                      |
| This clause provides basic information about the join index being created: its containing database, its name, whether or not it is fallback-protected, and whether or not disk I/O integrity checking is enabled. |                                                                                                                                                      |
| <code>database_name</code>   <code>user_name</code>                                                                                                                                                               | an optional database name or user name specified if the join index is to be contained in a database or user other than the current database or user. |

| Syntax Element ...                            | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------------|-----|-----|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----|--------|----|-----|---|------|---------------------------------------------|
| <i>join_index_name</i>                        | <p>the name given to the join index created by this statement.</p> <p>Join index names conform to the rules for naming tables, including explicit qualification with a database or user name.</p> <p>A join index need not be defined in the same database as the base tables represented in its definition.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
| FALLBACK<br>[PROTECTION]                      | <p>that the join index uses fallback protection.</p> <p>PROTECTION is an optional noise keyword that has no effect on the join index definition.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
| NO FALLBACK<br>[PROTECTION]                   | <p>that the join index does not use fallback protection. This is the default.</p> <p>PROTECTION is an optional noise keyword that has no effect on the join index definition.</p> <p>Note that if a join index is not fallback protected, an AMP failure prevents the following events from occurring:</p> <ul style="list-style-type: none"> <li>Processing queries on the join index.</li> <li>Updating the base table on which the join index is defined.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
| CHECKSUM =<br><i>integrity_checking_level</i> | <p>a table-specific disk I/O integrity checksum level.</p> <p>The checksum setting applies to primary data rows, fallback data rows, and all secondary index rows for the join index.</p> <p>If you do not specify a value, then the system assumes the system-wide default value for this table type. The result is identical to specifying DEFAULT.</p> <p>If you are changing the checksum for this table to the system-wide default value, then specify DEFAULT.</p> <p>You can change the percentage of sampling for the system-wide default values for LOW, MEDIUM, and HIGH using the Checksum Level Definitions fields in the DBSControl utility (see <i>Utilities</i>). The values provided here for those checksum percentages are the defaults specified by the installation or upgrade.</p> <p>You cannot change the sampling percentage for the following:</p> <ul style="list-style-type: none"> <li>The system-wide default values ALL and NONE.</li> <li>Dictionary tables.</li> </ul> <table border="1"> <thead> <tr> <th>Level</th><th>Checksum Sample Count Percentage</th></tr> </thead> <tbody> <tr> <td>ALL</td><td>100</td></tr> <tr> <td>DEFAULT</td><td>Percentage specified for this table type in the Checksum Levels fields of the Disk I/O Integrity Fields in the DBSControl utility (see <i>Utilities</i>).</td></tr> <tr> <td>HIGH</td><td>67</td></tr> <tr> <td>MEDIUM</td><td>33</td></tr> <tr> <td>LOW</td><td>2</td></tr> <tr> <td>NONE</td><td>Disable checksum disk I/O integrity checks.</td></tr> </tbody> </table> | Level | Checksum Sample Count Percentage | ALL | 100 | DEFAULT | Percentage specified for this table type in the Checksum Levels fields of the Disk I/O Integrity Fields in the DBSControl utility (see <i>Utilities</i> ). | HIGH | 67 | MEDIUM | 33 | LOW | 2 | NONE | Disable checksum disk I/O integrity checks. |
| Level                                         | Checksum Sample Count Percentage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
| ALL                                           | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
| DEFAULT                                       | Percentage specified for this table type in the Checksum Levels fields of the Disk I/O Integrity Fields in the DBSControl utility (see <i>Utilities</i> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
| HIGH                                          | 67                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
| MEDIUM                                        | 33                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
| LOW                                           | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
| NONE                                          | Disable checksum disk I/O integrity checks.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |

## End Table Options Clause

| Syntax Element ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p style="text-align: center;"><b>SELECT Clause</b></p> <p>This clause projects the columns from one or more base tables that are to be included in the join index definition.</p> <p>The options you can specify for this clause are identical to those for any other SELECT statement except where explicitly contradicted.</p> <p>Among the prohibited options that are available for ordinary SELECT statements are the following clauses: TOP <i>n</i>, FULL OUTER JOIN, CROSS JOIN, HAVING, QUALIFY, and SAMPLE; all functions except COUNT, EXTRACT, and SUM; the set operators UNION, EXCEPT/MINUS, INTERSECT, and their derivatives; and subqueries.</p> <p>Note that some of the optional clauses the system accepts do <i>not</i> become part of the join index definition. Examples include such things as output FORMAT and TITLE phrases. You can determine if any of the options you specify do not become part of the stored join index definition by performing a SHOW JOIN INDEX statement to view the DDL for the CREATE JOIN INDEX statement of interest.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <i>database_name.table_name</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | the fully qualified path to <i>column_1_name</i> , if they are required for unique identification of <i>column_1_name</i> or ROWID.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <i>column_1_name</i><br>ROWID                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <p>the name of a column to be included in the join index.</p> <p>No column in a join index can have a UDT, BLOB, CLOB, or Period data type.</p> <p>You cannot specify the system-derived columns PARTITION, PARTITION#L1, PARTITION#L2, PARTITION#L3, PARTITION#L4, PARTITION#L5, PARTITION#L6, PARTITION#L7, PARTITION#L8, PARTITION#L9, PARTITION#L10, PARTITION#L11, PARTITION#L12, PARTITION#L13, PARTITION#L14, or PARTITION#L15 as part of the <i>column_1_name</i> list.</p> <p>You can, however, specify a user-defined column named <i>PARTITION</i> or <i>PARTITION#Ln</i>, where <i>n</i> ranges from 1 - 15, inclusive.</p> <p>If two specified columns have the same name, both names must be aliased using a column name alias. See <i>SQL Fundamentals</i>.</p> <p>Specify the keyword ROWID as one of the values for either the <i>column_1_name</i> list or the <i>column_2_name</i> list to enable the Optimizer to join a partial covering index to its base table to access any noncovered columns.</p> <p>You can alias both <i>column_1_name</i> and ROWID with a column name alias.</p> <p>If you reference multiple tables in the join index definition, then you must fully qualify each ROWID specification.</p> <p>If you reference a ROWID in a GROUP BY clause, then you must define a column name alias for it. The literal ROWID is not valid in the column list argument of a GROUP BY specification.</p> <p>If you reference a ROWID column name alias in the select list of a join index definition, then you can also reference that column name alias in a CREATE INDEX statement that creates a secondary index on the join index; however, you cannot directly reference the ROWID keyword in a CREATE INDEX statement.</p> <p>You can only specify ROWID in the outermost SELECT list of the CREATE JOIN INDEX statement.</p> <p>Even though you do not explicitly specify this join when you write your query, it counts against the 64 table restriction on joins.</p> |

| Syntax Element ...                         | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                |                                                                                                              |         |     |             |                                                                                                                                                                                                                                                                              |
|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------|---------|-----|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>column_1_name</i><br>ROWID (continued)  | <p>If you also define a <i>column_2_name</i> list (see “<i>column_2_name</i>” later in this table), then the system stores each distinct value of the <i>column_1_name</i> list only once.</p> <p>You can specify no more than 64 columns per referenced base table per join index.</p> <table> <tr> <th>IF <i>column_2_name</i> is ...</th><th>THEN the limit on the total number of columns that can be specified for the <i>column_1_name</i> list is ...</th></tr> <tr> <td>defined</td><td>64.</td></tr> <tr> <td>not defined</td><td> <p>not defined.</p> <p>The maximum is restricted only by the number of columns that can be defined within the row size limit.</p> <p>This limit is not related in any way to the restriction of 64 columns that can be defined per referenced base table per join index.</p> </td></tr> </table> | IF <i>column_2_name</i> is ... | THEN the limit on the total number of columns that can be specified for the <i>column_1_name</i> list is ... | defined | 64. | not defined | <p>not defined.</p> <p>The maximum is restricted only by the number of columns that can be defined within the row size limit.</p> <p>This limit is not related in any way to the restriction of 64 columns that can be defined per referenced base table per join index.</p> |
| IF <i>column_2_name</i> is ...             | THEN the limit on the total number of columns that can be specified for the <i>column_1_name</i> list is ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                |                                                                                                              |         |     |             |                                                                                                                                                                                                                                                                              |
| defined                                    | 64.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                |                                                                                                              |         |     |             |                                                                                                                                                                                                                                                                              |
| not defined                                | <p>not defined.</p> <p>The maximum is restricted only by the number of columns that can be defined within the row size limit.</p> <p>This limit is not related in any way to the restriction of 64 columns that can be defined per referenced base table per join index.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                |                                                                                                              |         |     |             |                                                                                                                                                                                                                                                                              |
| [AS]<br><i>column_name_alias</i>           | an alias for <i>column_1_name</i> or ROWID. Do not use the name CountStar if you create an aggregate join index because the system reserves that name for any expression being summed, counted, or extracted in the aggregate definition.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                |                                                                                                              |         |     |             |                                                                                                                                                                                                                                                                              |
| EXTRACT YEAR  <br>MONTH FROM               | <p>to use the EXTRACT date function to extract a year or month from a date column.</p> <p>See <i>SQL Functions, Operators, Expressions, and Predicates</i> for more information about the EXTRACT function.</p> <p>Note that join index definitions support only the extraction of years and months from a date column.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                |                                                                                                              |         |     |             |                                                                                                                                                                                                                                                                              |
| <i>date_expression</i>                     | a date column or date expression from which either the year or the month is to be extracted.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                |                                                                                                              |         |     |             |                                                                                                                                                                                                                                                                              |
| [AS] <i>expression_alias</i>               | a mandatory unique alias for a sum, count, or extracted year or month. This name permits further use of the result as the grouping key for a GROUP BY clause or the ordering key for an ORDER BY clause.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                |                                                                                                              |         |     |             |                                                                                                                                                                                                                                                                              |
| <i>database_name.</i><br><i>table_name</i> | the fully qualified path to <i>column_1_name</i> for a compressed join index definition, if required for unique identification of <i>column_1_name</i> or ROWID.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                |                                                                                                              |         |     |             |                                                                                                                                                                                                                                                                              |
| <i>column_1_name</i>  <br>ROWID            | <p>the name of a column to be included in the fixed portion of a compressed join index.</p> <p>No column in a join index can have a UDT, BLOB, CLOB, or Period data type.</p> <p>You cannot specify the system-derived columns PARTITION, PARTITION#L1, PARTITION#L2, PARTITION#L3, PARTITION#L4, PARTITION#L5, PARTITION#L6, PARTITION#L7, PARTITION#L8, PARTITION#L9, PARTITION#L10, PARTITION#L11, PARTITION#L12, PARTITION#L13, PARTITION#L14, or PARTITION#L15 as part of the <i>column_1_name</i> list.</p> <p>You can, however, specify a user-defined column named <i>PARTITION</i> or <i>PARTITION#Ln</i>, where <i>n</i> ranges from 1 - 15, inclusive.</p> <p>If two specified columns have the same name, both names must be aliased using a column name alias. See <i>SQL Fundamentals</i>.</p>                                 |                                |                                                                                                              |         |     |             |                                                                                                                                                                                                                                                                              |

| Syntax Element ...                          | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>column_1_name</i>  <br>ROWID (continued) | <p>Specify the keyword ROWID as one of the values for the <i>column_1_name</i> list to enable the Optimizer to join a partial covering index to its base table to access any noncovered columns.</p> <p>You can alias both <i>column_1_name</i> and ROWID with a column name alias.</p> <p>If you reference multiple tables in the join index definition, then you must fully qualify each ROWID specification.</p> <p>If you reference a ROWID in a GROUP BY clause, then you must define a column name alias for it. The literal ROWID is not valid in the column list argument of a GROUP BY specification.</p> <p>If you reference a ROWID column name alias in the select list of a join index definition, then you can also reference that column name alias in a CREATE INDEX statement that creates a secondary index on the join index.</p> <p>However, you cannot directly reference the ROWID keyword in a CREATE INDEX statement.</p> <p>You can only specify ROWID in the outermost SELECT list of the CREATE JOIN INDEX statement.</p> <p>Even though you do not explicitly specify this join when you write your query, it counts against the 64 table restriction on joins.</p> <p>You can specify no more than 64 columns per referenced base table per join index.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| [AS]<br><i>column_name_alias</i>            | an alias for <i>column_1_name</i> or ROWID.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <i>database_name.</i><br><i>table_name</i>  | the fully qualified path to <i>column_2_name</i> for a compressed join index definition, if required for unique identification of <i>column_2_name</i> or ROWID.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>column_2_name</i>  <br>ROWID             | <p>one of a list of multiple columns to be included in the join index. This column set represents the repeated portion of the join index row. These columns form the compressed portion of a compressed join index definition.</p> <p>You cannot define a partitioned primary index for a join index that is also compressed.</p> <p>No column in a join index can have a UDT, BLOB, or CLOB data type.</p> <p>If two specified columns have the same name, both names must be aliased using a column name alias. See <i>SQL Fundamentals</i>.</p> <p>You can specify the keyword ROWID as one of the values for <i>column_2_name</i> to enable the Optimizer to join a partial covering index to its base table to access any noncovered columns. Do not duplicate the ROWID specification if you have already defined ROWID as one of the <i>column_1_name</i> list values.</p> <p>You cannot specify the system-derived columns PARTITION, PARTITION#L1, PARTITION#L2, PARTITION#L3, PARTITION#L4, PARTITION#L5, PARTITION#L6, PARTITION#L7, PARTITION#L8, PARTITION#L9, PARTITION#L10, PARTITION#L11, PARTITION#L12, PARTITION#L13, PARTITION#L14, or PARTITION#L15 as part of the <i>column_2_name</i> list.</p> <p>You can, however, specify a user-defined column named <i>PARTITION</i> or <i>PARTITION#Ln</i>, where <i>n</i> ranges from 1 - 15, inclusive.</p> <p>You can alias both <i>column_2_name</i> and ROWID with a column name alias.</p> <p>If you reference a ROWID in a GROUP BY clause, then you must define a column name alias for it. The literal ROWID is not valid in the column list argument of a GROUP BY specification.</p> <p>If you reference multiple tables in the join index definition, then you must fully qualify each ROWID specification.</p> |

| Syntax Element ...                                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>column_2_name</code><br>ROWID (continued)         | <p>If you reference a ROWID column name alias in the select list of a join index definition, then you can also reference that column name alias in a CREATE INDEX statement that creates a secondary index on the join index.</p> <p>You can only specify ROWID in the outermost SELECT list of the CREATE JOIN INDEX statement.</p> <p>Even though you do not explicitly specify this join when you write your query, it counts against the 64 table restriction on joins.</p> <p>Do <i>not</i> specify <code>column_2_name</code> values for aggregate join indexes.</p> <p>You can specify no more than 64 columns for <code>column_2_name</code>.</p> <p>If you specify <code>column_2_name</code>, then you can specify no more than 64 columns for <code>column_1_name</code> because the total column limit for a compressed join index is 128 columns.</p> <p>There is no limit for the number of these repeated portions that can be stored for a given fixed portion of a join index; however, there is a <i>physical</i> limit in that the total size of any one fixed portion/repeated portion pair cannot exceed the Teradata Database row size limit.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| [AS]<br><code>column_name_alias</code>                  | <p>an alias for <code>column_2_name</code> or ROWID. Do not use the name CountStar if you create an aggregate join index because the system reserves that name for any expression being summed or counted in the index definition.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Aggregation Clause                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <code>database_name.</code><br><code>table_name.</code> | <p>the fully qualified path to <code>column_1_name</code>, if required for unique identification of <code>column_1_name</code> or ROWID.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <code>column_1_name</code>  <br>ROWID                   | <p>the name of a column to be included in the non-aggregate portion of an aggregate join index.</p> <p>No column in a join index can have a UDT, BLOB, CLOB, or Period data type.</p> <p>You cannot specify the system-derived columns PARTITION, PARTITION#L1, PARTITION#L2, PARTITION#L3, PARTITION#L4, PARTITION#L5, PARTITION#L6, PARTITION#L7, PARTITION#L8, PARTITION#L9, PARTITION#L10, PARTITION#L11, PARTITION#L12, PARTITION#L13, PARTITION#L14, or PARTITION#L15 as part of the <code>column_1_name</code> list.</p> <p>You can, however, specify a user-defined column named <i>PARTITION</i> or <i>PARTITION#Ln</i>, where <i>n</i> ranges from 1 - 15, inclusive.</p> <p>If two specified columns have the same name, both names must be aliased using a column name alias. See <i>SQL Fundamentals</i>.</p> <p>Specify the keyword ROWID as one of the values for the <code>column_1_name</code> list to enable the Optimizer to join a partial covering index to its base table to access any noncovered columns.</p> <p>You can alias both <code>column_1_name</code> and ROWID with a column name alias.</p> <p>If you reference multiple tables in the join index definition, then you must fully qualify each ROWID specification.</p> <p>If you reference a ROWID in a GROUP BY clause, then you must define a column name alias for it. The literal ROWID is not valid in the column list argument of a GROUP BY specification.</p> <p>If you reference a ROWID column name alias in the select list of a join index definition, then you can also reference that column name alias in a CREATE INDEX statement that creates a secondary index on the join index.</p> |

| Syntax Element ...                          | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>column_1_name</i>  <br>ROWID (continued) | <p>However, you cannot directly reference the ROWID keyword in a CREATE INDEX statement.</p> <p>You can only specify ROWID in the outermost SELECT list of the CREATE JOIN INDEX statement.</p> <p>Even though you do not explicitly specify this join when you write your query, it counts against the 64 table restriction on joins.</p> <p>You can specify no more than 64 columns per referenced base table per join index.</p>                                                                                                                                                                                                          |
| [AS]<br><i>column_name_alias</i>            | an alias for <i>column_1_name</i> or ROWID. Do not use the name CountStar if you create an aggregate join index because the system reserves that name for any expression being summed, counted, or extracted in the aggregate definition.                                                                                                                                                                                                                                                                                                                                                                                                    |
| SUM                                         | <p>to use the SUM aggregate function to compute the sum of the column or column expression specified by <i>numeric_expression</i>.</p> <p>Note that SUM DISTINCT is not permitted.</p> <p>If you specify SUM only, then the system adds a COUNT(*) expression to the column list and names it CountStar.</p> <p>See <i>SQL Functions, Operators, Expressions, and Predicates</i> for more information about the SUM operator.</p>                                                                                                                                                                                                            |
| <i>numeric_expression</i>                   | <p>an expression having a numeric data type that is to be summed over a specified column.</p> <p>To avoid overflow, type the SUM <i>numeric_expression</i> specification in a join index definition as FLOAT. If you do not assign a data type, the system types it as FLOAT automatically. If you assign a type other than FLOAT, the system returns an error message to the requestor.</p>                                                                                                                                                                                                                                                 |
| COUNT                                       | <p>to use the COUNT aggregate function to count the number of values in the column or column expression specified by <i>column_expression</i>.</p> <p>Note that COUNT DISTINCT is not permitted.</p> <p>See <i>SQL Functions, Operators, Expressions, and Predicates</i> for more information about the COUNT operator.</p> <p>Note that all aggregate join indexes must have either a COUNT(*) or a COUNT(<i>non_null_expression</i>) in their definition to support index maintenance.</p> <p>If none is specified, the system creates a COUNT(*) implicitly, adds it to the definition, and assigns it the default name of CountStar.</p> |
| <i>column_expression</i>                    | <p>a valid column expression to be counted.</p> <p>To avoid overflow, type the COUNT <i>column_expression</i> specification in a join index definition as FLOAT. If you do not assign a data type, the system types it as FLOAT automatically. If you assign a type other than FLOAT, the system returns an error message to the requestor.</p>                                                                                                                                                                                                                                                                                              |
| EXTRACT YEAR  <br>MONTH FROM                | to use the EXTRACT function to extract the year or month from a date expression.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <i>date_expression</i>                      | a valid date expression from which the year or month is to be extracted.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| [AS] <i>expression_alias</i>                | a mandatory alias for the aggregated expression.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| End Aggregation Clause                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |



| Syntax Element ...                                                       | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>FROM Clause</b>                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| FROM <i>database_name</i>   <i>user_name.table_name</i>                  | <p>the name of a table from which a column or columns to be included in the join index are taken as well as the name of a table to be joined with at least one other table to form a join index.</p> <p>You cannot define a join index on any of the following database objects:</p> <ul style="list-style-type: none"> <li>• Global temporary tables</li> <li>• Hash indexes</li> <li>• Join indexes</li> <li>• Journal tables</li> <li>• Queue tables</li> <li>• Views (both types)</li> <li>• Volatile tables</li> </ul> <p>Each table in the FROM clause should have at least one of its fields contained in either <i>column_1_name</i> or <i>column_2_name</i>.</p> <p>In the case of a single-table join index, all columns in a FROM clause table must be contained in the <i>column_1_name</i> list.</p> <p>Each table name can be qualified by a database name if necessary and can have a maximum of 64 different columns referenced in the entire join index definition.</p> <p>Every table must be connected to at least one other table by means of a join condition. The cross join and full outer join conditions are not supported.</p> <p>The maximum number of <i>table_name</i> references allowed is the same as the system limit for SELECT statements.</p> <p>A FROM clause can have any number of simple tables, but is limited to a single joined <i>non</i>-simple table expression.</p> <p>For example, the two following examples are legal. The first is a simple table list and the second is a single non-simple table expression:</p> <pre>FROM table_1, table_2, table_3, table_4</pre> <pre>FROM (table_1 INNER JOIN table_2 ON x1 = x2) INNER JOIN (table_3 ON x1 = x3)</pre> <p>The following example is <i>not</i> legal because it has more than one non-simple table expression:</p> <pre>FROM (table_1 INNER JOIN table_2 ON table_1 x1 = x2), (table_3 INNER JOIN table_4 ON x3 = x4)</pre> |
| [[AS]<br><i>correlation_name</i> ]                                       | an alias for <i>table_name</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Joined Table Clause</b>                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| The <i>joined_table</i> clause is used only for multitable join indexes. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <i>joined_table</i>                                                      | the name of a table (or previously joined tables) from which the columns of this join index are to be derived.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| INNER JOIN                                                               | keywords defining the join as an ordinary join.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

| Syntax Element ...                                                   | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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| LEFT OUTER JOIN<br>RIGHT OUTER JOIN                                  | <p>keywords defining the join as either a left or a right outer join. Full outer join is not supported for join indexes.</p> <p>For most non-aggregate applications, this is the better choice for defining a join index.</p> <p>You cannot specify outer joins for a join index that also contains aggregate operators in its definition.</p> <p>When you specify an outer join, the following rules apply:</p> <ul style="list-style-type: none"> <li>The outer table joining column for each condition must be contained in either <i>column_1_name</i> or <i>column_2_name</i>.</li> <li>The inner table of each join condition must have at least one non-nullable column in either <i>column_1_name</i> or <i>column_2_name</i>.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| ON <i>search_condition</i>                                           | <p>a conditional expression used to eliminate all rows from a query that do not evaluate to TRUE.</p> <p>Multiple join conditions must be connected using the AND logical operator.</p> <p>Data types for any columns used in a join condition must be drawn from the same domain because neither explicit nor implicit data type conversions are permitted.</p> <p>You cannot specify the ROWID keyword in the search condition of a join operation.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| [ <i>database_name</i>  <br><i>user_name</i> .]<br><i>table_name</i> | an optional database name specified if <i>table_name</i> is contained in a database or user other than the current database or user preceding the name of a single table if no tables are joined in this clause.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| [[AS]<br><i>correlation_name</i> ]                                   | an alias for <i>table_name</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| End Joined Table Clause                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| End FROM Clause                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| WHERE<br><i>search_condition</i>                                     | <p>a conditional expression used to eliminate all rows from the SELECT clause query that do not evaluate to TRUE.</p> <p>Multiple join conditions must be connected using the AND logical operator.</p> <p>Data types for any columns used in a join condition must be drawn from the same domain because neither explicit nor implicit data type conversions are permitted.</p> <p>You can only specify a join condition using an inequality operator if you specify multiple join conditions and use the AND logical operator to connect the inequality join condition or conditions with an equality join condition.</p> <p>You cannot specify the ROWID keyword in the search condition of a sparse join index definition.</p> <p>Use caution whenever you define a join index search condition using built-in, or system, functions because the system resolves their value at the time the join index is created and then stores it as part of the join index definition. The values are <i>not</i> resolved for built-in functions specified in a query at the time the Optimizer evaluates the coverage of the index for the query, which means the Optimizer does not even know the index is relevant if a query specifies the built-in function used in its index definition instead of specifying the relevant value explicitly (see the CREATE JOIN INDEX topic “Join Indexes and Built-In Functions” in <i>SQL Data Definition Language Detailed Topics</i> for details).</p> |

| Syntax Element ...                                       | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WHERE<br><i>search_condition</i><br>(continued)          | <p>The following bullets list the relevant built-in functions:</p> <ul style="list-style-type: none"> <li>ACCOUNT</li> <li>CURRENT_DATE</li> <li>CURRENT_TIME</li> <li>CURRENT_TIMESTAMP</li> <li>DATABASE</li> <li>DATE</li> <li>PROFILE</li> <li>ROLE</li> <li>SESSION</li> <li>TIME</li> <li>USER</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| GROUP BY<br><i>column_name</i><br><i>column_position</i> | <p>the name of the column or columns or their ordinal position within the join index definition select column list used to group aggregate index rows on the AMPs.</p> <p>The GROUP BY column list must include all the nonaggregated columns for an aggregate join index.</p> <p>If you include a ROWID column in the GROUP BY column list, it must be previously aliased with a column name alias. You <i>cannot</i> specify the literal ROWID as part of the column list.</p> <p>If you specify a GROUP BY clause but do not specify either a COUNT or a SUM operator, then the system adds a COUNT(*) expression to the column list and names it CountStar.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| ORDER BY<br><i>column_name</i><br><i>column_position</i> | <p>the name or ordinal position of the column within the join index definition select column list used to order index rows on the AMPs.</p> <p>You cannot specify the system-derived columns PARTITION, PARTITION#L1, PARTITION#L2, PARTITION#L3, PARTITION#L4, PARTITION#L5, PARTITION#L6, PARTITION#L7, PARTITION#L8, PARTITION#L9, PARTITION#L10, PARTITION#L11, PARTITION#L12, PARTITION#L13, PARTITION#L14, or PARTITION#L15 as part of the <i>column_name</i> list.</p> <p>You can, however, specify a user-defined column named <i>PARTITION</i> or <i>PARTITION#Ln</i>, where <i>n</i> ranges from 1 - 15, inclusive.</p> <p>You cannot specify an ORDER BY clause in the same join index definition as a partitioned primary index.</p> <p>Sort order is restricted to ascending. If not specified in the ORDER BY clause, the join index rows on an AMP are sorted by the row hash of their primary index.</p> <p>Aggregate columns and expressions are <i>not</i> permitted in the ORDER BY clause.</p> <p>All ordering <i>column_names</i> must be in the <i>column_name_1</i> list. Data in <i>column_name</i> is limited to a maximum of four bytes of the following data types:</p> <ul style="list-style-type: none"> <li>BYTEINT</li> <li>DATE</li> <li>DECIMAL</li> <li>INTEGER</li> <li>SMALLINT</li> </ul> |
| End SELECT Clause                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

| Syntax Element ...                                                                                                                                                                                                               | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p style="text-align: center;"><b>Indexes Clause</b></p> <p>The INDEXES clause defines the primary index and any secondary indexes for the join index.</p> <p>It is used with both multitable and single-table join indexes.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| [PRIMARY] INDEX                                                                                                                                                                                                                  | <p>a mandatory primary index and any number of nonunique secondary indexes defined on the join index. The primary index for a join index must be a nonunique primary index.</p> <p>The primary index for an aggregate join index must be drawn from the columns specified in the GROUP BY clause of the join index definition. You cannot specify any aggregated columns as the primary index.</p> <p>You cannot include the system-derived columns PARTITION, PARTITION#L1, PARTITION#L2, PARTITION#L3, PARTITION#L4, PARTITION#L5, PARTITION#L6, PARTITION#L7, PARTITION#L8, PARTITION#L9, PARTITION#L10, PARTITION#L11, PARTITION#L12, PARTITION#L13, PARTITION#L14, or PARTITION#L15 in the column set that defines the primary index for a join index, nor can you collect statistics on any of the system-derived PARTITION columns.</p> <p>If the primary index is not compressed, you can define it as a partitioned primary index by specifying a partitioning expression (see “PARTITION BY” later in this table).</p> <p>You <i>cannot</i> partition the primary index of a join index if the index is defined with compression.</p> <p>The primary index must be defined as a NUPI even when it is defined on a unique column. You cannot define a UPI for a join index.</p> <p>If you do not define an explicit NUPI, then the first column defined for the join index is assigned to be the NUPI by default. A non-compressed join index can be defined to have a partitioned primary index; however, the primary index cannot be partitioned if the join index is also compressed.</p> <p>If you specify one or more NUSIs, each counts against the maximum number of 32 secondary indexes that can be defined on a join index. Each multicolumn NUSI defined with an ORDER BY clause counts as two consecutive indexes against the limit of 32 per join index.</p> |
| PARTITION BY                                                                                                                                                                                                                     | <p>that the primary index is partitioned by the partitioning expression that follows.</p> <p>You can define a partitioned primary index for a join index only if the index is not compressed.</p> <p>You cannot specify a PARTITION BY clause in the same join index definition as an ORDER BY CLAUSE.</p> <p>You cannot collect statistics on the system-derived PARTITION#Ln columns for a join index.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

| Syntax Element ...             | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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| <i>partitioning_expression</i> | <p>an SQL expression used to define the partition to which a partitioned primary index row is assigned when it is hashed to its AMP. See “Partitioned and Nonpartitioned Primary Indexes” under “CREATE TABLE” in <i>SQL Data Definition Language Detailed Topics</i> for more information about partitioned primary indexes.</p> <p>You can define a multilevel PPI for a noncompressed join index, which means you can define as many as 15 different partitioning expressions for it. If you do so, you must define at least two ranges for each level, and each level must be defined by a lone RANGE_N or CASE_N expression.</p> <p>The result of the partitioning expression is cast to a 4-byte INTEGER type if it is not already of INTEGER type. The value also must fall within the range 1 - 65 535, inclusive. See the CREATE JOIN INDEX topics: “Partitioned Primary Index For Join Indexes” and “Guidelines for Choosing Between a PPI and a Value-Ordered NUSI For Covering Range Queries With a Join Index” in <i>SQL Data Definition Language Detailed Topics</i> for additional information about PPIs and join indexes.</p> <p>See <i>SQL Functions, Operators, Expressions, and Predicates</i> for documentation of functions that are particularly useful for use as partitioning expressions, most notably RANGE_N and CASE_N.</p> |
| <i>index_name</i>              | the optional name of the NUSI being defined.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| ALL                            | <p>that the defined NUSI is to maintain Row ID pointers for each logical row of the join index (as opposed to only the compressed physical rows).</p> <p>ALL also ignores the NOT CASESPECIFIC attribute of data types so a NUSI can include case-specific values.</p> <p>ALL enables a NUSI to cover a join index, which enhances performance by eliminating the need to access the join index when all values needed by a query are in the secondary index. However, ALL might also require the use of additional index storage space.</p> <p>Use this keyword only when a secondary index is being defined on top of a join index.</p> <p>You cannot specify ALL with a PRIMARY index.</p> <p>You cannot specify multiple indexes that differ only by the presence or absence of the ALL option.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>index_column_name</i>       | <p>a column set whose values are to be an index on this join index. If you specify more than one column, then the new index is based on the combined values of each column.</p> <p>No column in a secondary index can have a UDT, Period, BLOB, or CLOB data type.</p> <p>You cannot specify the system-derived columns PARTITION, PARTITION#L1, PARTITION#L2, PARTITION#L3, PARTITION#L4, PARTITION#L5, PARTITION#L6, PARTITION#L7, PARTITION#L8, PARTITION#L9, PARTITION#L10, PARTITION#L11, PARTITION#L12, PARTITION#L13, PARTITION#L14, or PARTITION#L15 as part of the <i>index_column_name</i> list.</p> <p>You can, however, specify a user-defined column named <i>PARTITION</i> or <i>PARTITION#Ln</i>, where <i>n</i> ranges from 1 - 15, inclusive.</p> <p>If two specified columns have the same name, both names must be aliased with unique column name aliases. See <i>SQL Fundamentals</i>.</p> <p>A maximum of 64 columns can be defined for one index.</p> <p>Multiple indexes can be defined on the same columns as long as each index differs in its ordering option (VALUES versus HASH).</p>                                                                                                                                                                                                                                       |

| Syntax Element ...                             | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                             |          |        |                                                              |                                                |                               |                      |                                                                                             |                                     |                                                                                                                     |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------|--------|--------------------------------------------------------------|------------------------------------------------|-------------------------------|----------------------|---------------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| ORDER BY                                       | <p>row ordering on each AMP by a single NUSI column: either value-ordered or hash-ordered.</p> <p>Each multicolumn NUSI defined with an ORDER BY clause counts as two consecutive indexes against the limit of 32 per join index.</p> <p>You cannot specify an ORDER BY clause in the same join index definition as a partitioned primary index.</p> <p>Rules for using an ORDER BY clause are shown in the following table:</p> <table> <tr> <th>IF you specify ORDER BY ...</th><th>THEN ...</th></tr> <tr> <td>VALUES</td><td><i>column_name_2</i> must be numeric with four bytes or less</td></tr> <tr> <td>without specifying the HASH or VALUES keywords</td><td>VALUES is assumed by default.</td></tr> <tr> <td><i>column_name_2</i></td><td><i>column_name_2</i> must be one of the columns specified in the <i>column_name_1</i> list.</td></tr> <tr> <td>the system-derived PARTITION column</td><td>the request aborts and returns an error to the requestor.<br/>You can specify a user-defined column named partition.</td></tr> </table> | IF you specify ORDER BY ... | THEN ... | VALUES | <i>column_name_2</i> must be numeric with four bytes or less | without specifying the HASH or VALUES keywords | VALUES is assumed by default. | <i>column_name_2</i> | <i>column_name_2</i> must be one of the columns specified in the <i>column_name_1</i> list. | the system-derived PARTITION column | the request aborts and returns an error to the requestor.<br>You can specify a user-defined column named partition. |
| IF you specify ORDER BY ...                    | THEN ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                             |          |        |                                                              |                                                |                               |                      |                                                                                             |                                     |                                                                                                                     |
| VALUES                                         | <i>column_name_2</i> must be numeric with four bytes or less                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                             |          |        |                                                              |                                                |                               |                      |                                                                                             |                                     |                                                                                                                     |
| without specifying the HASH or VALUES keywords | VALUES is assumed by default.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                             |          |        |                                                              |                                                |                               |                      |                                                                                             |                                     |                                                                                                                     |
| <i>column_name_2</i>                           | <i>column_name_2</i> must be one of the columns specified in the <i>column_name_1</i> list.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                             |          |        |                                                              |                                                |                               |                      |                                                                                             |                                     |                                                                                                                     |
| the system-derived PARTITION column            | the request aborts and returns an error to the requestor.<br>You can specify a user-defined column named partition.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                             |          |        |                                                              |                                                |                               |                      |                                                                                             |                                     |                                                                                                                     |
| <u>VALUES</u>                                  | <p>value-ordering for the ORDER BY column. This is the default specification.</p> <p>Select VALUES to optimize queries that return a contiguous range of values, especially for a covered index or a nested join.</p> <p>See the CREATE JOIN INDEX topic “Guidelines for Choosing Between a PPI and a Value-Ordered NUSI For Covering Range Queries With a Join Index” in <i>SQL Data Definition Language Detailed Topics</i> for information about determining whether a PPI or a value-ordered NUSI would be a better choice for a given application workload.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                             |          |        |                                                              |                                                |                               |                      |                                                                                             |                                     |                                                                                                                     |
| HASH                                           | <p>hash-ordering for the ORDER BY column.</p> <p>Select HASH to limit hash-ordering to one column, rather than all columns of the primary index, which is the default.</p> <p>Hash-ordering a multicolumn NUSI on one of its columns allows the index to participate in a nested join where join conditions involve only that ordering column.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                             |          |        |                                                              |                                                |                               |                      |                                                                                             |                                     |                                                                                                                     |

| Syntax Element ...   | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>column_name_2</i> | <p>a column in the <i>column_name_1</i> list that specifies the sort order to be used.</p> <p>No column in a join index can have a UDT, BLOB, or CLOB data type.</p> <p>You cannot compress column values for a join index.</p> <p>You cannot specify the system-derived columns PARTITION, PARTITION#L1, PARTITION#L2, PARTITION#L3, PARTITION#L4, PARTITION#L5, PARTITION#L6, PARTITION#L7, PARTITION#L8, PARTITION#L9, PARTITION#L10, PARTITION#L11, PARTITION#L12, PARTITION#L13, PARTITION#L14, or PARTITION#L15 as part of the <i>column_2_name</i> list.</p> <p>You can, however, specify a user-defined column named <i>PARTITION</i> or <i>PARTITION#Ln</i>, where <i>n</i> ranges from 1 - 15, inclusive.</p> <p>Supported data types for a value-ordered, four-bytes-or-less <i>column_name_2</i> are:</p> <ul style="list-style-type: none"> <li>• BYTEINT</li> <li>• DATE</li> <li>• DECIMAL</li> <li>• INTEGER</li> <li>• SMALLINT</li> </ul> |
| End Indexes Clause   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

## ANSI Compliance

CREATE JOIN INDEX is a Teradata extension to the ANSI SQL:2008 standard. ANSI does not define DDL for creating indexes.

## Required Privileges

You must have the following sets of privileges to create a join index:

- CREATE TABLE on the database in which the join index is to be created.
- DROP TABLE or INDEX on each of the covered tables or their containing databases.

## Privileges Granted Automatically

Owners have implicit privileges on the join index. The following default privileges are granted automatically to the creator of a join index:

- DROP TABLE
- RESTORE
- DUMP
- SELECT
- INDEX

## Example 1: Creating and Using a Simple Join Index

This example set uses the following table definitions:

```
CREATE TABLE customer (
    c_custkey    INTEGER,
    c_name      CHARACTER(26) ,
```

```
        c_address      VARCHAR(41),
        c_nationkey    INTEGER,
        c_phone        CHARACTER(16),
        c_acctbal      DECIMAL(13,2),
        c_mktsegment   CHARACTER(21),
        c_comment      VARCHAR(127))
UNIQUE PRIMARY INDEX (c_custkey);

CREATE TABLE orders (
        o_orderkey      INTEGER NOT NULL,
        o_custkey       INTEGER,
        o_orderstatus   CHARACTER(1),
        o_totalprice    DECIMAL(13,2) NOT NULL,
        o_orderdate     DATE FORMAT 'yyyy-mm-dd' NOT NULL,
        o_orderpriority CHARACTER(21),
        o_clerk         CHARACTER(16),
        o_shippriority  INTEGER,
        o_comment       VARCHAR(79))
UNIQUE PRIMARY INDEX (o_orderkey);

CREATE TABLE lineitem (
        l_orderkey      INTEGER NOT NULL,
        l_partkey       INTEGER NOT NULL,
        l_suppkey       INTEGER,
        l_linenumbers   INTEGER,
        l_quantity      INTEGER NOT NULL,
        l_extendedprice DECIMAL(13,2) NOT NULL,
        l_discount      DECIMAL(13,2),
        l_tax           DECIMAL(13,2),
        l_returnflag    CHARACTER(1),
        l_linestatus    CHARACTER(1),
        l_shipdate      DATE FORMAT 'yyyy-mm-dd',
        l_commitdate    DATE FORMAT 'yyyy-mm-dd',
        l_receiptdate   DATE FORMAT 'yyyy-mm-dd',
        l_shipinstruct  VARCHAR(25),
        l_shipmode      VARCHAR(10),
        l_comment       VARCHAR(44))
PRIMARY INDEX (l_orderkey);
```

The following request defines a join index on these tables. Subsequent examples demonstrate the effect of this join index on how the Optimizer processes various queries.

```
CREATE JOIN INDEX order_join_line AS
SELECT (l_orderkey, o_orderdate, o_custkey, o_totalprice),
       (l_partkey, l_quantity, l_extendedprice, l_shipdate)
FROM lineitem
LEFT JOIN orders ON l_orderkey = o_orderkey
ORDER BY o_orderdate
PRIMARY INDEX (l_orderkey);

*** Index has been created.
*** Total elapsed time was 15 seconds.
```

The following EXPLAIN report shows how the newly created join index, *order\_join\_line*, might be used by the Optimizer:

```
EXPLAIN SELECT o_orderdate, o_custkey, l_partkey, l_quantity,
              l_extendedprice
FROM lineitem, orders
```



```
WHERE l_orderkey = o_orderkey;
```

Explanation

- 1) First, we lock a distinct LOUISB."pseudo table" for read on a Row Hash to prevent global deadlock for LOUISB.order\_join\_line.
- 2) Next, we lock LOUISB.order\_join\_line for read.
- 3) We do an all-AMPS RETRIEVE step from join index table LOUISB.order\_join\_line by way of an all-rows scan with a condition of ("NOT (LOUISB.order\_join\_line.o\_orderdate IS NULL)") into Spool 1, which is built locally on the AMPS. The input table will not be cached in memory, but it is eligible for synchronized scanning. The result spool file will not be cached in memory. The size of Spool 1 is estimated to be 1,000,000 rows. The estimated time for this step is 4 minutes and 27 seconds.
- 4) Finally, we send out an END TRANSACTION step to all AMPS involved in processing the request.

The following EXPLAIN report shows how the join index might be used in a query when an additional search condition is added on the join indexed rows:

```
EXPLAIN SELECT o_orderdate, o_custkey, l_partkey, l_quantity,
              l_extendedprice
FROM lineitem, orders
WHERE l_orderkey = o_orderkey
AND o_orderdate > '1997-11-01';
```

Explanation

- 1) First, we lock a distinct LOUISB."pseudo table" for read on a Row Hash to prevent global deadlock for LOUISB.order\_join\_line.
- 2) Next, we lock LOUISB.order\_join\_line for read.
- 3) We do an all-AMPS RETRIEVE step from join index table LOUISB.order\_join\_line with a range constraint of ("LOUISB.order\_join\_line.Field\_1026 > 971101") with a residual condition of ("NOT (LOUISB.order\_join\_line.o\_orderdate IS NULL ) ) AND (LOUISB.order\_join\_line.Field\_1026 > 971101)") into Spool 1, which is built locally on the AMPS. The input table will not be cached in memory, but it is eligible for synchronized scanning. The size of Spool 1 is estimated to be 1000 rows. The estimated time for this step is 0.32 seconds.
- 4) Finally, we send out an END TRANSACTION step to all AMPS involved in processing the request.

The following EXPLAIN report shows how the join index might be used in a query when aggregation is performed on the join indexed rows:

```
EXPLAIN SELECT l_partkey, avg(l_quantity), AVG(l_extendedprice)
FROM lineitem, orders
WHERE l_orderkey = o_orderkey
AND o_orderdate > '1997-11-01'
GROUP BY l_partkey;
```

Explanation

- 1) First, we lock a distinct LOUISB."pseudo table" for read on a RowHash to prevent global deadlock for LOUISB.order\_join\_line.
- 2) Next, we lock LOUISB.order\_join\_line for read.
- 3) We do a SUM step to aggregate from join index table LOUISB.order\_join\_line with a range constraint of ("LOUISB.order\_join\_line.Field\_1026 > 971101") with a residual condition of ("(LOUISB.order\_join\_line.Field\_1026 > 971101) AND (NOT (LOUISB.order\_join\_line.o\_orderdate IS NULL ))"), and the grouping identifier in field 1. Aggregate Intermediate Results are computed globally, then placed in Spool 3. The input table will not be cached in memory, but it is eligible for synchronized scanning.
- 4) We do an all-AMPs RETRIEVE step from Spool 3 (Last Use) by way of an all-rows scan into Spool 1, which is built locally on the AMPs. The size of Spool 1 is estimated to be 10 rows. The estimated time for this step is 0.32 seconds.
- 5) Finally, we send out an END TRANSACTION step to all AMPs involved in processing the request.

The following EXPLAIN report shows how the join index might be used in a query when join indexed rows are used to join with another base table:

```
EXPLAIN SELECT o_orderdate, c_name, c_phone, l_partkey, l_quantity,
              l_extendedprice
FROM lineitem, orders, customer
WHERE l_orderkey = o_orderkey
AND o_custkey = c_custkey;
```

Explanation

- 1) First, we lock a distinct LOUISB."pseudo table" for read on a Row Hash to prevent global deadlock for LOUISB.order\_join\_line.
- 2) Next, we lock a distinct LOUISB."pseudo table" for read on a Row Hash to prevent global deadlock for LOUISB.customer.
- 3) We lock LOUISB.order\_join\_line for read, and we lock LOUISB.customer for read.
- 4) We do an all-AMPs RETRIEVE step from join index table LOUISB.order\_join\_line by way of an all-rows scan with a condition of ("NOT (LOUISB.order\_join\_line.o\_orderdate IS NULL)") into Spool 2, which is redistributed by hash code to all AMPs. Then we do a SORT to order Spool 2 by row hash. The size of Spool 2 is estimated to be 1,000,000 rows. The estimated time for this step is 1 minute and 53 seconds.
- 5) We do an all-AMPs JOIN step from LOUISB.customer by way of a Row Hash match scan with no residual conditions, which is joined to Spool 2 (Last Use). LOUISB.customer and Spool 2 are joined using a merge join, with a join condition of ("Spool\_2.o\_custkey = LOUISB.customer.c\_custkey"). The result goes into Spool 1, which is built locally on the AMPs. The size of Spool 1 is estimated to be 1,000,000 rows. The estimated time for this step is 32.14 seconds.
- 6) Finally, we send out an END TRANSACTION step to all AMPs involved in processing the request.

The following EXPLAIN report shows how the join index might be used in a query of a single table:

```
EXPLAIN SELECT l_orderkey, l_partkey, l_quantity, l_extendedprice
FROM lineitem
WHERE l_partkey = 1001;
```

#### Explanation

- 
- 1) First, we lock a distinct LOUISB."pseudo table" for read on a Row Hash to prevent global deadlock for LOUISB.order\_join\_line.
  - 2) Next, we lock LOUISB.order\_join\_line for read.
  - 3) We do an all-AMPS RETRIEVE step from join index table LOUISB.order\_join\_line by way of an all-rows scan with a condition of ("LOUISB.order\_join\_line.l\_partkey = 1001") into Spool 1, which is built locally on the AMPS. The input table will not be cached in memory, but it is eligible for synchronized scanning. The result spool file will not be cached in memory. The size of Spool 1 is estimated to be 100 rows. The estimated time for this step is 59.60 seconds.
  - 4) Finally, we send out an END TRANSACTION step to all AMPS involved in processing the request.

### Example 2: Specifying a Disk I/O Checksum Value for a Join Index

The following example defines a join index with a disk I/O checksum value of MEDIUM. If secondary indexes are defined on *ord\_cust\_idx*, then the specified checksum value applies to them as well.

```
CREATE JOIN INDEX ord_cust_idx, CHECKSUM = MEDIUM AS
SELECT c_nationkey, SUM(o_totalprice(FLOAT)) AS price, o_orderdate
FROM orders, customer
WHERE o_custkey = c_custkey
GROUP BY c_nationkey, o_orderdate;
ORDER BY o_orderdate;
```

### Example 3: Defining and Using a Simple Join Index With an *n*-way Join Result

The following example shows the creation of a join index defined with a multiway join result and then shows how the Optimizer uses the join index to process a query on the base tables for which it is defined:

```
CREATE JOIN INDEX cust_order_join_line AS
SELECT (l_orderkey, o_orderdate, c_nationkey, o_totalprice),
       (l_partkey, l_quantity, l_extendedprice, l_shipdate)
FROM (lineitem
LEFT JOIN orders ON l_orderkey = o_orderkey)
INNER JOIN customer ON o_custkey = c_custkey
PRIMARY INDEX (l_orderkey);

*** Index has been created.
*** Total elapsed time was 20 seconds.
```

```
EXPLAIN SELECT l_orderkey, o_orderdate, o_totalprice,
               l_partkey, l_quantity, l_extendedprice, l_shipdate
FROM lineitem, orders, customer
WHERE l_orderkey = o_orderkey
AND o_custkey = c_custkey
AND c_nationkey = 10;
```

```
*** Help information returned. 16 rows.
*** Total elapsed time was 1 second.
```

Explanation

- 1) First, we lock a distinct LOUISB."pseudo table" for read on a Row Hash to prevent global deadlock for LOUISB.cust\_order\_join\_line.
- 2) Next, we lock LOUISB.cust\_order\_join\_line for read.
- 3) We do an all-AMPS RETRIEVE step from join index table LOUISB.cust\_order\_join\_line by way of an all-rows scan with a condition of ("LOUISB.cust\_order\_join\_line.c\_nationkey = 10") into Spool 1, which is built locally on the AMPS. The input table will not be cached in memory, but it is eligible for synchronized scanning. The result spool file will not be cached in memory. The size of Spool 1 is estimated to be 200 rows. The estimated time for this step is 3 minutes and 57 seconds.
- 4) Finally, we send out an END TRANSACTION step to all AMPS involved in processing the request.

## Example 4: Using the EXTRACT Function With a Join Index Definition

Join index definitions support the EXTRACT function.

The following example illustrates the use of the EXTRACT function in the definition of an aggregate join index:

```
CREATE JOIN INDEX ord_cust_idx_2 AS
SELECT c_nationkey, SUM(o_totalprice(FLOAT)) AS price,
       EXTRACT(YEAR from o_orderdate) AS o_year
FROM orders, customer
WHERE o_custkey = c_custkey
GROUP BY c_nationkey, o_year
ORDER BY o_year;
```

The aggregation is based only on the year of o\_orderdate, which has fewer groups than the entire o\_orderdate, so *ord\_cust\_idx\_2* is much smaller than *ord\_cust\_idx*.

On the other hand, the use for *ord\_cust\_idx\_2* is more limited than *ord\_cust\_idx*. In particular, *ord\_cust\_idx\_2* can only be used to satisfy queries that select full years of orders.

For example, *ord\_cust\_idx\_2* cannot be used for the query analyzed in [“Example 5: Creating and Using an Aggregate Join Index” on page 237](#), but the following query *does* profit from its use:

```
SELECT COUNT(*), SUM(o_totalprice)
FROM orders, customer
WHERE o_custkey = c_custkey
AND o_orderdate > DATE '1998-01-01'
AND o_orderdate < DATE '1998-12-31'
GROUP BY c_nationkey;
```

## Example 5: Creating and Using an Aggregate Join Index

This example set uses the following table definitions:

```

CREATE TABLE customer (
  c_custkey    INTEGER NOT NULL,
  c_name       CHARACTER(26) CASESPECIFIC NOT NULL,
  c_address    VARCHAR(41),
  c_nationkey  INTEGER,
  c_phone      CHARACTER(16),
  c_acctbal    DECIMAL(13,2),
  c_mktsegment CHARACTER(21),
  c_comment    VARCHAR(127))
UNIQUE PRIMARY INDEX (c_custkey);

CREATE TABLE orders (
  o_orderkey    INTEGER NOT NULL,
  o_custkey     INTEGER,
  o_orderstatus CHARACTER(1) CASESPECIFIC,
  o_totalprice  DECIMAL(13,2) NOT NULL,
  o_orderdate   DATE FORMAT 'YYYY-MM-DD' NOT NULL,
  o_orderpriority CHARACTER(21),
  o_clerk       CHARACTER(16),
  o_shippriority INTEGER,
  o_comment     VARCHAR(79))
UNIQUE PRIMARY INDEX (o_orderkey);

```

Consider the following aggregate join query:

```

SELECT COUNT(*), SUM(o_totalprice)
FROM orders, customer
WHERE o_custkey = c_custkey
AND   o_orderdate > DATE '1998-09-20'
AND   o_orderdate < DATE '1998-10-15'
GROUP BY c_nationkey;

```

Without an aggregate join index, a typical execution plan for this query might involve the following stages:

- 1 Redistribute *orders* into a spool file.
- 2 Sort the spool file on *o\_custkey*.
- 3 Merge join the sorted spool file and the *customer* file.
- 4 Aggregate the result of the merge join.
- 5 End of process.

Suppose you define the following aggregate join index, which aggregates *o\_totalprice* over a join of *orders* and *customer*:

```

SELECT c_nationkey, SUM(o_totalprice(FLOAT)) AS price, o_orderdate
FROM orders, customer
WHERE o_custkey = c_custkey
GROUP BY c_nationkey, o_orderdate
ORDER BY o_orderdate;

```

The execution plan produced by the Optimizer for this query includes an aggregate step on the aggregate join index, which is much smaller than either one of the join tables. You can confirm this by performing an EXPLAIN on the query.

```
EXPLAIN SELECT COUNT(*), SUM(o_totalprice)
FROM orders, customer
WHERE o_custkey = c_custkey
AND   o_orderdate > DATE '1998-09-20'
AND   o_orderdate < DATE '1998-10-15'
GROUP BY c_nationkey;
```

```
*** Help information returned. 18 rows.
*** Total elapsed time was 3 seconds.
```

Explanation

- 
- 1) First, we lock a distinct TPCD."pseudo table" for read on a RowHash to prevent global deadlock for TPCD.ord\_cust\_idx.
  - 2) Next, we lock TPCD.ord\_cust\_idx for read.
  - 3) We do a SUM step to aggregate from join index table TPCD.ordcustidx by way of an all-rows scan with a condition of ( "(TPCD.ord\_cust\_idx.O\_ORDERDATE > DATE '1998-09-20') AND (TPCD.ord\_cust\_idx.O\_ORDERDATE < DATE '1998-10-15')"), and the grouping identifier in field 1. Aggregate Intermediate Results are computed globally, then placed in Spool 2. The size of Spool 2 is estimated to be 1 row.
  - 4) We do an all-AMPS RETRIEVE step from Spool 2 (Last Use) by way of an all-rows scan into Spool 1, which is built locally on the AMPS. The size of Spool 1 is estimated with no confidence to be 1 row. The estimated time for this step is 0.17 seconds.
  - 5) Finally, we send out an END TRANSACTION step to all AMPS involved in processing the request.
- > The contents of Spool 1 are sent back to the user as the result of statement 1.

## Example 6: Join Index With a Single-Level Partitioned Primary Index

Assume the following base table definition:

```
CREATE TABLE orders (
  o_orderkey      INTEGER NOT NULL,
  o_custkey       INTEGER,
  o_orderstatus   CHARACTER(1) CASESPECIFIC,
  o_totalprice    DECIMAL(13,2) NOT NULL,
  o_orderdate     DATE FORMAT 'yyyy-mm-dd' NOT NULL,
  o_orderpriority CHARACTER(21),
  o_clerk         CHARACTER(16),
  o_shippriority  INTEGER,
  o_comment       VARCHAR(79))
UNIQUE PRIMARY INDEX (o_orderkey, o_orderdate);
```

The following DDL creates a single-level PPI join index on the base table named *orders*:

```
CREATE JOIN INDEX ordJI1 AS
  SELECT o_custkey, o_totalprice
  FROM orders
PRIMARY INDEX (o_custkey)
  PARTITION BY RANGE_N(CAST(o_totalprice AS INTEGER)
    BETWEEN 0
    AND 999999
    EACH 100, NO RANGE);
```

## Example 7: Another SLPPI Join Index

The following example shows how a noncompressed PPI join index can help query performance.

Assume a star schema with the following fact and dimension tables defined in the physical data model:

- A fact table named *sales* with columns *sale\_date*, *store\_id*, *prod\_id*, and *amount*.
- The following three dimension tables:
  - *calendar*, with columns *dayofmth*, *mth*, and *yr* and a primary index defined on *yr* and *mth*.
  - *product*, with columns *prod\_id* and *prod\_category*.
  - *org*, with columns *store\_id*, *area*, *division*, and *business\_unit*.

You might want to create an aggregate join index with daily summary data like the following join index named *sales\_summary* to answer a set of ad hoc queries:

```
CREATE JOIN INDEX sales_summary AS
  SELECT sale_date, prod_category, division,
         SUM(amount) AS daily_sales
  FROM calendar AS c, product AS p, org AS o, sales AS s
  WHERE c.dayofmth = s.sale_date
  AND   p.prod_id = s.prod_id
  AND   o.store_id = s.store_id
  AND   s.sale_date BETWEEN DATE '1991-01-01' AND DATE '2006-12-31'
  GROUP BY sale_date, prod_category, division
  PRIMARY INDEX(sale_date, prod_category, division)
  PARTITION BY RANGE_N(sale_date BETWEEN DATE '1991-01-01'
                        AND DATE '2006-12-31'
                        EACH INTERVAL '1' MONTH);
```

A wide range of queries can make use of this join index, especially when there are foreign key-primary key relationships defined between the fact table and the dimension tables that enable the join index to be used as a broad join index to cover queries over a subset of dimension tables.

Significant performance gains can be achieved with this join index when the Optimizer uses it to answer the queries that have equality or range constraints on the *sale\_date* column. The system applies optimizations such as Static Partition Elimination and Rowkey-Based Merge Join to a PPI join index in the same way it does to a PPI base table.

For example, the following query needs to access only 12 of the 192 total partitions, which saves as much as 93.75 percent on disk reads, and proportional savings on elapsed time compared with an otherwise identical NPPI join index, which requires a full-table scan.

```
SELECT prod_category, SUM(amount) AS daily_sales
FROM calendar c, product p, sales s
WHERE c.dayofmth = s.sale_date
AND   p.prod_id = s.prod_id
AND   sale_date BETWEEN DATE '2006-01-01' AND DATE '2006-12-31'
GROUP BY prod_category;
```

While a join index often significantly improves query response times, you must also consider the overhead of maintaining the index when inserts, deletes, updates, and merges occur to the base table on which it is defined.

A noncompressed PPI join index might see significant improvement in maintenance performance because of PPI-related optimizations. For example, partitioning on the DATE column in the join index also helps insert performance if the transaction data are inserted into the *sales* table according to a time sequence.

The Teradata Parallel Transporter UPDATE operator, MultiLoad, and FastLoad cannot be used to load rows into base tables with join indexes. Because of this limitation, you must use either of the following workarounds:

- Use the Teradata Parallel Data Pump utility to load the rows into *sales*
- FastLoad the rows into a staging table and then use either an INSERT ... SELECT or MERGE request with error logging to load the rows into *sales*.

Because the inserted rows are clustered in the data blocks corresponding to the appropriate partitions, the number of data blocks the system must read and write is reduced compared to an NPPI join index, where the inserted rows scatter among all the data blocks.

On the other hand, it is possible that the maintenance of a PPI join index makes the index less efficient than it would be with an NPPI. For example, if the primary index of the join index does not include the partitioning columns, and a DELETE or UPDATE statement specifies a constraint on the primary index, the system must probe all partitions on the AMP to maintain the SLPPI join index as opposed to the fast primary index access for the join index when defined with an NPPI.

## Examples That Obey the General Covering Rules for Extra Tables in the Join Index Definition

The following set of base tables, join indexes, queries, and EXPLAIN reports demonstrate how the referential integrity relationships among the underlying base tables in a join index definition influence whether the Optimizer selects the index for queries that reference fewer base tables than are referenced by the join index:



```

CREATE SET TABLE t1, NO FALLBACK, NO BEFORE JOURNAL,
    NO AFTER JOURNAL (
    x1 INTEGER NOT NULL,
    a1 INTEGER NOT NULL,
    b1 INTEGER NOT NULL,
    c1 INTEGER NOT NULL,
    d1 INTEGER NOT NULL,
    e1 INTEGER NOT NULL,
    f1 INTEGER NOT NULL,
    g1 INTEGER NOT NULL,
    h1 INTEGER NOT NULL,
    i1 INTEGER NOT NULL,
    j1 INTEGER NOT NULL,
    k1 INTEGER NOT NULL,
    CONSTRAINT ri1 FOREIGN KEY (a1, b1, c1) REFERENCES t2 (a2, b2, c2),
    CONSTRAINT ri2 FOREIGN KEY (d1) REFERENCES t3(d3),
    CONSTRAINT ri3 FOREIGN KEY (e1, f1) REFERENCES t4 (e4, f4),
    CONSTRAINT ri4 FOREIGN KEY (g1, h1, i1, j1)
        REFERENCES t5(g5, h5, i5, j5),
    CONSTRAINT ri5 FOREIGN KEY (k1) REFERENCES t6(k6));

CREATE SET TABLE t2, NO FALLBACK, NO BEFORE JOURNAL,
    NO AFTER JOURNAL (
    a2 INTEGER NOT NULL,
    b2 INTEGER NOT NULL,
    c2 INTEGER NOT NULL,
    x2 INTEGER)
    UNIQUE PRIMARY INDEX(a2, b2, c2);

CREATE SET TABLE t3, NO FALLBACK, NO BEFORE JOURNAL,
    NO AFTER JOURNAL (
    d3 INTEGER NOT NULL,
    x3 INTEGER)
    UNIQUE PRIMARY INDEX(d3);

CREATE SET TABLE t4, NO FALLBACK, NO BEFORE JOURNAL,
    NO AFTER JOURNAL (
    e4 INTEGER NOT NULL,
    f4 INTEGER NOT NULL,
    x4 INTEGER)
    UNIQUE PRIMARY INDEX(e4, f4);

CREATE SET TABLE t5, NO FALLBACK, NO BEFORE JOURNAL,
    NO AFTER JOURNAL (
    g5 INTEGER NOT NULL,
    h5 INTEGER NOT NULL,
    i5 INTEGER NOT NULL,
    j5 INTEGER NOT NULL,
    x5 INTEGER)
    UNIQUE PRIMARY INDEX(g5, h5, i5, j5);

CREATE SET TABLE t6, NO FALLBACK, NO BEFORE JOURNAL,
    NO AFTER JOURNAL (
    k6 INTEGER NOT NULL,
    x6 INTEGER)
    UNIQUE PRIMARY INDEX(k6);

```

## Example 8: All Outer Joins in Join Index Definition

The following join index definition left outer joins *t1* to *t3* on *da=d3* and then left outer joins that result to *t6* on *k1=k6*:

```
CREATE JOIN INDEX jiout AS
  SELECT d1, d3, k1, k6, x1
  FROM t1 LEFT OUTER JOIN t3 ON d1=d3
  LEFT OUTER JOIN t6 ON k1=k6;
```

You would expect the Optimizer to use *jiout* with the following query, because all the outer joins in the join index are inner joined to the query tables on unique columns (*d1* and *k1* are declared foreign keys in *t1* and *d3* and *k6*, the primary keys for *t3* and *t6*, respectively, are declared as the unique primary index for those tables).

The bold EXPLAIN report text indicates that the Optimizer does use *jiout* in its query plan.

```
EXPLAIN SELECT d1, SUM(x1)
FROM t1, t3
WHERE d1=d3
GROUP by 1;

*** Help information returned. 17 rows.
*** Total elapsed time was 1 second.
```

### Explanation

- 1) First, we lock a distinct HONG\_JI."pseudo table" for read on a RowHash to prevent global deadlock for HONG\_JI.jiout.
  - 2) Next, we lock **HONG\_JI.jiout** for read.
  - 3) We do an all-AMPs SUM step to aggregate from **HONG\_JI.jiout** by way of an all-rows scan with no residual conditions, and the grouping identifier in field 1. Aggregate Intermediate Results are computed locally, then placed in Spool 3. The size of Spool 3 is estimated with low confidence to be 1 row. The estimated time for this step is 0.03 seconds.
  - 4) We do an all-AMPs RETRIEVE step from Spool 3 (Last Use) by way of an all-rows scan into Spool 1 (group\_amps), which is built locally on the AMPs. The size of Spool 1 is estimated with low confidence to be 1 row. The estimated time for this step is 0.04 seconds.
  - 5) Finally, we send out an END TRANSACTION step to all AMPs involved in processing the request.
- > The contents of Spool 1 are sent back to the user as the result of statement 1.

## Example 9: All Inner Joins Without Aggregation in Join Index Definition

The following simple join index definition specifies inner joins on tables *t1*, *t3* and *t6*:

```
CREATE JOIN INDEX jiin AS
  SELECT d1, d3, k1, k6, x1
  FROM t1, t3, t6
  WHERE d1=d3
  AND k1=k6;
```

You would expect the Optimizer to use *jiin* with the following query, and the bold EXPLAIN report text indicates that it does.

```
EXPLAIN SELECT d1, SUM(x1)
FROM t1, t3
WHERE d1=d3
GROUP BY 1;
```

## Explanation

- 
- 1) First, we lock a distinct HONG\_JI."pseudo table" for read on a RowHash to prevent global deadlock for **HONG\_JI.jiin**.
  - 2) Next, we lock HONG\_JI.jiin for read.
  - 3) We do an all-AMPs SUM step to aggregate from **HONG\_JI.jiin** by way of an all-rows scan with no residual conditions, and the grouping identifier in field 1. Aggregate Intermediate Results are computed locally, then placed in Spool 3. The size of Spool 3 is estimated with low confidence to be 1 row. The estimated time for this step is 0.03 seconds.
  - 4) We do an all-AMPs RETRIEVE step from Spool 3 (Last Use) by way of an all-rows scan into Spool 1 (group\_amps), which is built locally on the AMPs. The size of Spool 1 is estimated with low confidence to be 1 row. The estimated time for this step is 0.04 seconds.
  - 5) Finally, we send out an END TRANSACTION step to all AMPs involved in processing the request.
- > The contents of Spool 1 are sent back to the user as the result of statement 1.

**Example 10: All Inner Joins With Aggregation in Join Index Definition**

The following aggregate join index definition specifies inner joins on tables *t1*, *t2*, and *t4*:

```
CREATE JOIN INDEX jiin_aggr AS
SELECT a1, e1, SUM(x1) AS total
FROM t1, t2, t4
WHERE a1=a2
AND    e1=e4
AND    a1>1
GROUP BY 1, 2;
```

You would expect the Optimizer to use join index *jiin\_aggr* in its plan for the following query because it has the same join term as the query.

The bold EXPLAIN report text indicates that the Optimizer does use *jiin\_aggr* in its plan:

```
EXPLAIN SELECT a1, e1, SUM(x1) AS total
FROM t1, t2, t4
WHERE a1=a2
AND    e1=e4
AND    a1>2
GROUP BY 1, 2;
```

```
*** Help information returned. 13 rows.
*** Total elapsed time was 1 second.
```

## Explanation

- 
- 1) First, we lock a distinct HONG\_JI."pseudo table" for read on a RowHash to prevent global deadlock for **HONG\_JI.jiin\_aggr**.
  - 2) Next, we lock **HONG\_JI.jiin\_aggr** for read.
  - 3) We do an all-AMPs RETRIEVE step from HONG\_JI.jiin\_aggr by way of an all-rows scan with a condition of ("**HONG\_JI.jiin\_aggr.a1** > 2) AND (**HONG\_JI.jiin\_aggr.a1** >= 3)") into Spool 1 (group\_amps), which is built locally on the AMPs. The size of Spool 1 is estimated with no confidence to be 1 row. The estimated time for this step is 0.03 seconds.
  - 4) Finally, we send out an END TRANSACTION step to all AMPs involved in processing the request.
- > The contents of Spool 1 are sent back to the user as the result of statement 1. The total estimated time is 0.03 seconds.

## Example 11: All Inner Joins With Aggregation in Join Index Definition

You would not expect the Optimizer to use join index *jiin\_aggr* (see [“Example 10: All Inner Joins With Aggregation in Join Index Definition” on page 243](#)) in its plan for the following query because the conditions *b1=b2* and *f1=f4* are not covered by the join index defined by *jiin\_aggr*. As a result, the Optimizer specifies a full-table scan to retrieve the specified rows.

The EXPLAIN report text indicates that the Optimizer does *not* choose *jiin\_aggr* to cover the query:

```
EXPLAIN SELECT a1, e1, SUM(x1) AS total
FROM t1, t2, t4
WHERE b1=b2
AND    f1=f4
AND    a1>2
GROUP BY 1, 2;
```

### Explanation

- 1) First, we lock a distinct HONG\_JI."pseudo table" for read on a RowHash to prevent global deadlock for HONG\_JI.t4.
- 2) Next, we lock a distinct HONG\_JI."pseudo table" for read on a RowHash to prevent global deadlock for HONG\_JI.t2.
- 3) We lock a distinct HONG\_JI."pseudo table" for read on a RowHash to prevent global deadlock for HONG\_JI.t1.
- 4) We lock HONG\_JI.t4 for read, we lock HONG\_JI.t2 for read, and we lock HONG\_JI.t1 for read.
- 5) We do an all-AMPs RETRIEVE step from HONG\_JI.t1 by way of an all-rows scan with a condition of ("HONG\_JI.t1.a1 > 2") into Spool 4 (all\_amps), which is duplicated on all AMPs. The size of Spool 4 is estimated with no confidence to be 2 rows. The estimated time for this step is 0.03 seconds.
- 6) We do an all-AMPs JOIN step from HONG\_JI.t2 by way of an all-rows scan with no residual conditions, which is joined to Spool 4 (Last Use). HONG\_JI.t2 and Spool 4 are joined using a product join, with a join condition of ("b1 = HONG\_JI.t2.b2"). The result goes into Spool 5 (all\_amps), which is duplicated on all AMPs. The size of Spool 5 is estimated with no confidence to be 3 rows. The estimated time for this step is 0.04 seconds.
- 7) We do an all-AMPs JOIN step from HONG\_JI.t4 by way of an all-rows scan with no residual conditions, which is joined to Spool 5 (Last Use). HONG\_JI.t4 and Spool 5 are joined using a product join, with a join condition of ("f1 = HONG\_JI.t4.f4"). The result goes into Spool 3 (all\_amps), which is built locally on the AMPs. The size of Spool 3 is estimated with no confidence to be 2 rows. The estimated time for this step is 0.04 seconds.
- 8) We do an all-AMPs SUM step to aggregate from Spool 3 (Last Use) by way of an all-rows scan, and the grouping identifier in field 1. Aggregate Intermediate Results are computed globally, then placed in Spool 6. The size of Spool 6 is estimated with no confidence to be 2 rows. The estimated time for this step is 0.05 seconds.
- 9) We do an all-AMPs RETRIEVE step from Spool 6 (Last Use) by way of an all-rows scan into Spool 1 (group\_amps), which is built locally on the AMPs. The size of Spool 1 is estimated with no confidence to be 2 rows. The estimated time for this step is 0.04 seconds.
- 10) Finally, we send out an END TRANSACTION step to all AMPs involved in processing the request.  
-> The contents of Spool 1 are sent back to the user as the result of statement 1.

## Example 12: More Inner Joined Tables in Aggregate Join Index Definition Than in Query

The following aggregate join index definition specifies inner joins on tables *t1*, *t3*, and *t6* using conditions that exploit a foreign key-primary key relationship between table *t1* and tables *t3* and *t6*, respectively:

```
CREATE JOIN INDEX jiin_aggr AS
SELECT d1, k1, SUM(x1) AS total
FROM t1, t3, t6
WHERE d1=d3
AND    k1=k6
GROUP BY 1, 2;
```

You would expect the Optimizer to include join index *jiin\_aggr* in its access plan for the following query even though *jiin\_aggr* is defined with an inner joined table, *t6*, that the query does not reference. This is acceptable to the Optimizer because of the foreign key-primary key relationship between *t1* and the extra table, *t6*, on columns *k1* and *k6*, which have a foreign key-primary key relationship and are explicitly defined as a foreign key and as the unique primary index for their respective tables.

The bold EXPLAIN report text indicates that the Optimizer does select *jiin\_aggr* for the query plan:

```
EXPLAIN SELECT d1, SUM(x1)
FROM t1, t3
WHERE d1=d3
GROUP BY 1;

*** Help information returned. 17 rows.
*** Total elapsed time was 1 second.
```

### Explanation

- 1) First, we lock a distinct HONG\_JI."pseudo table" for read on a RowHash to prevent global deadlock for **HONG\_JI.jiin\_aggr**.
  - 2) Next, we lock **HONG\_JI.jiin\_aggr** for read.
  - 3) We do an all-AMPs SUM step to aggregate from **HONG\_JI.jiin\_aggr** by way of an all-rows scan with no residual conditions, and the grouping identifier in field 1. Aggregate Intermediate Results are computed locally, then placed in Spool 3. The size of Spool 3 is estimated with low confidence to be 1 row. The estimated time for this step is 0.03 seconds.
  - 4) We do an all-AMPs RETRIEVE step from Spool 3 (Last Use) by way of an all-rows scan into Spool 1 (group\_amps), which is built locally on the AMPs. The size of Spool 1 is estimated with low confidence to be 1 row. The estimated time for this step is 0.04 seconds.
  - 5) Finally, we send out an END TRANSACTION step to all AMPs involved in processing the request.
- > The contents of Spool 1 are sent back to the user as the result of statement 1.

### Example 13: Join Index Left Outer Joined on Six Tables

The following join index definition left outer joins table *t1* with, in succession, tables *t2*, *t3*, *t4*, *t5*, and *t6* on a series of equality conditions made on foreign key-primary key relationships among the underlying base tables:

```
CREATE JOIN INDEX jiout AS
SELECT a1, b1, c1, c2, d1, d3, e1, e4, f1, g1, h1, i1, j1, j5, k1,
       k6, x1
FROM t1
LEFT OUTER JOIN t2 ON  a1=a2
                   AND b1=b2
                   AND c1=c2
LEFT OUTER JOIN t3 ON  d1=d3
LEFT OUTER JOIN t4 ON  e1=e4
                   AND f1=f4
LEFT OUTER JOIN t5 ON  g1=g5
                   AND h1=h5
                   AND i1=i5
                   AND j1=j5
LEFT OUTER JOIN t6 ON  k1=k6;
```

Even though the following query references fewer tables than are defined in the join index, you would expect the Optimizer to include join index *ji\_out* in its access plan because all the extra outer joins are defined on unique columns and the extra tables are the inner tables in the outer joins.

The bold EXPLAIN report text indicates that the Optimizer does select *ji\_out* for the query plan:

```
EXPLAIN SELECT a1, b1, c1, SUM(x1)
FROM t1, t2
WHERE a1=a2
AND    b1=b2
AND    c1=c2
GROUP BY 1, 2, 3;

*** Help information returned. 18 rows.
*** Total elapsed time was 1 second.
```

#### Explanation

- 
- 1) First, we lock a distinct HONG JI."pseudo table" for read on a RowHash to prevent global deadLock for **HONG\_JI.jiout**.
  - 2) Next, we lock **HONG\_JI.jiout** for read.
  - 3) We do an all-AMPS SUM step to aggregate from **HONG\_JI.jiout** by way of an all-rows scan with no residual conditions, and the grouping identifier in field 1. Aggregate Intermediate Results are computed locally, then placed in Spool 3. The size of Spool 3 is estimated with high confidence to be 2 rows. The estimated time for this step is 0.03 seconds.
  - 4) We do an all-AMPS RETRIEVE step from Spool 3 (Last Use) by way of an all-rows scan into Spool 1 (group\_amps), which is built locally on the AMPS. The size of Spool 1 is estimated with high confidence to be 2 rows. The estimated time for this step is 0.04 seconds.
  - 5) Finally, we send out an END TRANSACTION step to all AMPS involved in processing the request.
- > The contents of Spool 1 are sent back to the user as the result of statement 1.

## Example 14: Many More Tables Referenced by Join Index Definition Than Referenced by Query

The following join index definition specifies all inner joins on tables *t1*, *t2*, *t3*, *t4*, *t5* and *t6* and specifies equality conditions on all the foreign key-primary key relationships among those tables:

```
CREATE JOIN INDEX ji_in AS
SELECT a1, b1, c1, c2, d1, d3, e1, e4, f1, g1, g5, h1, i1, j1, k1,
       k6, x1
FROM t1, t2, t3, t4, t5, t6
WHERE a1=a2
AND   b1=b2
AND   c1=c2
AND   d1=d3
AND   e1=e4
AND   f1=f4
AND   g1=g5
AND   h1=h5
AND   i1=i5
AND   j1=j5
AND   k1=k6;
```

Even though 6 tables are referenced in the join index definition, and all its join conditions are inner joins, you would expect the Optimizer to include join index *ji\_in* in its query plan for the following query, which only references 2 of the 6 tables, because all the conditions in the join index definition are based on foreign key-primary key relationships among the underlying base tables.

The bold EXPLAIN report text indicates that the Optimizer does select *ji\_in* for the query plan:

```
EXPLAIN SELECT a1, b1, c1, SUM(x1)
FROM t1, t2
WHERE a1=a2
AND   b1=b2
AND   c1=c2
GROUP BY 1, 2, 3;

*** Help information returned. 18 rows.
*** Total elapsed time was 1 second.
```

### Explanation

- 
- 1) First, we lock a distinct HONG\_JI."pseudo table" for read on a RowHash to prevent global deadlock for **HONG\_JI.ji\_in**.
  - 2) Next, we lock **HONG\_JI.ji\_in** for read.
  - 3) We do an all-AMPs SUM step to aggregate from **HONG\_JI.ji\_in** by way of an all-rows scan with no residual conditions, and the grouping identifier in field 1. Aggregate Intermediate Results are computed locally, then placed in Spool 3. The size of Spool 3 is estimated with high confidence to be 2 rows. The estimated time for this step is 0.03 seconds.
  - 4) We do an all-AMPs RETRIEVE step from Spool 3 (Last Use) by way of an all-rows scan into Spool 1 (group\_amps), which is built locally on the AMPs. The size of Spool 1 is estimated with high confidence to be 2 rows. The estimated time for this step is 0.04 seconds.
  - 5) Finally, we send out an END TRANSACTION step to all AMPs involved in processing the request.
- > The contents of Spool 1 are sent back to the user as the result of statement 1.

## Example 15: Using a Join Index That Has an Extra Inner Join In Its Definition

The following example illustrates how the Optimizer uses a join index with an extra inner join when the connections among the tables in its definition are appropriately defined.

Suppose you have the following table definitions:

```
CREATE SET TABLE fact (  
  f_d1 INTEGER NOT NULL,  
  f_d2 INTEGER NOT NULL,  
  FOREIGN KEY (f_d1) REFERENCES WITH NO CHECK OPTION dim1 (d1),  
  FOREIGN KEY (f_d2) REFERENCES WITH NO CHECK OPTION dim2 (d2))  
  UNIQUE PRIMARY INDEX (f_d1, f_d2);  
  
CREATE SET TABLE dim1 (  
  a1 INTEGER NOT NULL,  
  d1 INTEGER NOT NULL,  
  FOREIGN KEY (a1) REFERENCES WITH NO CHECK OPTION dim1_1 (d11))  
  UNIQUE PRIMARY INDEX (d1);  
  
CREATE SET TABLE dim2 (  
  d1 INTEGER NOT NULL,  
  d2 INTEGER NOT NULL)  
  UNIQUE PRIMARY INDEX (d2);  
  
CREATE SET TABLE dim1_1 (  
  d11 INTEGER NOT NULL,  
  d22 INTEGER NOT NULL)  
  UNIQUE PRIMARY INDEX (d11);
```

In the following join index definition, the fact table is joined with dimension tables *dim1* and *dim2* by foreign key-primary key joins on *fact.f\_d1=dim1.d1* and *fact.f\_d2=dim2.d2*. Dimension table *dim1* is also joined with its dimension subtable *dim1\_1* by a foreign key-primary key join on *dim1.a1=dim1\_1.d11*. A query on the *fact* and *dim2* tables uses the join index *ji\_all* because of its use of foreign key-primary key relationships among the tables:

```
CREATE JOIN INDEX ji_all AS  
  SELECT (COUNT(*) (FLOAT)) AS countstar, dim1.d1, dim1_1.d11, dim2.d2,  
         (SUM(fact.f_d1) (FLOAT)) AS sum_f1  
  FROM fact, dim1, dim2, dim1_1  
 WHERE ((fact.f_d1 = dim1.d1)  
        AND (fact.f_d2 = dim2.d2))  
        AND (dim1.a1 = dim1_1.d11)  
 GROUP BY dim1.d1, dim1_1.d11, dim2.d2  
  PRIMARY INDEX (d1);
```

Note that the results of the aggregate operations COUNT and SUM are both typed as FLOAT (see the CREATE JOIN INDEX topic “Aggregate Join Indexes” in *SQL Data Definition Language Detailed Topics*).

As the bold text in the following EXPLAIN report indicates, the Optimizer uses the join index *ji\_all* for its query plan in this situation because even though table *fact* is the parent table of both tables *dim1* and *dim2*, those tables are joined with *fact* on foreign key columns in the join index definition. Similarly, *dim1* is joined to *dim1\_1* in the join index definition on a foreign key column.



```
EXPLAIN SELECT d2, SUM(f_d1)
FROM fact, dim2
WHERE f_d2=d2
GROUP BY 1;
```

```
*** Help information returned. 18 rows.
*** Total elapsed time was 1 second.
```

#### Explanation

- 
- 1) First, we lock a distinct HONG\_JI."pseudo table" for read on a RowHash to prevent global deadlock for **HONG\_JI.ji\_all**.
  - 2) Next, we lock **HONG\_JI.ji\_all** for read.
  - 3) We do an all-AMPs SUM step to aggregate from **HONG\_JI.ji\_all** by way of an all-rows scan with no residual conditions, and the grouping identifier in field 1. Aggregate Intermediate Results are computed globally, then placed in Spool 3. The size of Spool 3 is estimated with no confidence to be 3 rows. The estimated time for this step is 0.08 seconds.
  - 4) We do an all-AMPs RETRIEVE step from Spool 3 (Last Use) by way of an all-rows scan into Spool 1 (group\_amps), which is built locally on the AMPs. The size of Spool 1 is estimated with no confidence to be 3 rows. The estimated time for this step is 0.07 seconds.
  - 5) Finally, we send out an END TRANSACTION step to all AMPs involved in processing the request.
- > The contents of Spool 1 are sent back to the user as the result of statement 1.

## Examples of Exceptions to the General Rules for Extra Tables in the Join Index Definition

“[Example 16](#)” on page 249 and “[Example 17](#)” on page 250 illustrate cases that are exceptions to the general coverage rules for extra tables in a join index definition (see the CREATE JOIN INDEX topic “Restriction on Coverage by Join Indexes When a Join Index Definition References More Tables Than a Query” in *SQL Data Definition Language Detailed Topics*).

### Example 16

In the following example, table *t9* is the parent table of tables *t7* and *t8*. Generally, this relationship disqualifies a join index from covering any query with fewer tables than are referenced in the definition for that index. However, because *t7* and *t8* are joined on the FK columns (*y7*=*x8*) in the join index definition, the Optimizer uses the index *ji* to cover the query, as you can see by looking at the bold text in the EXPLAIN report:

```
CREATE SET TABLE t7 (
  x7 INTEGER NOT NULL,
  y7 INTEGER NOT NULL,
  z7 INTEGER NOT NULL,
  CONSTRAINT r7 FOREIGN KEY (y7) REFERENCES WITH NO CHECK OPTION
    t9 (y9))
PRIMARY INDEX (x7);

CREATE SET TABLE t8 (
  x8 INTEGER NOT NULL,
  y8 INTEGER NOT NULL,
  z8 INTEGER NOT NULL,
  CONSTRAINT r8 FOREIGN KEY (x8) REFERENCES WITH NO CHECK OPTION
    t9 (x9));
```

```
CREATE SET TABLE t9(  
  x9 INTEGER NOT NULL UNIQUE,  
  y9 INTEGER NOT NULL,  
  z9 INTEGER NOT NULL)  
UNIQUE PRIMARY INDEX(y9);  
  
CREATE JOIN INDEX ji AS  
  SELECT x7, y7, x8, y8, x9, y9  
  FROM t7, t8, t9  
  WHERE y7=x8  
  AND   y7=y9  
  AND   x8=x9;  
  
EXPLAIN SELECT x7, y7, x8, y8  
FROM t7, t8  
WHERE y7=x8  
AND   x7>1;  
  
*** Help information returned. 14 rows.  
*** Total elapsed time was 1 second.
```

#### Explanation

- 
- 1) First, we lock a distinct HONG\_JI."pseudo table" for read on a RowHash to prevent global deadlock for **HONG\_JI.ji**.
  - 2) Next, we lock **HONG\_JI.ji** for read.
  - 3) We do an all-AMPs RETRIEVE step from **HONG\_JI.ji** by way of an all-rows scan with a condition of ("HONG\_JI.ji.x1 > 1") into Spool 1 (group\_amps), which is built locally on the AMPs. The size of Spool 1 is estimated with no confidence to be 3 rows. The estimated time for this step is 0.06 seconds.
  - 4) Finally, we send out an END TRANSACTION step to all AMPs involved in processing the request.
- > The contents of Spool 1 are sent back to the user as the result of statement 1. The total estimated time is 0.06 seconds.

## Example 17

As with “[Example 16](#)” on page 249, this example demonstrates how a join index can be used to cover a query when one table in the join index definition is a parent of two others if the tables are joined on foreign key-primary key relationships. *t9* is the parent table of both *t7* and *t10*. But because *t7* and *t10* are joined with *t9* on the same PK column, by transitive closure, *t7* and *t10* are joined on *y7=x10*. The Optimizer does select join index *ji* to cover the query, as the bold text in the EXPLAIN report for the example query demonstrates:

```
CREATE SET TABLE t10(  
  x10 INTEGER NOT NULL,  
  y10 INTEGER NOT NULL,  
  z10 INTEGER NOT NULL,  
  CONSTRAINT r10 FOREIGN KEY (x10) REFERENCES WITH NO CHECK OPTION  
    t9 (y9))  
PRIMARY INDEX x10;  
  
CREATE JOIN INDEX ji AS  
  SELECT x7, y7, x10, y10, x9, y9  
  FROM t7, t10, t9  
  WHERE y7=y9  
  AND   x10=y9;
```

```
EXPLAIN SELECT x7, y7, x10, y10
FROM t7, t10
WHERE y7=x10
AND x7>1;
```

```
*** Help information returned. 14 rows.
*** Total elapsed time was 1 second.
```

#### Explanation

- 
- 1) First, we lock a distinct HONG\_JI."pseudo table" for read on a RowHash to prevent global deadlock for HONG\_JI.ji.
  - 2) Next, we lock HONG\_JI.ji for read.
  - 3) We do an all-AMPS RETRIEVE step from HONG\_JI.ji by way of an all-rows scan with a condition of ("HONG\_JI.ji.x1 > 1") into Spool 1 (group\_amps), which is built locally on the AMPS. The size of Spool 1 is estimated with no confidence to be 3 rows. The estimated time for this step is 0.06 seconds.
  - 4) Finally, we send out an END TRANSACTION step to all AMPS involved in processing the request.
- > The contents of Spool 1 are sent back to the user as the result of statement 1. The total estimated time is 0.06 seconds.

## Related Topics

See *SQL Fundamentals* for a capsule overview of join indexes and *Database Design* for more examples, an extended discussion of the functions and features of join and partitioned primary indexes, and an overview of disk I/O integrity checking.

See *SQL Request and Transaction Processing* for descriptions of the various forms of partition elimination.

Also see ["CREATE HASH INDEX" on page 200](#).

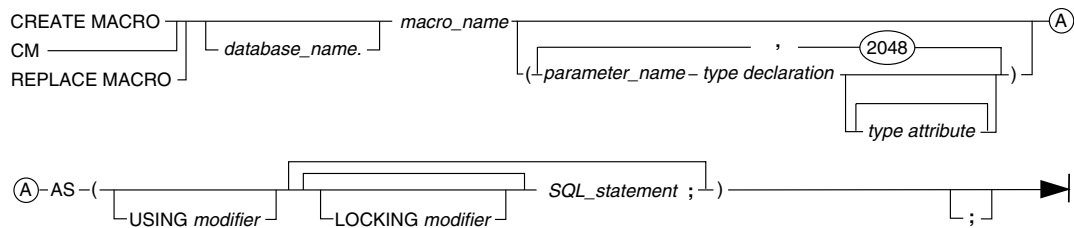
# CREATE MACRO/ REPLACE MACRO

## Purpose

Defines a set of statements that are frequently used or that perform a complex operation. The statements in the macro body are submitted when the macro is invoked by a subsequent EXECUTE statement.

REPLACE MACRO redefines an existing macro. If the specified macro does not exist, REPLACE MACRO creates a new macro with that name.

## Syntax



1101G172

where:

| Syntax Element ...               | Specifies ...                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name   user_name</i> | the name of the containing database or user for <i>macro_name</i> if something other than the current database or user.                                                                                                                                                                                                                             |
| <i>macro_name</i>                | the name of the new macro. If a fully qualified name is not specified, the default database or user is used.                                                                                                                                                                                                                                        |
| <i>parameter_name</i>            | <p>the name of a parameter that is replaced with a value during macro execution. UDT columns and TOP <i>n</i> operators are valid parameters. Parameters are restricted to data values. You cannot parameterize database object names.</p> <p>When referenced in the macro body, you must prefix a parameter name with the COLON (:) character.</p> |
| <i>type_declaration</i>          | <p>a data definition or default definition for a parameter.</p> <p>If you do not assign a default value, you must specify a value for the parameter at EXECUTE time.</p> <p>UDTs are valid data types.</p> <p>For a list of data types see <i>SQL Data Types and Literals</i>.</p>                                                                  |

| Syntax Element ...              | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>type_attribute</i>           | the data type attributes, such as NOT NULL, UPPERCASE, or TITLE.<br><br>For a list of data type attributes see <i>SQL Data Types and Literals</i> .                                                                                                                                                                                                                                                                                                                                                                         |
| USING <i>request_modifier</i>   | one or more variable parameter names. A value is substituted for each parameter name when the request is processed. Also see “USING Request Modifier” in <i>SQL Data Manipulation Language</i> . This is an optional phrase.<br><br>USING does not work in a macro when the macro is accessed using BTEQ. When running BTEQ, specify USING in the EXECUTE statement.<br><br>Including USING in a macro might require special programming. See your Teradata Field support engineer or the Teradata Support Center for help. |
| LOCKING <i>request_modifier</i> | a lock on a database, table, view or row.<br><br>The specified lock overrides the default usage lock placed in response to a request.<br><br>Also see “LOCKING Request Modifier” in <i>SQL Data Manipulation Language</i> .                                                                                                                                                                                                                                                                                                 |
| <i>SQL_request</i>              | Specifies an SQL request. Every request in the macro body must be terminated by a SEMICOLON character.<br><br>Parameter names referenced in the macro body are prefaced by the COLON (:) character. The macro body can include EXECUTE statements to invoke other macros.                                                                                                                                                                                                                                                   |

## ANSI Compliance

CREATE MACRO and REPLACE MACRO are Teradata extensions to the ANSI SQL:2008 standard.

## Required Privileges: CREATE MACRO

You must have the CREATE MACRO privilege on the containing database or user in which the macro is to be created. The creator of a macro is automatically granted the DROP MACRO and EXECUTE privileges WITH GRANT OPTION on the macro.

The user creating a macro must have the privileges for all statements it performs.

Once a macro has been created, its immediate owner is the database in which it exists, *not* the user who created it. The immediately owning database must have all the appropriate privileges for executing the macro, including WITH GRANT OPTION.

Access to data via a macro is controlled by the access privileges of its immediate owner, *not* by the privileges of its creator. This can be a security issue. See “Security Considerations With CREATE MACRO Privilege” under “GRANT (SQL Form)” in *SQL Data Control Language* for details.

The user who performs a macro need not be aware of the tables affected by its performance.

## Required Privileges: REPLACE MACRO

You must have the DROP MACRO privilege on an existing macro or its containing database or user to replace it.

You must have the CREATE MACRO privilege on the macro or its containing database or user if it does not already exist.

The user replacing a macro must have the privileges for all statements it performs.

Once a macro has been replaced, its immediate owner is the database in which it exists, *not* the user who replaced it. The immediately owning database must have all the appropriate privileges for executing the macro, including WITH GRANT OPTION.

## Privileges Granted Automatically

The following privileges are granted automatically to the creator of a macro:

- DROP MACRO
- EXECUTE
- GRANT

## Example 1: INSERT Operation Followed by a SELECT Verification Operation

The following request creates a macro that first inserts a row for a new employee in the *employee* table, then performs a SELECT request to verify that the information was entered correctly:

```
CREATE MACRO new_emp1 (  
  number    INTEGER,  
  name      VARCHAR(12),  
  dept      INTEGER    DEFAULT 900,  
  position  VARCHAR(12)  
  sex       CHARACTER,  
  dob       DATE       FORMAT 'MMbDDbYYYY',  
  edlev     BYTEINT ) AS  
(INSERT INTO employee (empno,name,deptno,jobtitle,sex,dob,edlev)  
VALUES (:number, :name, :dept, :position, :sex, :dob, :edlev);  
-- The following select verifies the insert  
SELECT *  
FROM employee  
WHERE empno = :number; );
```

Use the -- comment construct to include comments in the macro. Text appearing after -- and up to the end of the line is not performed.

If this macro is performed in ANSI session mode, the INSERT has not been committed. This is also true in Teradata session mode when the macro is performed as part of an explicit transaction.

## Example 2: INSERT Operation Followed By an UPDATE Operation

This example creates a macro that also inserts a row for a new employee in the *employee* table, but unlike “[Example 1: INSERT Operation Followed by a SELECT Verification Operation](#)” on [page 254](#), then performs an UPDATE request rather than a SELECT request. The UPDATE request changes the *department* table by incrementing the employee count in the row containing a department number that matches the value of the *:dept* parameter.

```
CREATE MACRO new_emp2 (
  (number    INTEGER,
   name      VARCHAR(12),
   dept      INTEGER    DEFAULT 900,
   position  VARCHAR(12),
   sex       CHARACTER,
   dob       DATE        FORMAT 'MMbDDbYYYY',
   edlev     BYTEINT)    AS
  (INSERT INTO employee (empno,name,deptno,jobtitle,sex,dob,edlev)
   VALUES (:number, :name, :dept, :position, :sex, :dob, :edlev) ;
   UPDATE department
   SET empcount=empcount+1
   WHERE deptno = :dept; );
```

If this macro is performed in ANSI session mode, the INSERT and UPDATE requests have not been committed. This is also true in Teradata session mode when the macro is performed as part of an explicit transaction.

## Example 3: Specifying an ABORT or ROLLBACK Condition

You can include a condition for halting execution of a macro by incorporating an ABORT or ROLLBACK request into its definition. If the specified condition is encountered during execution, the macro is aborted (the transaction in process is concluded, locks on the tables are released, changes made to data are backed out, and any spooled output is deleted).

As an example, to restrict the *newemp* macro from being used to add employees to the Executive Office, department 300, incorporate an ABORT request into the macro specification, as follows:

```
CREATE MACRO personnel.new_emp
  (number    (SMALLINT    FORMAT '9(5)'),
   name      (VARCHAR(12)),
   dept      (SMALLINT    FORMAT '999'),
   position  (VARCHAR(12)),
   birthdate (DATE        FORMAT 'MMbDDbYYYY'),
   sex       (CHARACTER(1))
   education (BYTEINT))    AS
  (
  (ABORT 'Department 300 not valid'
   WHERE :dept = 300;
   INSERT INTO employee (empno,name,deptno,jobtitle,dob,sex,edlev)
   VALUES (:number,:name,:dept,:position,:birthdate,:sex,:education);
  );
```

Specify the text of an optional error message following the ABORT keyword and enclose it in APOSTROPHE characters. This message displays on the terminal screen if the macro is aborted for the specified condition. In this example, the abort condition, *:dept = 300*, is specified in the WHERE clause of the ABORT request.

## Example 4: DELETE With an ABORT Condition

This example replaces the INSERT request of [“Example 2: INSERT Operation Followed By an UPDATE Operation” on page 255](#) with a DELETE request, and then decrements the employee count for the *department* table. The ABORT request terminates macro execution if the row for the employee being deleted is not present in the *employee* table.

The example shows a macro designed for use in ANSI mode, and for which the user wants to commit if the delete and update operations are successful. Note that the requests in the body of the macro are entered as one multistatement request. Therefore, if the WHERE condition of the ROLLBACK statement is met, the entire request is aborted and the value in *empcount* is protected.

```
CREATE MACRO del_emp
(num SMALLINT FORMAT '9(5)',
 dname VARCHAR(12),
 dept SMALLINT FORMAT '999') AS
(ABORT 'Name does not exist'
 WHERE :num NOT IN (SELECT empno
                    FROM employee
                    WHERE name = :dname);

DELETE FROM employee
WHERE name = :dname;

UPDATE department
SET empcount = empcount - 1
WHERE deptno = :dept;
COMMIT WORK; );
```

## Example 5: REPLACE MACRO

The following example illustrates the use of REPLACE MACRO.

The following request can be used to replace macro *new\_emp* (see [“CREATE MACRO/ REPLACE MACRO” on page 252](#) and [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)).

```
REPLACE MACRO new_emp(name VARCHAR(12) NOT NULL,
 street CHARACTER(30),
 city CHARACTER(20),
 number INTEGER NOT NULL,
 dept SMALLINT DEFAULT 999) AS
(INSERT INTO employee (name, street, city, empno, deptno)
 VALUES (:name, :street, :city, :number, :dept);
UPDATE department
SET empcount = empcount + 1
WHERE deptno = :dept ;);
```



## Example 6: Macro Support for UDT Parameters

The following example demonstrates macro support for UDT parameters.

The *p2* parameter of the macro is a structured UDT.

The conversion from VARCHAR to the structured UDT is done using the NEW constructor invocation expression, which is performed before the macro is actually invoked.

```

CREATE MACRO m1 (p1 INTEGER, p2 structured_type)
AS (INSERT t1(:p1, :p2));

USING (a INTEGER, b VARCHAR(100))
EXEC m1(:a, NEW structured_type(:b));

```

## Example 7: Same Insert Operation Done Differently

The following example illustrates another way to perform the same insert that was performed in “[Example 6: Macro Support for UDT Parameters](#)” on page 257.

The *p2* parameter of the macro is a VARCHAR. It is passed through to the macro. The conversion is performed within the macro itself using the NEW constructor expression (see “NEW” in *SQL Functions, Operators, Expressions, and Predicates*).

```

CREATE MACRO m2 (p1 integer, p2 VARCHAR(100))
AS (INSERT t1(:p1, NEW structured_type(:p2)));

USING (a INTEGER, b VARCHAR(100))
EXEC m2(:a, :b);

```

## Example 8: A More Complicated UDT Example Using Parameters

Suppose you have a macro named *ins\_mail\_list* that inserts the first name, last name, and home address of new customers into a table named *mailing\_addresses*. The value of the customer home address is defined with a structured UDT named *address*.

The macro is defined as follows:

```

CREATE MACRO ins_mail_list (first VARCHAR(15), last VARCHAR(15),
                           addr address)
AS (INSERT INTO mailing_addresses VALUES (:first, :last, :addr));

```

The following trigger adds new California customers to a mailing list whenever a new customer row is inserted into the *customer* table. The insert into the *mailing\_addresses* table is done using the triggered SQL action statement, the macro *ins\_mail\_list*, which accepts the UDT parameter *address*:

```

CREATE TRIGGER CA_Mailing_list
AFTER INSERT ON customer
REFERENCING NEW AS newrow
FOR EACH ROW
WHEN (newrow.address.state() = 'CA')
EXEC ins_mail_list(newrow.name.last(), newrow.name.first(),
                  newrow.address);

```

## Example 9: Passing a TOP *n* Value Into a Macro as a Parameter

This example passes the integer value of *n* for the TOP *n* operator into a macro as a parameter named *p*.

```
CREATE MACRO m (p INTEGER)
AS (SELECT TOP :p x1
    FROM t1;);
```

## Example 10: Setting the Transaction Query Band Using a Parameter

The following macro sets the transaction query band using the parameter *qbin*:

```
CREATE MACRO qbmac (p1 INTEGER, p2 INTEGER, qbin VARCHAR(200)
AS (SET QUERY_BAND = :qbin FOR TRANSACTION
    SELECT GetQueryBand(););

*** Macro has been created.
*** Total elapsed time was 1 second.

EXEC qbmac (5,10,'music=classical;musician=david_tudor;');

*** Set QUERY_BAND accepted.
*** Total elapsed time was 1 second.

*** Query completed. One row found. One column returned.
GetQueryBand()
-----
=T> music=classical;musician=david_tudor;
```

## Related Topics

See [“DROP MACRO/ DROP PROCEDURE/ DROP TABLE/ DROP TRIGGER/ DROP VIEW” on page 574s](#).

If a stored procedure would better meet your needs for a specific application than a macro, see the following references:

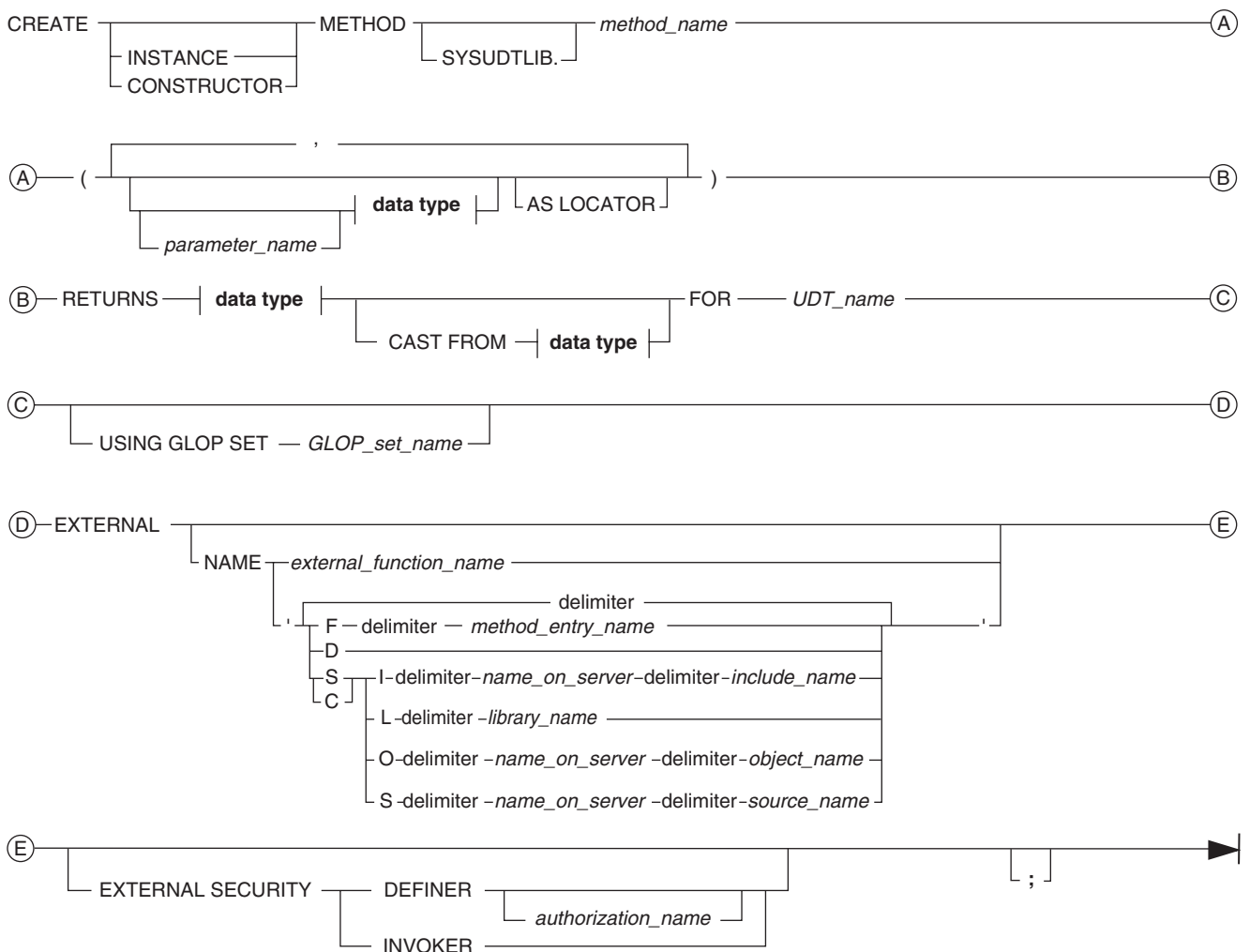
- [“CREATE PROCEDURE \(External Form\)/ REPLACE PROCEDURE \(External Form\)” on page 276](#)
- [“CREATE PROCEDURE \(SQL Form\)/ REPLACE PROCEDURE” on page 310](#)
- *SQL Stored Procedures and Embedded SQL*

# CREATE METHOD

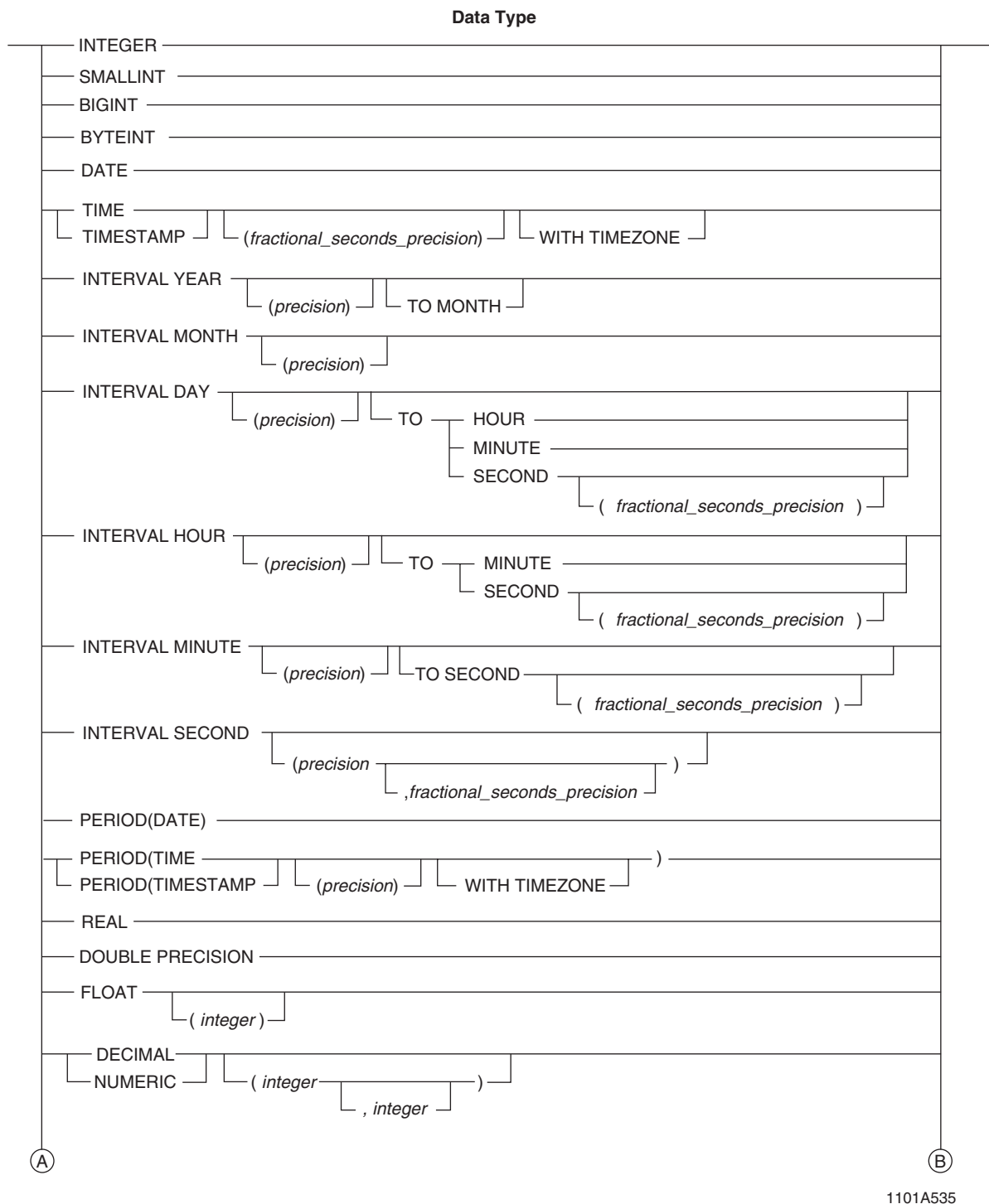
## Purpose

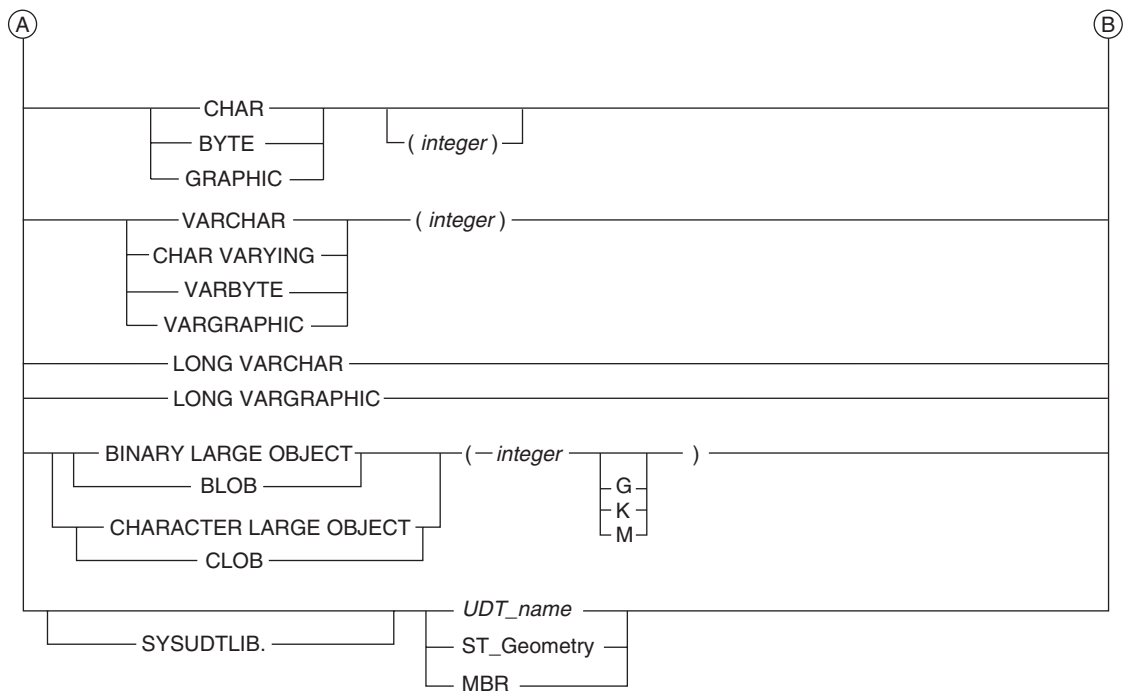
Defines the body of a method that is associated with a user-defined data type (see “[CREATE TYPE \(Distinct Form\)](#)” on page 507 and “[CREATE TYPE \(Structured Form\)](#)” on page 515).

## Syntax



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1101A536

where:

| Syntax element ... | Specifies ...                                                                                                                                                                                                     |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| INSTANCE           | that the object is an instance method. See the CREATE METHOD topic “About Methods” in <i>SQL Data Definition Language Detailed Topics</i> for information about instance methods.<br><br>INSTANCE is the default. |
| CONSTRUCTOR        | that the object is a constructor method. See the CREATE METHOD topic “About Methods” in <i>SQL Data Definition Language Detailed Topics</i> for information about constructor methods.                            |

| Syntax element ... | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>method_name</i> | <p>the calling name for the method.</p> <p>If your Teradata Database runs on the MP-RAS operating system, you should keep the method name as short as possible (see the CREATE METHOD topic “Maximum Size of UNIX MP-RAS Command Line Argument Affects Names and Number of External Routines in a Database” in <i>SQL Data Definition Language Detailed Topics</i>).</p> <p><i>method_name</i> must be unique within the <i>SYSUDTLIB</i> database. You cannot give a method the same name as an existing method or any other database object contained within the <i>SYSUDTLIB</i> database. See the topic on naming conventions for details.</p> <p><i>method_name</i> must match the spelling and case of its C/C++ method name exactly if you do not specify a <i>specific_method_name</i> or <i>external_method_name</i>. This applies only to the definition of the method, not to its use.</p> <p>SQL supports function name overloading within the same method class (see the CREATE FUNCTION/REPLACE FUNCTION topic “CLASS function_class” in <i>SQL Data Definition Language Detailed Topics</i>), so <i>method_name</i> need not be unique within its class.</p> <p>Parameter data types and number of parameters are used to distinguish among different methods within the same class that have the same <i>method_name</i>.</p> <p>See <i>SQL External Routine Programming</i> for further information about function overloading.</p> <p>See the following the “CREATE FUNCTION/ REPLACE FUNCTION” topics in <i>SQL Data Definition Language Detailed Topics</i> for information that is equally applicable to methods, the necessary changes in terminology being made:</p> <ul style="list-style-type: none"> <li>• “Function Identifiers”</li> <li>• “Function Name”</li> <li>• “Function Calling Argument”</li> <li>• “Function Name Overloading”</li> <li>• “Parameter Names and Data Types”</li> </ul> |

| Syntax element ...                                                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>[parameter_name]</code><br><code>data_type</code> [AS<br>LOCATOR] | <p>a parenthetical comma-separated list of data types and optional parameter names for the variables to be passed to the function.</p> <p>The maximum number of parameters a method accepts is 128.</p> <p>BLOB and CLOB types must be represented by a locator (see <i>SQL Data Manipulation Language</i> for a description of locators). Teradata Database does not support in-memory LOB parameters: an AS LOCATOR phrase must be specified for each LOB parameter and return value.</p> <p>Note, however, that whenever a LOB that requires data type conversion is passed to a method, the LOB must be materialized for the conversion to take place.</p> <p>You must specify opening and closing parentheses even if no parameters are to be passed to the function.</p> <p>If you specify one parameter name, then you must specify names for all the parameters passed to the function.</p> <p>If you do not specify parameter names, the system assigns unique names to them in the form P1, P2, ..., Pn. These names are used in the COMMENT statement (see <a href="#">“COMMENT (Comment Placing Form)” on page 112</a>) and displayed in the report produced by the HELP METHOD statement (see <a href="#">“HELP METHOD” on page 735</a>), and appear in the text of error messages.</p> <p>The data type associated with each parameter is the type of the parameter or returned value. All Teradata Database predefined data types and UDTs (except for the DYNAMIC type) are valid. If you specify a UDT, then the current user of the method must have one of the following privilege sets:</p> <ul style="list-style-type: none"> <li>• UDTMETHOD, UDTTYPE, or UDTUSAGE on the <i>SYSUDTLIB</i> database.</li> <li>• UDTUSAGE on the specified UDT.</li> </ul> <p>Character data can also specify a CHARACTER SET clause.</p> <p>For data types that take a length or size specification, like BYTE, CHARACTER, DECIMAL, VARCHAR, and so on, the size of the parameter indicates the largest number of bytes that can be passed (see the CREATE FUNCTION/REPLACE FUNCTION topic “Parameter Names and Data Types” in <i>SQL Data Definition Language Detailed Topics</i>).</p> |

| Syntax element ...                     | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RETURNS <i>data_type</i>               | <p>the predefined data type or UDT for the value returned by the method.</p> <p>The method is responsible for providing the returned data with the correct type. If the return type is difficult for the method to create, you should also specify a CAST FROM clause so the system can perform the appropriate data type conversion (see <i>SQL Functions, Operators, Expressions, and Predicates</i> for more information about using CAST expressions).</p> <p>The result type has a dictionary entry in <i>DBC.TVFields</i> under the name RETURN0[<i>n</i>], where <i>n</i> is a sequence of digits appended to RETURN0 rows to make each value unique, ensuring that no user-defined parameter names are duplicated. The value of <i>n</i> is incremented until it no longer duplicates a parameter name.</p> <p>The <i>n</i> subscript is not used if there is no parameter name of RETURN0.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Returns Clause” in <i>SQL Data Definition Language Detailed Topics</i>.</p> <p>This clause is optional.</p> <p>If you specify a RETURNS clause, it must be the same as the RETURNS clause specified for the corresponding CREATE TYPE.</p> <p>If you do not specify a RETURNS clause for the UDM, then the RETURNS clause specified for the corresponding CREATE TYPE applies to this method by default.</p> |
| CAST FROM <i>data_type</i>             | <p>the result type returned by the method that is to be converted to the type specified by the RETURNS clause.</p> <p>If you specify a CAST FROM clause, there must be an existing cast from the “result cast from” data type to the returns data type.</p> <p>Example:</p> <pre>...RETURNS DECIMAL(9,5) CAST FROM FLOAT...</pre> <p>If <i>data_type</i> is a UDT, then the appropriate cast and transform must be defined to handle its conversion. See <a href="#">“CREATE CAST/ REPLACE CAST” on page 125</a> and <a href="#">“CREATE TRANSFORM/ REPLACE TRANSFORM” on page 484</a>.</p> <p>Whenever a LOB that requires data type conversion is passed to a method, the LOB must first be materialized for the conversion to take place.</p> <p>If <i>data_type</i> contains a locator indication, then you cannot specify a CAST FROM clause for the method.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| FOR <i>UDT_name</i>                    | <p>the name of the UDT with which the method is associated.</p> <p>The UDT referenced can be either a distinct UDT or a structured UDT. See <a href="#">“CREATE TYPE (Distinct Form)” on page 507</a> and <a href="#">“CREATE TYPE (Structured Form)” on page 515</a> in <i>SQL Data Definition Language Syntax and Examples</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| USING GLOP SET<br><i>GLOP_set_name</i> | <p>the name of the GLOP set this method is associated with.</p> <p>It is not mandatory that the specified GLOP set exist at the time the method is created.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |



| Syntax element ...                  | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EXTERNAL                            | <p>the introduction to the mandatory external method body reference clause.</p> <p>This clause can specify two different things:</p> <ul style="list-style-type: none"><li>• The keyword EXTERNAL only.</li><li>• The keywords EXTERNAL NAME plus an external method name (with optional Parameter Style specification)</li></ul> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “External Body Reference Clause” in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                                                                                                                                |
| NAME<br><i>external_method_name</i> | <p>the entry point for the method object. This name must be unique within the SYSUDTLIB database. See the CREATE METHOD topic “Naming Conventions: Avoiding Name Clashes Among UDFs, UDMs, and UDTs” in <i>SQL Data Definition Language Detailed Topics</i> for details.</p> <p>Case is significant and must match the C or C++ method name.</p> <p>If your Teradata Database runs on the MP-RAS operating system, you should keep the external method name as short as possible (see the CREATE METHOD topic “Maximum Size of UNIX MP-RAS Command Line Argument Affects Names and Number of External Routines in a Database” in <i>SQL Data Definition Language Detailed Topics</i>).</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “External Name Clause” in <i>SQL Data Definition Language Detailed Topics</i>.</p> |

| Syntax element ...                     | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |              |   |                                                                                                                                                                                                                                                                                                                  |   |                                                                                                                                                                                                                                                                                   |   |                                                                                                                                                                                                                                                                                              |
|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|--------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NAME<br><i>external_string_literal</i> | <p>a string that specifies the source and object components needed to build the method.</p> <p>Depending on the initial code in the sequence, the string specifies either the C/C++ object name for the method or an encoded name or path for the components needed to create the method.</p> <p>The following table briefly documents the codes used to specify component locations:</p> <table> <tr> <th>IF you specify this code ...</th><th>THEN the ...</th></tr> <tr> <td>F</td><td> <p>string that follows is the entry point name of the C or C++ method object.</p> <p>The <i>method_entry_name</i> is the same as the <i>specific_method_name</i>.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Function Entry Name Clause” in <i>SQL Data Definition Language Detailed Topics</i>.</p> </td></tr> <tr> <td>C</td><td> <p>source or object code for the method is stored on the client and the string that follows is the path to its location.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Client-Server UDF Code Specification” in <i>SQL Data Definition Language Detailed Topics</i>.</p> </td></tr> <tr> <td>S</td><td> <p>source or object code for the method is stored on the Teradata platform and the string that follows is the path to its location.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Client-Server UDF Code Specification” in <i>SQL Data Definition Language Detailed Topics</i>.</p> </td></tr> </table> | IF you specify this code ... | THEN the ... | F | <p>string that follows is the entry point name of the C or C++ method object.</p> <p>The <i>method_entry_name</i> is the same as the <i>specific_method_name</i>.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Function Entry Name Clause” in <i>SQL Data Definition Language Detailed Topics</i>.</p> | C | <p>source or object code for the method is stored on the client and the string that follows is the path to its location.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Client-Server UDF Code Specification” in <i>SQL Data Definition Language Detailed Topics</i>.</p> | S | <p>source or object code for the method is stored on the Teradata platform and the string that follows is the path to its location.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Client-Server UDF Code Specification” in <i>SQL Data Definition Language Detailed Topics</i>.</p> |
| IF you specify this code ...           | THEN the ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                              |              |   |                                                                                                                                                                                                                                                                                                                  |   |                                                                                                                                                                                                                                                                                   |   |                                                                                                                                                                                                                                                                                              |
| F                                      | <p>string that follows is the entry point name of the C or C++ method object.</p> <p>The <i>method_entry_name</i> is the same as the <i>specific_method_name</i>.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Function Entry Name Clause” in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                              |              |   |                                                                                                                                                                                                                                                                                                                  |   |                                                                                                                                                                                                                                                                                   |   |                                                                                                                                                                                                                                                                                              |
| C                                      | <p>source or object code for the method is stored on the client and the string that follows is the path to its location.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Client-Server UDF Code Specification” in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                              |              |   |                                                                                                                                                                                                                                                                                                                  |   |                                                                                                                                                                                                                                                                                   |   |                                                                                                                                                                                                                                                                                              |
| S                                      | <p>source or object code for the method is stored on the Teradata platform and the string that follows is the path to its location.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Client-Server UDF Code Specification” in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                              |              |   |                                                                                                                                                                                                                                                                                                                  |   |                                                                                                                                                                                                                                                                                   |   |                                                                                                                                                                                                                                                                                              |

| Syntax element ...                                    | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |        |               |                                                                                                                                                                          |         |                                                                                                                                                                                  |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |        |                                                                                                                                                                                                 |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NAME<br><i>external_string_literal</i><br>(continued) | <p>The following table briefly documents the path specifications for the external method. The character ; represents an arbitrary user-defined delimiter.</p> <p>You must use the same delimiter throughout the string specification.</p> <table> <tr> <th>File Type</th><th>Syntax</th></tr> <tr> <td>Method object</td><td> <i>F;method_entry_point_name</i><br/>           See the CREATE FUNCTION/REPLACE FUNCTION topic “Function Entry Name Clause” in <i>SQL Data Definition Language Detailed Topics</i>.         </td></tr> <tr> <td>Include</td><td> <i>I;name_on_server;include_name</i><br/>           See the CREATE FUNCTION/REPLACE FUNCTION topic “Include Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.         </td></tr> <tr> <td>Library</td><td> <i>L;library_name</i><br/>           See the CREATE FUNCTION/REPLACE FUNCTION topic “Library Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.         </td></tr> <tr> <td>Object</td><td> <i>O;name_on_server;object_name</i><br/>           See the CREATE FUNCTION/REPLACE FUNCTION topic “Object File Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.         </td></tr> <tr> <td>Source</td><td> <i>S;name_on_server;source_name</i><br/>           See the CREATE FUNCTION/REPLACE FUNCTION topic “Source File Name Clause” on page 347 in <i>SQL Data Definition Language Detailed Topics</i> for details.         </td></tr> </table> | File Type | Syntax | Method object | <i>F;method_entry_point_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Function Entry Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> . | Include | <i>I;name_on_server;include_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Include Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. | Library | <i>L;library_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Library Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. | Object | <i>O;name_on_server;object_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Object File Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. | Source | <i>S;name_on_server;source_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Source File Name Clause” on page 347 in <i>SQL Data Definition Language Detailed Topics</i> for details. |
| File Type                                             | Syntax                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |        |               |                                                                                                                                                                          |         |                                                                                                                                                                                  |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |        |                                                                                                                                                                                                 |
| Method object                                         | <i>F;method_entry_point_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Function Entry Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |        |               |                                                                                                                                                                          |         |                                                                                                                                                                                  |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |        |                                                                                                                                                                                                 |
| Include                                               | <i>I;name_on_server;include_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Include Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |        |               |                                                                                                                                                                          |         |                                                                                                                                                                                  |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |        |                                                                                                                                                                                                 |
| Library                                               | <i>L;library_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Library Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           |        |               |                                                                                                                                                                          |         |                                                                                                                                                                                  |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |        |                                                                                                                                                                                                 |
| Object                                                | <i>O;name_on_server;object_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Object File Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |        |               |                                                                                                                                                                          |         |                                                                                                                                                                                  |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |        |                                                                                                                                                                                                 |
| Source                                                | <i>S;name_on_server;source_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Source File Name Clause” on page 347 in <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           |        |               |                                                                                                                                                                          |         |                                                                                                                                                                                  |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |        |                                                                                                                                                                                                 |

| Syntax element ...                                    | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |                                                     |                      |                                                                                         |                             |                                      |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------|-----------------------------|--------------------------------------|
| NAME<br><i>external_string_literal</i><br>(continued) | <p>To compile the C or C++ method object code with debug symbols for core dump analysis, specify the delimited character D at any point in the external string literal. This feature does not produce a useful .so or .dll file with debug symbols for Linux and Windows systems.</p> <table> <tr> <th>IF you ...</th><th>THEN the system compiles the method source code ...</th></tr> <tr> <td>specify the D option</td><td>and produces debug symbols.<br/>Generates a core file when a protected mode UDF crashes.</td></tr> <tr> <td>do not specify the D option</td><td>but does not generate debug symbols.</td></tr> </table> <p>The purpose of the D option is to provide debug symbol information for the method when examining a method core file with gdb (see <i>SQL External Routine Programming</i>).</p> <p>See the user documentation for your C or C++ compiler and debugger for debugging information.</p> <p>A side effect of specifying the D option is that linked libraries become larger because they must also contain all the symbol information.</p> | IF you ... | THEN the system compiles the method source code ... | specify the D option | and produces debug symbols.<br>Generates a core file when a protected mode UDF crashes. | do not specify the D option | but does not generate debug symbols. |
| IF you ...                                            | THEN the system compiles the method source code ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            |                                                     |                      |                                                                                         |                             |                                      |
| specify the D option                                  | and produces debug symbols.<br>Generates a core file when a protected mode UDF crashes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |                                                     |                      |                                                                                         |                             |                                      |
| do not specify the D option                           | but does not generate debug symbols.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |                                                     |                      |                                                                                         |                             |                                      |
| EXTERNAL SECURITY                                     | <p>keywords introducing the external security clause.</p> <p>This clause is mandatory for methods that perform operating system I/O operations.</p> <p>If you do not specify an external security clause, but the method being defined performs OS I/O, then the results of that I/O are unpredictable. The most likely outcome is crashing the database, and perhaps crashing the entire system.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “External Security Clause” on page 354 in <i>SQL Data Definition Language Detailed Topics</i> for information about the EXTERNAL SECURITY clause and how it is used for UDFs. This information generalizes to all external routines, including methods and external stored procedures.</p> <p>See <a href="#">“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120</a> for information about creating authorizations for external routines.</p>                                                                                                                                                                    |            |                                                     |                      |                                                                                         |                             |                                      |

| Syntax element ...                   | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |          |                               |                                                                                       |                                      |                                                                                                                                                          |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|-------------------------------|---------------------------------------------------------------------------------------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| DEFINER                              | <p>that the method runs in the client user context of the associated security authorization object created for this purpose, which is contained within <i>SYSUDTLIB</i>.</p> <table border="1"> <tr> <th>IF you ...</th><th>THEN ...</th></tr> <tr> <td>specify an authorization name</td><td>an authorization object with that name must be defined before you can run the method.</td></tr> <tr> <td>do not specify an authorization name</td><td> <p>you must define a default DEFINER authorization object.</p> <p>The default authorization object must be defined before a user can run the method.</p> </td></tr> </table> <p>The system reports a warning if the specified authorization name does not exist at the time the method is created, stating that no authorization name exists.</p> <p>See <a href="#">“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120</a>.</p> | IF you ... | THEN ... | specify an authorization name | an authorization object with that name must be defined before you can run the method. | do not specify an authorization name | <p>you must define a default DEFINER authorization object.</p> <p>The default authorization object must be defined before a user can run the method.</p> |
| IF you ...                           | THEN ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |          |                               |                                                                                       |                                      |                                                                                                                                                          |
| specify an authorization name        | an authorization object with that name must be defined before you can run the method.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |          |                               |                                                                                       |                                      |                                                                                                                                                          |
| do not specify an authorization name | <p>you must define a default DEFINER authorization object.</p> <p>The default authorization object must be defined before a user can run the method.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |          |                               |                                                                                       |                                      |                                                                                                                                                          |
| <i>authorization_name</i>            | <p>an optional authorization name.</p> <p>The specified authorization object must already be defined (see <a href="#">“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120</a> for further information) or the system reports an error.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            |          |                               |                                                                                       |                                      |                                                                                                                                                          |
| INVOKER                              | <p>that the method runs in the OS user context with the associated default authorization object that exists for this purpose.</p> <p>See <a href="#">“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120</a>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |            |          |                               |                                                                                       |                                      |                                                                                                                                                          |

## ANSI Compliance

CREATE METHOD is ANSI SQL-2003 compliant.

## Required Privileges

You must have the UDTMETHOD privilege on the *SYSUDTLIB* database to create a method body.

## Privileges Granted Automatically

None.

## Example 1

The following example creates the definition for a constructor method named *address* for the UDT named *address*. The external routine for this method is stored on the Teradata platform at the location specified in the EXTERNAL NAME clause.

```
CREATE CONSTRUCTOR METHOD address( VARCHAR(20), CHARACTER(5) )
  RETURNS address
  FOR address
  EXTERNAL NAME
    'SO!C:\structured_lib\addr_cons.obj!F!addr_constructor';
```

## Example 2

The following example creates the definition for an instance method named *in\_state* for the UDT named *address*. The external routine for this method is stored on the Teradata platform at the location specified in the EXTERNAL NAME clause.

```
CREATE METHOD in_state( CHARACTER(2) )
  RETURNS CHARACTER(1)
  FOR address
  EXTERNAL NAME 'SO!C:\structured_lib\addr_in_state.c!F!in_state';
```

## Example 3

The following example creates the definition for an instance method named *timezone* for the UDT named *address*. The external routine for this method is stored on the Teradata platform at the location specified in the EXTERNAL NAME clause.

```
CREATE METHOD timezone( address )
  RETURNS CHARACTER(3)
  FOR address
  EXTERNAL NAME 'SO!C:\structured_lib\addr_timezone.c!F!in_state';
```

## Example 4

The following example creates the definition for an instance method named *toUS* for the UDT named *euro*. The external routine for this method is stored on the client at the location specified in the EXTERNAL NAME clause.

```
CREATE METHOD toUS()
  RETURNS us_dollar CAST FROM DECIMAL(8,2)
  FOR euro
  EXTERNAL NAME
    'CO!C:\sys\math.lib!CO!C:\distinct_lib\euro2us.obj!F!toUS';
```

## Related Topics

The following SQL statements and manuals document various aspects of methods:

- [“ALTER METHOD” on page 19](#)
- [“ALTER TYPE” on page 71](#)
- [“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120](#)
- [“CREATE CAST/ REPLACE CAST” on page 125](#)
- [“CREATE ORDERING/ REPLACE ORDERING” on page 272](#)
- [“CREATE TRANSFORM/ REPLACE TRANSFORM” on page 484](#)
- [“CREATE TYPE \(Distinct Form\)” on page 507](#)
- [“CREATE TYPE \(Structured Form\)” on page 515](#)
- [“DROP AUTHORIZATION” on page 553](#)
- [“DROP CAST” on page 554](#)
- [“DROP ORDERING” on page 577](#)
- [“DROP TRANSFORM” on page 591](#)
- [“DROP TYPE” on page 592](#)
- [“REPLACE METHOD” on page 640](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)

*SQL External Routine Programming* explains how to write the external routine for a method.

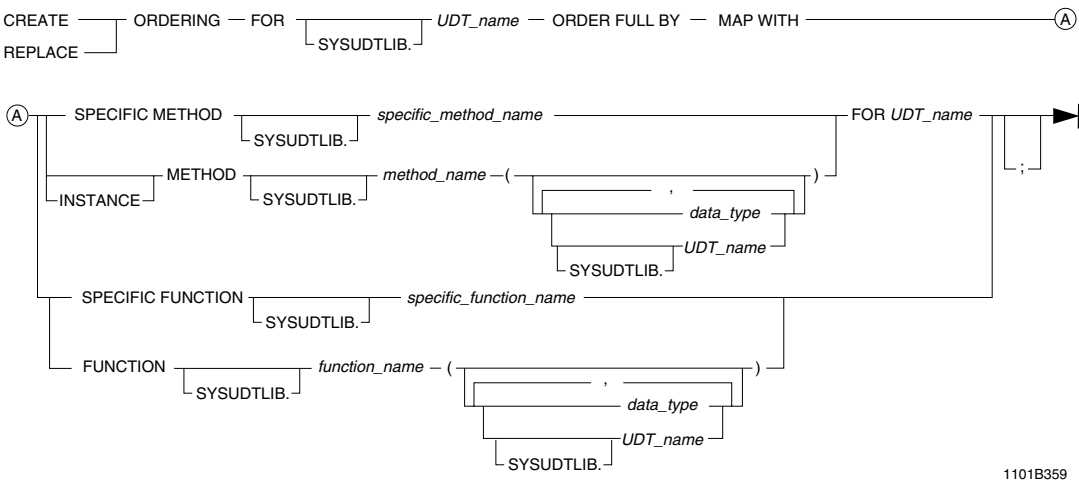
*SQL Functions, Operators, Expressions, and Predicates* documents the dot notation used to invoke methods within SQL expressions.

# CREATE ORDERING/ REPLACE ORDERING

## Purpose

Creates a map ordering routine used to compare UDT values.

## Syntax



where:

| Syntax element ...                                                   | Specifies ...                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FOR<br>[SYSUDTLIB.] <i>UDT_name</i>                                  | the name of the UDT with which this ordering map is associated.                                                                                                                                                                                                                                         |
| SPECIFIC FUNCTION<br>[SYSUDTLIB.]<br><i>specific_function_name</i>   | the specific name for the UDF that maps the UDT to a predefined data type value so it can be compared.                                                                                                                                                                                                  |
| FUNCTION [SYSUDTLIB.]<br><i>function_name</i> [( <i>data_type</i> )] | the name of the function and its associated data type list that maps the UDT to a predefined data type value so it can be compared.                                                                                                                                                                     |
| SPECIFIC METHOD<br>[SYSUDTLIB.]<br><i>specific_method_name</i>       | <div>the specific name for the UDM that maps the UDT to a predefined data type value so it can be compared.</div> <div>The specified method must already be defined. If you specify the name of a method that has not yet been created, the request aborts and returns an error to the requestor.</div> |



| Syntax element ...                                                             | Specifies ...                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [INSTANCE] METHOD<br>[SYSUDTLIB.]<br><i>method_name</i> [( <i>data_type</i> )] | the name of the UDM and its associated data type list that maps the UDT to a predefined data type value so it can be compared.<br><br>The specified method must already be defined. If you specify the name of a method that has not yet been created, the request aborts and returns an error to the requestor. |
| FOR<br>[SYSUDTLIB.] <i>UDT_name</i>                                            | the name of the UDT with which the specified instance UDM is associated.                                                                                                                                                                                                                                         |

## ANSI Compliance

CREATE ORDERING is ANSI SQL:2008-compliant.

REPLACE ORDERING is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have either the UDTYPE or UDMETHOD privilege on the *SYSUDTLIB* database.

If the map routine you specify is a UDF, then you must also have the EXECUTE FUNCTION privilege on the UDF, which must be contained within the *SYSUDTLIB* database.

## Privileges Granted Automatically

None.

## Example 1: Order Mapping Using a UDM

The following order mapping definition for a UDT named *circle* uses the UDM named *compare\_circ()*, which is also associated with the *circle* UDT.

```
CREATE ORDERING FOR circle
ORDER FULL BY MAP WITH METHOD compare_circ() FOR circle;
```

## Example 2: Order Mapping Using a UDF

The following order mapping definition for a UDT named *rectangle* uses the UDF named *compare\_rect()*.

```
CREATE ORDERING FOR rectangle
ORDER FULL BY MAP WITH FUNCTION compare_rect();
```

## Related Topics

See the documentation for the following statements for additional information about UDTs:

- [“ALTER FUNCTION” on page 16](#)
- [“ALTER METHOD” on page 19](#)
- [“ALTER TYPE” on page 71](#)
- [“CREATE CAST/ REPLACE CAST” on page 125](#)
- [“CREATE FUNCTION/ REPLACE FUNCTION” on page 138](#)
- [“CREATE METHOD” on page 259](#)
- [“CREATE TRANSFORM/ REPLACE TRANSFORM” on page 484](#)
- [“CREATE TYPE \(Distinct Form\)” on page 507](#)
- [“CREATE TYPE \(Structured Form\)” on page 515](#)
- [“DROP FUNCTION” on page 562](#)
- [“DROP ORDERING” on page 577](#)
- [“DROP TRANSFORM” on page 591](#)
- [“DROP TYPE” on page 592](#)
- [“RENAME FUNCTION” on page 634](#)
- [“REPLACE METHOD” on page 640](#)
- [“HELP CAST” on page 693](#)
- [“HELP FUNCTION” on page 715](#)
- [“HELP METHOD” on page 735](#)
- [“HELP TRANSFORM” on page 775](#)
- [“HELP TYPE” on page 779](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)

See *SQL Data Control Language* for information about the UDTTYPE, UDTMETHOD, UDTUSAGE, and EXECUTE FUNCTION privileges, particularly the topics “UDT-Related Privileges” and “EXECUTE FUNCTION Privilege” under “GRANT (SQL Form).”

Also see *SQL External Routine Programming* for information about how to write user-defined external routines.

## CHAPTER 4 **CREATE PROCEDURE - CREATE ROLE**

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DDL statements define, modify, and remove database object definitions.

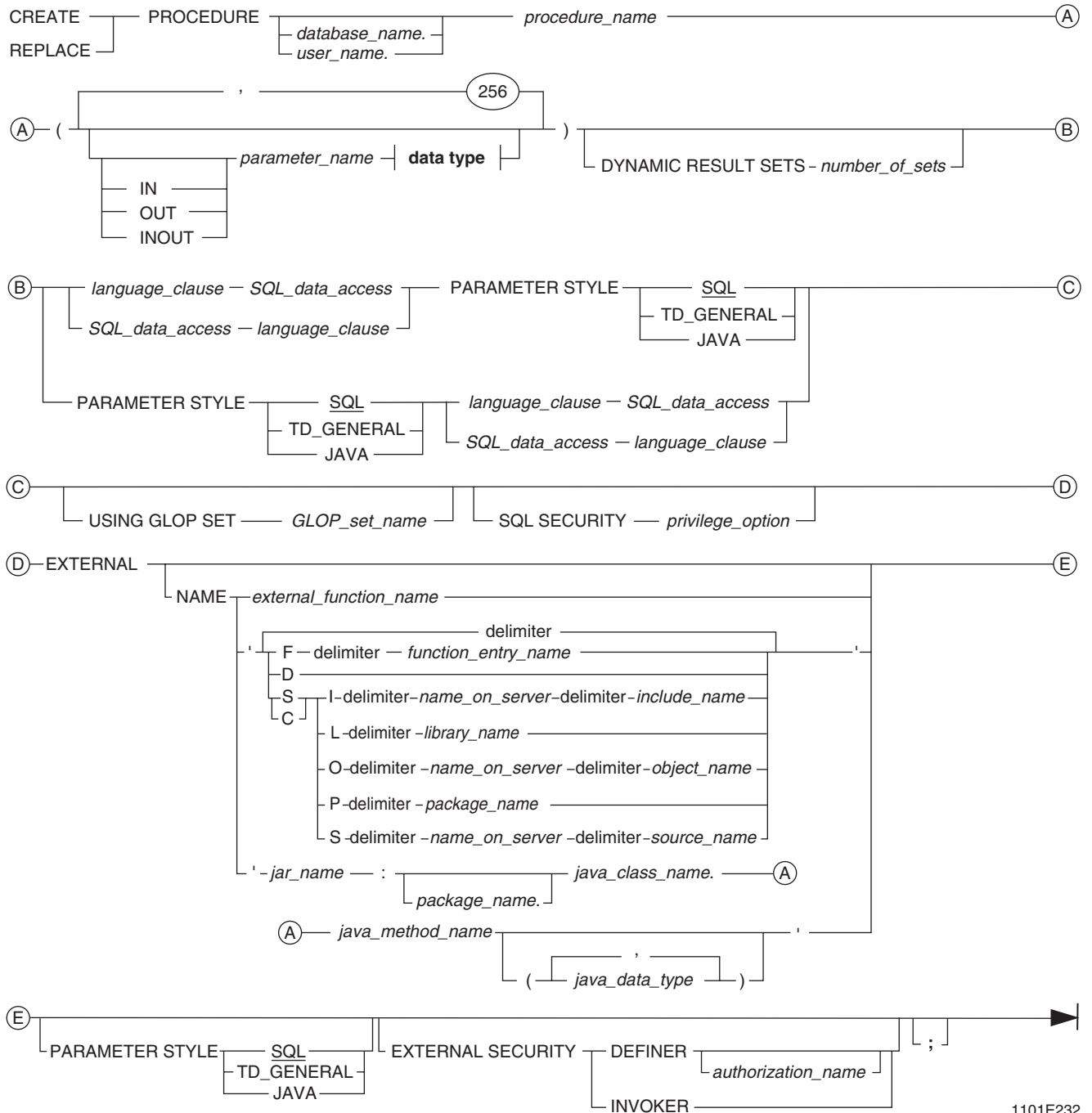
This chapter documents the syntax for, and provides examples of, the Teradata Database DDL statements from CREATE PROCEDURE through CREATE ROLE.

## **CREATE PROCEDURE (External Form)/ REPLACE PROCEDURE (External Form)**

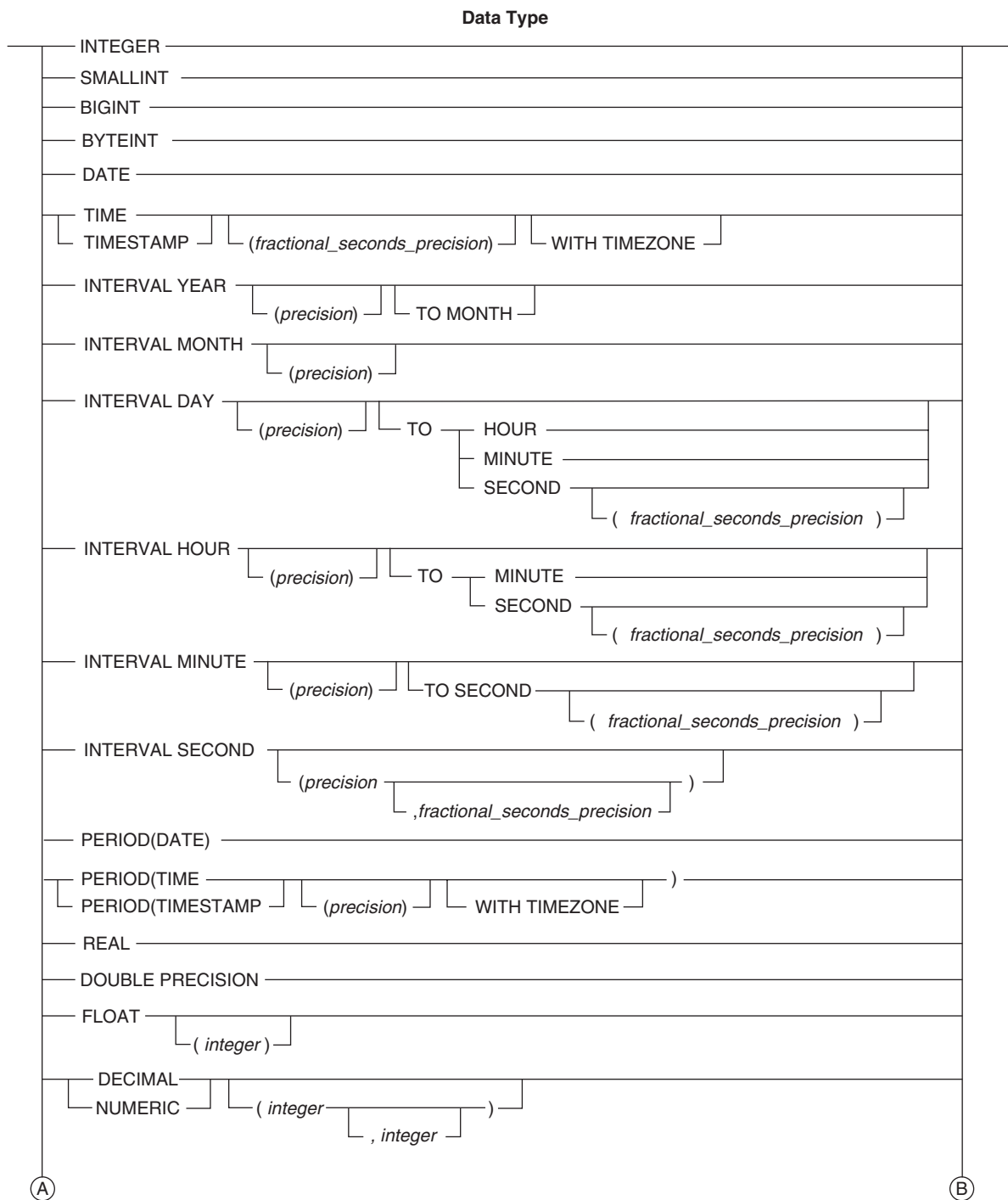
### **Purpose**

Compiles and installs an external non-SQL stored procedure routine and creates the SQL definition used to invoke the procedure.

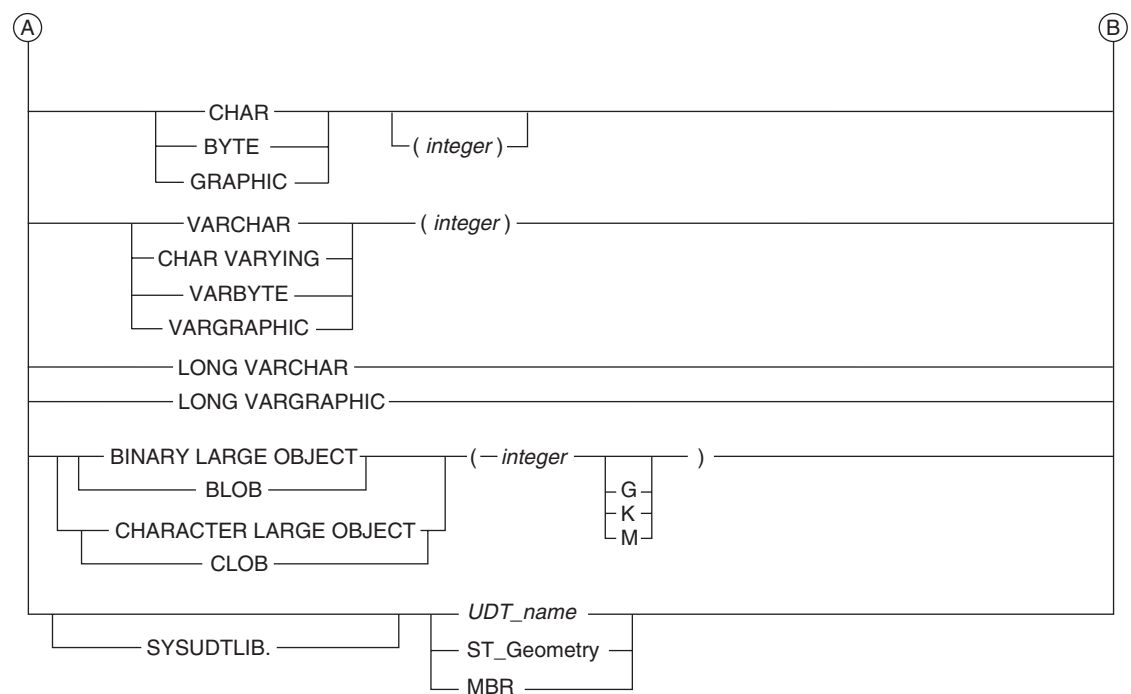
## Syntax



1101E232

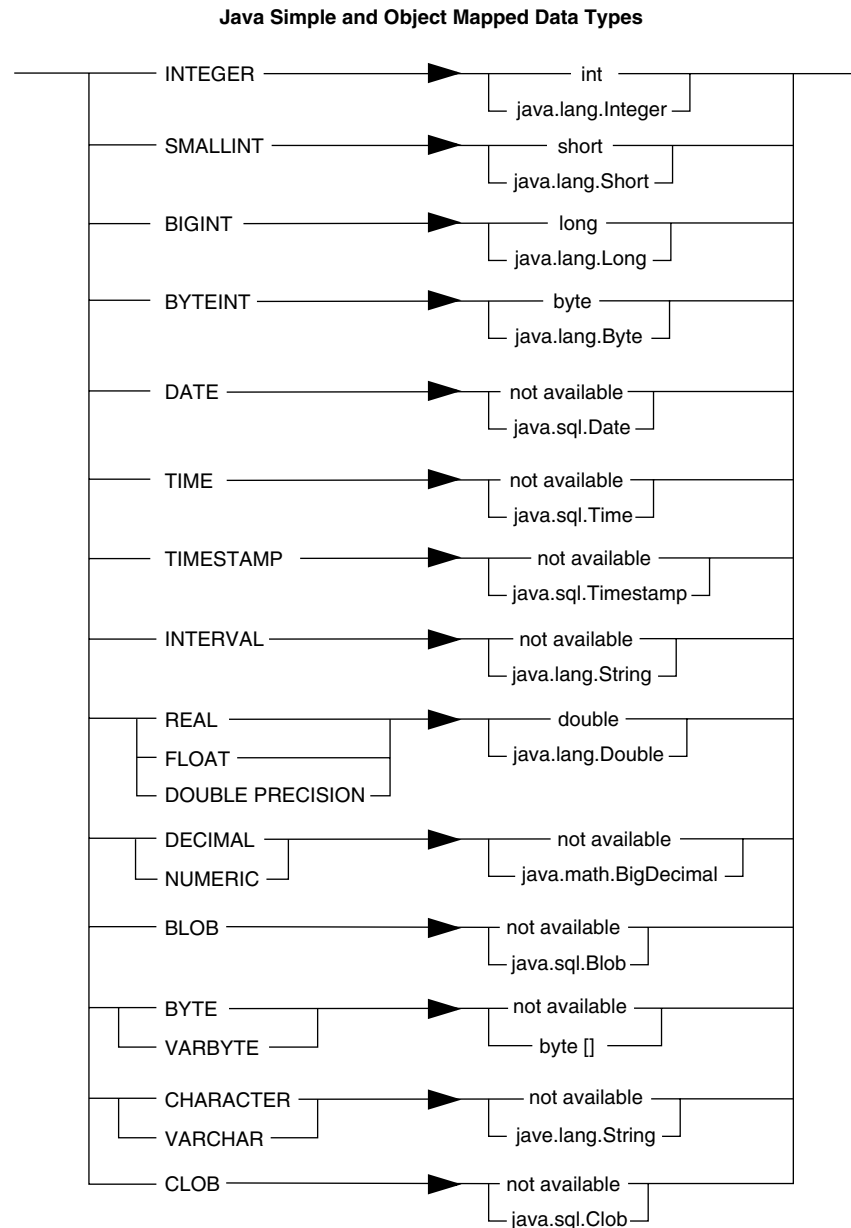


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The following syntax diagram shows the Java data types that you can specify in the External Java Reference String for a Java external stored procedure. For each case, the SQL data type is indicated first. An arrow points to the Java simple map for the type on the main line, with the Java object mapping type indicated on the line beneath.



1101A507



where:

| Syntax element ...                           | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>  <br><i>user_name</i>   | <p>an optional database or user name specified if the stored procedure is to be created or replaced in a nondefault database or user.</p> <p>If you do not specify a database or user name, the system creates or replaces the procedure within the current database or user.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <i>procedure_name</i>                        | <p>the calling name for the external stored procedure.</p> <p><i>procedure_name</i> must match the spelling and case of the C, C++, or Java procedure name <i>exactly</i> if you do not specify an <i>external_procedure_name</i>. This applies only to the definition of the procedure, not to its use.</p> <p>If your Teradata Database runs on the UNIX MP-RAS operating system, you should keep the procedure name as short as possible (see the CREATE METHOD topic “Maximum Size of UNIX MP-RAS Command Line Argument Affects Names and Number of External Routines in a Database” in <i>SQL Data Definition Language Detailed Topics</i>).</p> <p>See the following CREATE FUNCTION/REPLACE FUNCTION topics in <i>SQL Data Definition Language Detailed Topics</i> for further information:</p> <ul style="list-style-type: none"> <li>• “Function Identifiers”</li> <li>• “Function Name”</li> <li>• “Function Calling Argument”</li> <li>• “Function Name Overloading”</li> <li>• “Parameter Names and Data Types”</li> </ul> |
| IN<br>OUT<br>INOUT                           | <p>type of the parameter being specified.</p> <ul style="list-style-type: none"> <li>• IN parameter is input only.</li> <li>• OUT parameter is output only.</li> <li>• INOUT can be both input and output.</li> </ul> <p>IN is the default parameter type. If the parameter type is not specified, the parameter is assumed to be of the IN type.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| DYNAMIC RESULT<br>SETS <i>number_of_sets</i> | <p>that <i>number_of_sets</i> of dynamic result sets can be returned.</p> <p>The range of valid values for <i>number_of_sets</i> is 0 through 15, inclusive.</p> <p>See the CREATE PROCEDURE (External Form)/REPLACE PROCEDURE (External Form) topic “Dynamic Result Sets” in <i>SQL Data Definition Language Detailed Topics</i> for details and <a href="#">“Example5: Result Set Positioning” on page 301</a>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

| Syntax element ...                                                        | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                           |                                                                                    |                                                                   |     |      |     |
|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------|-----|------|-----|
| <i>parameter_name</i><br><i>data_type</i>                                 | <p>a parenthetical comma-separated list of data types, including UDTs, and parameter names for the variables to be passed to the procedure.</p> <table><tr><th>IF the external routine for the procedure is written in this language ...</th><th>THEN the maximum number of parameters you can specify in its parameter list is ...</th></tr><tr><td><ul style="list-style-type: none"><li>• C</li><li>• C++</li></ul></td><td>256</td></tr><tr><td>Java</td><td>255</td></tr></table> <p>BLOB and CLOB types must be represented by a locator (see <i>SQL Data Manipulation Language</i> for a description of locators). The Teradata Database does not support in-memory LOB parameters: an AS LOCATOR phrase must be specified for each LOB parameter and return value in a non-Java stored procedure.</p> <p>For Java stored procedures, the simple data type references BLOB and CLOB implicitly refer to BLOB AS LOCATOR and CLOB AS LOCATOR, respectively. Because of this, you cannot specify an explicit AS LOCATOR for BLOB and CLOB columns in Java stored procedures.</p> <p>Note, however, that whenever a LOB that requires data type conversion is passed to an external procedure, the LOB must be materialized for the conversion to take place.</p> <p>You must specify opening and closing parentheses even if no parameters are to be passed to the procedure.</p> <p>The data type associated with each parameter is the type of the parameter. All Teradata Database data types are valid for non-Java procedures.</p> <p>For Java procedures, neither the GRAPHIC and VARGRAPHIC types nor UDT parameters are valid.</p> <p>Character data can also specify a CHARACTER SET clause.</p> <p>Note that the system does not default to the data type you assign to an INOUT parameter when the procedure is called. Instead, it defaults to the smallest data type that can contain the specified input parameter. As a result, memory overflow errors can occur if an output parameter returned to an INOUT parameter cannot be contained by the default data type set for that parameter by the system. See the CREATE PROCEDURE (External Form)/REPLACE PROCEDURE (External Form) topic “Memory Considerations for INOUT Parameters” in <i>SQL Data Definition Language Detailed Topics</i> and “CALL” in <i>SQL Data Manipulation Language</i> for details.</p> | IF the external routine for the procedure is written in this language ... | THEN the maximum number of parameters you can specify in its parameter list is ... | <ul style="list-style-type: none"><li>• C</li><li>• C++</li></ul> | 256 | Java | 255 |
| IF the external routine for the procedure is written in this language ... | THEN the maximum number of parameters you can specify in its parameter list is ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                           |                                                                                    |                                                                   |     |      |     |
| <ul style="list-style-type: none"><li>• C</li><li>• C++</li></ul>         | 256                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                           |                                                                                    |                                                                   |     |      |     |
| Java                                                                      | 255                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                           |                                                                                    |                                                                   |     |      |     |

| Syntax element ...                                                   | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                  |                                              |   |   |     |     |      |      |
|----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------|---|---|-----|-----|------|------|
| <code>parameter_name</code><br><code>data_type</code><br>(continued) | <p>For data types that take a length or size specification, like BYTE, CHARACTER, DECIMAL, VARCHAR, and so on, the length of the parameter indicates the longest string that can be passed (see the CREATE PROCEDURE (External Form)/REPLACE PROCEDURE (External Form) topic “Parameter Names and Data Types” in <i>SQL Data Definition Language Detailed Topics</i>).</p> <p>See <i>SQL Stored Procedures and Embedded SQL</i> for a list of the data type encodings that stored procedure IN, INOUT, and OUT parameters can return to a client application.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                  |                                              |   |   |     |     |      |      |
| <code>language_clause</code>                                         | <p>a code that represents the programming language in which the external procedure is written.</p> <p>The valid languages for writing external stored procedures are C, C++, and Java.</p> <p>Note that Java external stored procedures are supported for 64-bit Linux and Windows systems only. You cannot create Java external stored procedures on UNIX systems.</p> <table border="1"> <thead> <tr> <th>IF the external stored procedure is written in this language ...</th><th>THEN the code for the LANGUAGE clause is ...</th></tr> </thead> <tbody> <tr> <td>C</td><td>C</td></tr> <tr> <td>C++</td><td>CPP</td></tr> <tr> <td>Java</td><td>JAVA</td></tr> </tbody> </table> <p>You must specify one of these codes even if the external procedure is supplied in object form.</p> <p>If the external procedure object is not written in C, C++, or Java it must be compatible with C, C++, or Java object code.</p> <p>This clause is mandatory.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Language Clause” in <i>SQL Data Definition Language Detailed Topics</i>.</p> | IF the external stored procedure is written in this language ... | THEN the code for the LANGUAGE clause is ... | C | C | C++ | CPP | Java | JAVA |
| IF the external stored procedure is written in this language ...     | THEN the code for the LANGUAGE clause is ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                  |                                              |   |   |     |     |      |      |
| C                                                                    | C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                  |                                              |   |   |     |     |      |      |
| C++                                                                  | CPP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                  |                                              |   |   |     |     |      |      |
| Java                                                                 | JAVA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                  |                                              |   |   |     |     |      |      |
| <code>SQL_data_access</code>                                         | <p>whether the external procedure body accesses the database or contains SQL statements.</p> <p>Any of the listed option strings is valid for external routines written in the C, C++, or Java languages. The default is NO SQL.</p> <p>For information on valid specification options, see the “CREATE PROCEDURE (External Form)/ REPLACE PROCEDURE (External Form)” topic in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                  |                                              |   |   |     |     |      |      |

| Syntax element ... | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |             |      |                                                                                                                                                                                                                                                           |            |                                                                                                                                 |            |                                                                                   |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------------------------------------------------------------|------------|-----------------------------------------------------------------------------------|
| PARAMETER STYLE    | <p>the parameter passing convention to be used when passing parameters to the procedure.</p> <p>The specified parameter style must match the parameter passing convention of the external procedure.</p> <table> <tr> <th>Style</th><th>Description</th></tr> <tr> <td>JAVA</td><td> <p>If the Java procedure must accept null arguments, then the EXTERNAL NAME clause must include the list of parameters and specify data types that map to Java objects.</p> <p>PARAMETER STYLE JAVA <i>must</i> be specified for all Java procedures.</p> </td></tr> <tr> <td><u>SQL</u></td><td> <p>Uses indicator variables to pass arguments. As a result, you can always pass nulls as inputs and return them in results.</p> </td></tr> <tr> <td>TD_GENERAL</td><td> <p>Uses parameters to pass arguments. Can neither be passed nor return nulls.</p> </td></tr> </table> <p>If you do not specify a parameter style at this point, you can specify one with the external body reference.</p> <p>You cannot specify parameter styles more than once in the same CREATE/REPLACE PROCEDURE statement.</p> <p>The default is SQL.</p> <p>This clause is optional and can only be specified once per external procedure definition.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Parameter Style Clause” in <i>SQL Data Definition Language Detailed Topics</i> for more information on parameter styles.</p> | Style | Description | JAVA | <p>If the Java procedure must accept null arguments, then the EXTERNAL NAME clause must include the list of parameters and specify data types that map to Java objects.</p> <p>PARAMETER STYLE JAVA <i>must</i> be specified for all Java procedures.</p> | <u>SQL</u> | <p>Uses indicator variables to pass arguments. As a result, you can always pass nulls as inputs and return them in results.</p> | TD_GENERAL | <p>Uses parameters to pass arguments. Can neither be passed nor return nulls.</p> |
| Style              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |             |      |                                                                                                                                                                                                                                                           |            |                                                                                                                                 |            |                                                                                   |
| JAVA               | <p>If the Java procedure must accept null arguments, then the EXTERNAL NAME clause must include the list of parameters and specify data types that map to Java objects.</p> <p>PARAMETER STYLE JAVA <i>must</i> be specified for all Java procedures.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |             |      |                                                                                                                                                                                                                                                           |            |                                                                                                                                 |            |                                                                                   |
| <u>SQL</u>         | <p>Uses indicator variables to pass arguments. As a result, you can always pass nulls as inputs and return them in results.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |             |      |                                                                                                                                                                                                                                                           |            |                                                                                                                                 |            |                                                                                   |
| TD_GENERAL         | <p>Uses parameters to pass arguments. Can neither be passed nor return nulls.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |             |      |                                                                                                                                                                                                                                                           |            |                                                                                                                                 |            |                                                                                   |

| Syntax element ...                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  |             |         |                                                                                                      |                |                                                                                |         |                                                                                        |       |                                                                                                                                   |
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| SQL SECURITY<br><i>privilege_option</i> | <p>The SQL SECURITY clause is supported only for those external procedures where both of the following statements are true:</p> <ul style="list-style-type: none"> <li>The procedure has one of the following AppCategory codes in <i>DBC.UDFInfo</i>: <ul style="list-style-type: none"> <li>C (CLIV2)</li> <li>J (Java)</li> <li>N (.NET)</li> <li>O (ODBC)</li> </ul> </li> </ul> <p>The only nonvalid AppCategory code is S.<br/>See <i>Data Dictionary</i> for details.</p> <ul style="list-style-type: none"> <li>The SQL ACCESS clause in the procedure definition specifies one of the following options that supports SQL: <ul style="list-style-type: none"> <li>CONTAINS SQL</li> <li>MODIFIES SQL DATA</li> <li>READS SQL DATA</li> </ul> </li> </ul> <p>The SQL ACCESS option <i>cannot</i> be NO SQL.</p> <p>Otherwise, the system aborts the request and returns an error to the requestor.</p> <table border="1"> <thead> <tr> <th>Privilege Option</th><th>Description</th></tr> </thead> <tbody> <tr> <td>CREATOR</td><td>Assign the privileges of the creator of the procedure regardless of its containing database or user.</td></tr> <tr> <td><u>DEFINER</u></td><td>Assign the privileges of the definer of the procedure.<br/>This is the default.</td></tr> <tr> <td>INVOKER</td><td>Assign the privileges possessed by the user at the top of the current execution stack.</td></tr> <tr> <td>OWNER</td><td>Assign the privileges owned by the owner of the procedure, which are the privileges possessed by its containing database or user.</td></tr> </tbody> </table> | Privilege Option | Description | CREATOR | Assign the privileges of the creator of the procedure regardless of its containing database or user. | <u>DEFINER</u> | Assign the privileges of the definer of the procedure.<br>This is the default. | INVOKER | Assign the privileges possessed by the user at the top of the current execution stack. | OWNER | Assign the privileges owned by the owner of the procedure, which are the privileges possessed by its containing database or user. |
| Privilege Option                        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                  |             |         |                                                                                                      |                |                                                                                |         |                                                                                        |       |                                                                                                                                   |
| CREATOR                                 | Assign the privileges of the creator of the procedure regardless of its containing database or user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |             |         |                                                                                                      |                |                                                                                |         |                                                                                        |       |                                                                                                                                   |
| <u>DEFINER</u>                          | Assign the privileges of the definer of the procedure.<br>This is the default.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |             |         |                                                                                                      |                |                                                                                |         |                                                                                        |       |                                                                                                                                   |
| INVOKER                                 | Assign the privileges possessed by the user at the top of the current execution stack.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |             |         |                                                                                                      |                |                                                                                |         |                                                                                        |       |                                                                                                                                   |
| OWNER                                   | Assign the privileges owned by the owner of the procedure, which are the privileges possessed by its containing database or user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                  |             |         |                                                                                                      |                |                                                                                |         |                                                                                        |       |                                                                                                                                   |

| Syntax element ...                                     | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| SQL SECURITY<br><i>privilege_option</i><br>(continued) | <p>Teradata Database treats procedures as follows when the procedure is defined as a DEFINER whether explicitly or by default. This is for the case when the CREATOR of the procedure is <i>not</i> its OWNER.</p> <ul style="list-style-type: none"> <li>• Teradata Database checks the privileges of the CREATOR during compilation of the procedure. If the CREATOR is missing a privilege for any object that a statement in the procedure references, Teradata Database aborts the request and returns an error.</li> <li>• Teradata Database checks the privileges of the OWNER (the containing database or user for the procedure) during compilation, and if the OWNER is missing any privileges for any object that is referenced by a statement in the procedure, Teradata Database returns a warning message.</li> <li>• During execution, Teradata Database checks the OWNER privileges for any object referenced by any statement in the procedure. Any access failures caused by not having the appropriate privileges return an error to the procedure, which it can handle if it is written to do so.</li> <li>• Teradata Database grants the DROP and EXECUTE privileges to a UDF created in a database or user different from the CREATOR. An OWNER <i>always</i> has the implicit privilege to drop any object it owns. If the OWNER wants to execute the UDF, then it must grant the EXECUTE FUNCTION privilege to that function.</li> </ul> <p>The following rules apply to all procedures:</p> <ul style="list-style-type: none"> <li>• Objects referenced by any statement in the procedure need not have the WITH GRANT OPTION privilege. They require only the GRANT privilege on the referenced object.</li> <li>• Teradata Database check CREATOR and OWNER access rights on DDL statements during execution.</li> </ul> |

| Syntax element ...                                                 | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                  |                                                                         |                                                                    |                                                                                                                                |     |                                                                                                                                                                                                                                                                                                                           |         |       |                                  |                                                                       |                                                                    |                                                                                                                              |     |                                                                                                                  |         |                    |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------|----------------------------------|-----------------------------------------------------------------------|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------------|---------|--------------------|
| SQL SECURITY<br><i>privilege_option</i><br>(continued)             | <p>The following table summarizes how Teradata Database treats privilege violations for procedures during compilation.</p> <table> <tr> <th>For this type of SQL request ...</th><th>Teradata Database checks the following privileges during compilation...</th></tr> <tr> <td> <ul style="list-style-type: none"> <li>DCL</li> <li>DDL</li> </ul> </td><td> <p>CREATOR and OWNER.</p> <p>The system returns warning messages to the procedure for any privilege violations that occur.</p> </td></tr> <tr> <td>DML</td><td> <ul style="list-style-type: none"> <li>CREATOR</li> </ul> <p>The system returns error messages to the procedure for any privilege violations that occur.</p> <ul style="list-style-type: none"> <li>OWNER</li> </ul> <p>The system returns warning messages to the procedure for any privilege violations that occur.</p> </td></tr> <tr> <td>Dynamic</td><td>None.</td></tr> </table> <p>The following table summarizes how Teradata Database treats privilege violations for procedures during execution.</p> <table> <tr> <th>For this type of SQL request ...</th><th>Teradata Database checks the following privileges during execution...</th></tr> <tr> <td> <ul style="list-style-type: none"> <li>DCL</li> <li>DDL</li> </ul> </td><td> <p>CREATOR and OWNER.</p> <p>The system returns error messages to the procedure for any privilege violations that occur.</p> </td></tr> <tr> <td>DML</td><td> <p>OWNER.</p> <p>The system returns error messages to the procedure for any privilege violations that occur.</p> </td></tr> <tr> <td>Dynamic</td><td>CREATOR and OWNER.</td></tr> </table> | For this type of SQL request ... | Teradata Database checks the following privileges during compilation... | <ul style="list-style-type: none"> <li>DCL</li> <li>DDL</li> </ul> | <p>CREATOR and OWNER.</p> <p>The system returns warning messages to the procedure for any privilege violations that occur.</p> | DML | <ul style="list-style-type: none"> <li>CREATOR</li> </ul> <p>The system returns error messages to the procedure for any privilege violations that occur.</p> <ul style="list-style-type: none"> <li>OWNER</li> </ul> <p>The system returns warning messages to the procedure for any privilege violations that occur.</p> | Dynamic | None. | For this type of SQL request ... | Teradata Database checks the following privileges during execution... | <ul style="list-style-type: none"> <li>DCL</li> <li>DDL</li> </ul> | <p>CREATOR and OWNER.</p> <p>The system returns error messages to the procedure for any privilege violations that occur.</p> | DML | <p>OWNER.</p> <p>The system returns error messages to the procedure for any privilege violations that occur.</p> | Dynamic | CREATOR and OWNER. |
| For this type of SQL request ...                                   | Teradata Database checks the following privileges during compilation...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                  |                                                                         |                                                                    |                                                                                                                                |     |                                                                                                                                                                                                                                                                                                                           |         |       |                                  |                                                                       |                                                                    |                                                                                                                              |     |                                                                                                                  |         |                    |
| <ul style="list-style-type: none"> <li>DCL</li> <li>DDL</li> </ul> | <p>CREATOR and OWNER.</p> <p>The system returns warning messages to the procedure for any privilege violations that occur.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                  |                                                                         |                                                                    |                                                                                                                                |     |                                                                                                                                                                                                                                                                                                                           |         |       |                                  |                                                                       |                                                                    |                                                                                                                              |     |                                                                                                                  |         |                    |
| DML                                                                | <ul style="list-style-type: none"> <li>CREATOR</li> </ul> <p>The system returns error messages to the procedure for any privilege violations that occur.</p> <ul style="list-style-type: none"> <li>OWNER</li> </ul> <p>The system returns warning messages to the procedure for any privilege violations that occur.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                  |                                                                         |                                                                    |                                                                                                                                |     |                                                                                                                                                                                                                                                                                                                           |         |       |                                  |                                                                       |                                                                    |                                                                                                                              |     |                                                                                                                  |         |                    |
| Dynamic                                                            | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                  |                                                                         |                                                                    |                                                                                                                                |     |                                                                                                                                                                                                                                                                                                                           |         |       |                                  |                                                                       |                                                                    |                                                                                                                              |     |                                                                                                                  |         |                    |
| For this type of SQL request ...                                   | Teradata Database checks the following privileges during execution...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                  |                                                                         |                                                                    |                                                                                                                                |     |                                                                                                                                                                                                                                                                                                                           |         |       |                                  |                                                                       |                                                                    |                                                                                                                              |     |                                                                                                                  |         |                    |
| <ul style="list-style-type: none"> <li>DCL</li> <li>DDL</li> </ul> | <p>CREATOR and OWNER.</p> <p>The system returns error messages to the procedure for any privilege violations that occur.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                  |                                                                         |                                                                    |                                                                                                                                |     |                                                                                                                                                                                                                                                                                                                           |         |       |                                  |                                                                       |                                                                    |                                                                                                                              |     |                                                                                                                  |         |                    |
| DML                                                                | <p>OWNER.</p> <p>The system returns error messages to the procedure for any privilege violations that occur.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                  |                                                                         |                                                                    |                                                                                                                                |     |                                                                                                                                                                                                                                                                                                                           |         |       |                                  |                                                                       |                                                                    |                                                                                                                              |     |                                                                                                                  |         |                    |
| Dynamic                                                            | CREATOR and OWNER.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                  |                                                                         |                                                                    |                                                                                                                                |     |                                                                                                                                                                                                                                                                                                                           |         |       |                                  |                                                                       |                                                                    |                                                                                                                              |     |                                                                                                                  |         |                    |
| USING GLOP SET<br><i>GLOP_set_name</i>                             | <p>the name of the GLOP set this procedure is associated with.</p> <p>It is not mandatory that the specified GLOP set exist at the time the procedure is created.</p> <p>You can specify this clause anywhere between the parameter list and the EXTERNAL clause.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                  |                                                                         |                                                                    |                                                                                                                                |     |                                                                                                                                                                                                                                                                                                                           |         |       |                                  |                                                                       |                                                                    |                                                                                                                              |     |                                                                                                                  |         |                    |

| Syntax element ...                     | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| EXTERNAL                               | <p>the introduction to the mandatory external procedure body reference clause.</p> <p>This clause can specify four different things:</p> <ul style="list-style-type: none"> <li>• The keyword EXTERNAL only.</li> <li>• The keywords EXTERNAL NAME plus an external procedure name (with optional Parameter Style specification)</li> <li>• The keywords EXTERNAL NAME plus a set of external string literals.</li> <li>• The keywords EXTERNAL NAME plus a set of Java external string literals.</li> </ul> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “External Body Reference Clause” on page 255 in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                                                                                        |
| NAME<br><i>external_procedure_name</i> | <p>the entry point for the procedure object.</p> <p>Case is significant and must match the C or C++ procedure name.</p> <p>Note that this option is not valid for Java external stored procedures. Instead, you must specify the EXTERNAL NAME <i>external_Java_reference_string</i> option (see the CREATE PROCEDURE (External Form)/REPLACE PROCEDURE (External Form) topic “NAME <i>external_Java_reference_string</i>” in <i>SQL Data Definition Language Detailed Topics</i>).</p> <p>If your Teradata Database runs on the UNIX MP-RAS operating system, you should keep the external procedure name as short as possible (see the CREATE METHOD topic “Maximum Size of UNIX MP-RAS Command Line Argument Affects Names and Number of External Routines in a Database” in <i>SQL Data Definition Language Detailed Topics</i>).</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “External Name Clause” in <i>SQL Data Definition Language Detailed Topics</i>.</p> |



| Syntax element ...                     | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                              |              |   |                                                                                                                                                                                                                                 |   |                                                                                                                                                                                                                                                                                      |   |                                                                                                                                                                                                                                                                                                 |
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| NAME<br><i>external_string_literal</i> | <p>a string that specifies the source and object components needed to build the procedure</p> <p>Depending on the initial code in the sequence, the string specifies either the C or C++ procedure object name for the external stored procedure or an encoded name or path for the components needed to create the procedure.</p> <p>The following table briefly documents the codes used to specify component locations:</p> <table> <tr> <th>IF you specify this code ...</th><th>THEN the ...</th></tr> <tr> <td>F</td><td> <p>string that follows is the entry point name of the C or C++ procedure object.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Function Entry Name Clause” in <i>SQL Data Definition Language Detailed Topics</i>.</p> </td></tr> <tr> <td>C</td><td> <p>source or object code for the procedure is stored on the client and the string that follows is the path to its location.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Client-Server UDF Code Specification” in <i>SQL Data Definition Language Detailed Topics</i>.</p> </td></tr> <tr> <td>S</td><td> <p>source or object code for the procedure is stored on the Teradata platform and the string that follows is the path to its location.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Client-Server UDF Code Specification” in <i>SQL Data Definition Language Detailed Topics</i>.</p> </td></tr> </table> | IF you specify this code ... | THEN the ... | F | <p>string that follows is the entry point name of the C or C++ procedure object.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Function Entry Name Clause” in <i>SQL Data Definition Language Detailed Topics</i>.</p> | C | <p>source or object code for the procedure is stored on the client and the string that follows is the path to its location.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Client-Server UDF Code Specification” in <i>SQL Data Definition Language Detailed Topics</i>.</p> | S | <p>source or object code for the procedure is stored on the Teradata platform and the string that follows is the path to its location.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Client-Server UDF Code Specification” in <i>SQL Data Definition Language Detailed Topics</i>.</p> |
| IF you specify this code ...           | THEN the ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                              |              |   |                                                                                                                                                                                                                                 |   |                                                                                                                                                                                                                                                                                      |   |                                                                                                                                                                                                                                                                                                 |
| F                                      | <p>string that follows is the entry point name of the C or C++ procedure object.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Function Entry Name Clause” in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                              |              |   |                                                                                                                                                                                                                                 |   |                                                                                                                                                                                                                                                                                      |   |                                                                                                                                                                                                                                                                                                 |
| C                                      | <p>source or object code for the procedure is stored on the client and the string that follows is the path to its location.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Client-Server UDF Code Specification” in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                              |              |   |                                                                                                                                                                                                                                 |   |                                                                                                                                                                                                                                                                                      |   |                                                                                                                                                                                                                                                                                                 |
| S                                      | <p>source or object code for the procedure is stored on the Teradata platform and the string that follows is the path to its location.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Client-Server UDF Code Specification” in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                              |              |   |                                                                                                                                                                                                                                 |   |                                                                                                                                                                                                                                                                                      |   |                                                                                                                                                                                                                                                                                                 |

| Syntax element ...                                    | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |        |                  |                                                                                                                                                                                        |         |                                                                                                                                                                                  |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NAME<br><i>external_string_literal</i><br>(continued) | <p>The following table briefly documents the path specifications for the external procedure. The character ; represents an arbitrary user-defined delimiter.</p> <p>You must use the same delimiter throughout the string specification.</p> <table> <tr> <th>File Type</th><th>Syntax</th></tr> <tr> <td>Procedure object</td><td> <i>F;procedure_entry_point_name</i><br/> See the CREATE FUNCTION/REPLACE FUNCTION topic “Function Entry Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. </td></tr> <tr> <td>Include</td><td> <i>I;name_on_server;include_name</i><br/> See the CREATE FUNCTION/REPLACE FUNCTION topic “Include Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. </td></tr> <tr> <td>Library</td><td> <i>L;library_name</i><br/> See the CREATE FUNCTION/REPLACE FUNCTION topic “Library Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. </td></tr> <tr> <td>Object</td><td> <i>O;name_on_server;object_name</i><br/> See the CREATE FUNCTION/REPLACE FUNCTION topic “Object File Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. </td></tr> <tr> <td>Package</td><td> <i>P;package_name</i><br/> <i>package_name</i> must be CLI for external stored procedures written in C or C++ that make SQL calls (see CREATE PROCEDURE (External Form)/REPLACE PROCEDURE (External Form) topic “SQL DATA ACCESS Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details).<br/> <i>package_name</i> must be JDBC for external stored procedures written in Java that make SQL calls.<br/> See the CREATE FUNCTION/REPLACE FUNCTION topic “Package Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. </td></tr> </table> | File Type | Syntax | Procedure object | <i>F;procedure_entry_point_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Function Entry Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. | Include | <i>I;name_on_server;include_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Include Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. | Library | <i>L;library_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Library Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. | Object | <i>O;name_on_server;object_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Object File Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. | Package | <i>P;package_name</i><br><i>package_name</i> must be CLI for external stored procedures written in C or C++ that make SQL calls (see CREATE PROCEDURE (External Form)/REPLACE PROCEDURE (External Form) topic “SQL DATA ACCESS Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details).<br><i>package_name</i> must be JDBC for external stored procedures written in Java that make SQL calls.<br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Package Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details. |
| File Type                                             | Syntax                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |        |                  |                                                                                                                                                                                        |         |                                                                                                                                                                                  |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Procedure object                                      | <i>F;procedure_entry_point_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Function Entry Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |        |                  |                                                                                                                                                                                        |         |                                                                                                                                                                                  |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Include                                               | <i>I;name_on_server;include_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Include Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |        |                  |                                                                                                                                                                                        |         |                                                                                                                                                                                  |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Library                                               | <i>L;library_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Library Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           |        |                  |                                                                                                                                                                                        |         |                                                                                                                                                                                  |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Object                                                | <i>O;name_on_server;object_name</i><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Object File Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |        |                  |                                                                                                                                                                                        |         |                                                                                                                                                                                  |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Package                                               | <i>P;package_name</i><br><i>package_name</i> must be CLI for external stored procedures written in C or C++ that make SQL calls (see CREATE PROCEDURE (External Form)/REPLACE PROCEDURE (External Form) topic “SQL DATA ACCESS Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details).<br><i>package_name</i> must be JDBC for external stored procedures written in Java that make SQL calls.<br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Package Name Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           |        |                  |                                                                                                                                                                                        |         |                                                                                                                                                                                  |         |                                                                                                                                                                   |        |                                                                                                                                                                                     |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

| Syntax element ...                                    | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |           |        |        |                                                                                                                                                                                                                                            |            |                                                                 |                      |                                                                                                                   |                             |                                      |
|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------------------------------------------------------|----------------------|-------------------------------------------------------------------------------------------------------------------|-----------------------------|--------------------------------------|
| NAME<br><i>external_string_literal</i><br>(continued) | <table><tr><th>File Type</th><th>Syntax</th></tr><tr><td>Source</td><td><i>S</i><sub><i>i</i></sub><i>name_on_server</i><sub><i>i</i></sub><i>source_name</i><br/><br/>See the CREATE FUNCTION/REPLACE FUNCTION topic “Source File Name Clause” <i>SQL Data Definition Language Detailed Topics</i> for details.</td></tr></table> <p>To compile the C or C++ object code with debug symbols for core dump analysis, specify the delimited character D at any point in the external string literal. This feature does not produce a useful .so or .dll with debug symbols for Linux and Windows systems.</p> <table><tr><th>IF you ...</th><th>THEN the system compiles the external procedure source code ...</th></tr><tr><td>specify the D option</td><td>and produces debug symbols.<br/><br/>Generates a core file when a protected mode external stored procedure crashes.</td></tr><tr><td>do not specify the D option</td><td>but does not generate debug symbols.</td></tr></table> <p>The purpose of the D option is to provide debug symbol information for the external procedure when examining an external procedure core file with gdb (see <i>SQL External Routine Programming</i>).</p> <p>See the user documentation for your C or C++ compiler and debugger for debugging information.</p> <p>A side effect of specifying the D option is that linked libraries become larger because they must also contain all the symbol information.</p> | File Type | Syntax | Source | <i>S</i> <sub><i>i</i></sub> <i>name_on_server</i> <sub><i>i</i></sub> <i>source_name</i><br><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Source File Name Clause” <i>SQL Data Definition Language Detailed Topics</i> for details. | IF you ... | THEN the system compiles the external procedure source code ... | specify the D option | and produces debug symbols.<br><br>Generates a core file when a protected mode external stored procedure crashes. | do not specify the D option | but does not generate debug symbols. |
| File Type                                             | Syntax                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |        |        |                                                                                                                                                                                                                                            |            |                                                                 |                      |                                                                                                                   |                             |                                      |
| Source                                                | <i>S</i> <sub><i>i</i></sub> <i>name_on_server</i> <sub><i>i</i></sub> <i>source_name</i><br><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Source File Name Clause” <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           |        |        |                                                                                                                                                                                                                                            |            |                                                                 |                      |                                                                                                                   |                             |                                      |
| IF you ...                                            | THEN the system compiles the external procedure source code ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |        |        |                                                                                                                                                                                                                                            |            |                                                                 |                      |                                                                                                                   |                             |                                      |
| specify the D option                                  | and produces debug symbols.<br><br>Generates a core file when a protected mode external stored procedure crashes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |        |        |                                                                                                                                                                                                                                            |            |                                                                 |                      |                                                                                                                   |                             |                                      |
| do not specify the D option                           | but does not generate debug symbols.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |        |        |                                                                                                                                                                                                                                            |            |                                                                 |                      |                                                                                                                   |                             |                                      |
| NAME<br><i>external_Java_reference_string</i>         | <p>a string that specifies the JAR file, Java class within the JAR, and the Java method within the class to be invoked when the system executes the procedure in the following format:</p> <pre><code>`jar_name:[package_name.]java_class_name.<br/>java_method_name[java_data_type]`</code></pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |        |        |                                                                                                                                                                                                                                            |            |                                                                 |                      |                                                                                                                   |                             |                                      |

| Syntax element ...                                        | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |               |                 |                                                                                                                                                                   |                     |                                                                                                                                                                            |                        |                                                                                                                                                                                                                                                                                                                    |                         |                                                                             |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| NAME<br><i>external_Java_reference_string</i> (continued) | <p>where:</p> <table> <tr> <th>Syntax element ...</th><th>Specifies ...</th></tr> <tr> <td><i>jar_name</i></td><td>the registered name of the JAR file associated with the procedure that the system creates when you call the built-in external procedure <i>SQLJ.Install_Jar</i>.</td></tr> <tr> <td><i>package_name</i></td><td>the name and path of an external method package.<br/><br/>This specification is required only if the Java class and method you specify are contained in an external package.</td></tr> <tr> <td><i>java_class_name</i></td><td>the name of the Java class contained within the JAR identified by <i>jar_name</i> that contains the Java method to execute for this procedure.<br/><br/>If the Java class and method are contained in an external package, you must fully qualify <i>java_class_name</i> with the appropriate package name and path.</td></tr> <tr> <td><i>java_method_name</i></td><td>the name of the Java method that is performed when this procedure executes.</td></tr> <tr> <td><i>java_data_type</i></td><td> <p>a string of one or more Java data types separated by a COMMA character and enclosed by LEFT PARENTHESIS and RIGHT PARENTHESIS characters.</p> <p>The Java data type list provides a means of specifying the signature of a particular implementation of a Java method.</p> <p>You must specify a Java data type list whenever the system must choose a particular overloaded implementation of the Java method.</p> <p>A Java data type can be either simple or object-mapped according to the parameter mapping rules described in the CREATE FUNCTION/REPLACE FUNCTION topic “Data Type Mapping Between SQL and Java” in <i>SQL Data Definition Language Detailed Topics</i>.</p> <p>Note that <i>java_data_type</i> names are case sensitive.</p> </td></tr> </table> <p>This feature is supported for 64-bit Linux and Windows systems only. You cannot create Java external stored procedures for UNIX MP-RAS systems.</p> | Syntax element ... | Specifies ... | <i>jar_name</i> | the registered name of the JAR file associated with the procedure that the system creates when you call the built-in external procedure <i>SQLJ.Install_Jar</i> . | <i>package_name</i> | the name and path of an external method package.<br><br>This specification is required only if the Java class and method you specify are contained in an external package. | <i>java_class_name</i> | the name of the Java class contained within the JAR identified by <i>jar_name</i> that contains the Java method to execute for this procedure.<br><br>If the Java class and method are contained in an external package, you must fully qualify <i>java_class_name</i> with the appropriate package name and path. | <i>java_method_name</i> | the name of the Java method that is performed when this procedure executes. | <i>java_data_type</i> | <p>a string of one or more Java data types separated by a COMMA character and enclosed by LEFT PARENTHESIS and RIGHT PARENTHESIS characters.</p> <p>The Java data type list provides a means of specifying the signature of a particular implementation of a Java method.</p> <p>You must specify a Java data type list whenever the system must choose a particular overloaded implementation of the Java method.</p> <p>A Java data type can be either simple or object-mapped according to the parameter mapping rules described in the CREATE FUNCTION/REPLACE FUNCTION topic “Data Type Mapping Between SQL and Java” in <i>SQL Data Definition Language Detailed Topics</i>.</p> <p>Note that <i>java_data_type</i> names are case sensitive.</p> |
| Syntax element ...                                        | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |               |                 |                                                                                                                                                                   |                     |                                                                                                                                                                            |                        |                                                                                                                                                                                                                                                                                                                    |                         |                                                                             |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <i>jar_name</i>                                           | the registered name of the JAR file associated with the procedure that the system creates when you call the built-in external procedure <i>SQLJ.Install_Jar</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |               |                 |                                                                                                                                                                   |                     |                                                                                                                                                                            |                        |                                                                                                                                                                                                                                                                                                                    |                         |                                                                             |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <i>package_name</i>                                       | the name and path of an external method package.<br><br>This specification is required only if the Java class and method you specify are contained in an external package.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |               |                 |                                                                                                                                                                   |                     |                                                                                                                                                                            |                        |                                                                                                                                                                                                                                                                                                                    |                         |                                                                             |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <i>java_class_name</i>                                    | the name of the Java class contained within the JAR identified by <i>jar_name</i> that contains the Java method to execute for this procedure.<br><br>If the Java class and method are contained in an external package, you must fully qualify <i>java_class_name</i> with the appropriate package name and path.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |               |                 |                                                                                                                                                                   |                     |                                                                                                                                                                            |                        |                                                                                                                                                                                                                                                                                                                    |                         |                                                                             |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <i>java_method_name</i>                                   | the name of the Java method that is performed when this procedure executes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |               |                 |                                                                                                                                                                   |                     |                                                                                                                                                                            |                        |                                                                                                                                                                                                                                                                                                                    |                         |                                                                             |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <i>java_data_type</i>                                     | <p>a string of one or more Java data types separated by a COMMA character and enclosed by LEFT PARENTHESIS and RIGHT PARENTHESIS characters.</p> <p>The Java data type list provides a means of specifying the signature of a particular implementation of a Java method.</p> <p>You must specify a Java data type list whenever the system must choose a particular overloaded implementation of the Java method.</p> <p>A Java data type can be either simple or object-mapped according to the parameter mapping rules described in the CREATE FUNCTION/REPLACE FUNCTION topic “Data Type Mapping Between SQL and Java” in <i>SQL Data Definition Language Detailed Topics</i>.</p> <p>Note that <i>java_data_type</i> names are case sensitive.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |               |                 |                                                                                                                                                                   |                     |                                                                                                                                                                            |                        |                                                                                                                                                                                                                                                                                                                    |                         |                                                                             |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| Syntax element ...                                        | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NAME<br><i>external_Java_reference_string</i> (continued) | <p><i>jar_name</i> and <i>java_class_name</i> must be separated by a COLON character, while <i>java_class_name</i> and <i>java_method_name</i> are separated by a FULL STOP character.</p> <p>For example, if you have a JAR file that is registered in the database with the name <i>salesreports</i>, the class contained within the JAR is named <i>formal</i>, and the method to be called within the class is named <i>monthend</i>, the complete definition for the exact method the system is to invoke when this procedure is executed is the following external Java reference string:</p> <pre>salesreports:formal.monthend</pre> <p><i>jar_name</i> must follow the rules for naming Teradata Database objects with unquoted names:</p> <ul style="list-style-type: none"> <li>• They may only include the following characters: <ul style="list-style-type: none"> <li>• Uppercase or lowercase letters (A to Z and a to z)</li> <li>• Digits (0 through 9)</li> <li>• The special characters DOLLAR SIGN (\$), NUMBER SIGN (#), and LOW LINE (_)</li> </ul> </li> <li>• They must not begin with a digit.</li> <li>• They must not be a reserved word.</li> </ul> <p>Additionally, <i>jar_name</i> cannot be a name that is reserved for JAR files that are part of the Teradata installation, where the restriction applies to any combination of uppercase and lowercase letters:</p> <ul style="list-style-type: none"> <li>• javFnc</li> <li>• terajdbc4</li> <li>• tdgssjava</li> <li>• tdgssconfig</li> </ul> |
| EXTERNAL SECURITY                                         | <p>keywords introducing the external security clause.</p> <p>This clause is recommended for procedures that perform operating system I/O operations because it permits you to specify a particular OS user under whom the function runs. Otherwise, a protected mode procedure runs under the generic user <i>tdatuser</i>.</p> <p>See the ALTER PROCEDURE topic “When to Specify Unprotected Mode,” the CREATE AUTHORIZATION/REPLACE AUTHORIZATION topic “Authorization Rules,” and the CREATE PROCEDURE (External Form)/REPLACE PROCEDURE (External Form) topic “When To Run External Stored Procedures in Unprotected Mode” in <i>SQL Data Definition Language Detailed Topics</i>.</p> <p>Also see <a href="#">“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120</a>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

| Syntax element ...                   | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|-------------------------------|-----------------------------------------------------------------------------------------|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DEFINER                              | <p>that the procedure runs in the client user context of the associated security authorization object created for this purpose, which is contained within the same database as the function.</p> <table> <tr> <th>IF you ...</th><th>THEN ...</th></tr> <tr> <td>specify an authorization name</td><td>an authorization object with that name must be defined before you can run the function.</td></tr> <tr> <td>do not specify an authorization name</td><td> <p>you must define a default DEFINER authorization object.</p> <p>The default authorization object must be defined before a user can run the function.</p> </td></tr> </table> <p>The system reports a warning if the specified authorization name does not exist at the time the procedure is created, stating that no authorization name exists.</p> <p>If you then attempt to execute the procedure, the statement aborts and the system returns an error to the requestor.</p> | IF you ... | THEN ... | specify an authorization name | an authorization object with that name must be defined before you can run the function. | do not specify an authorization name | <p>you must define a default DEFINER authorization object.</p> <p>The default authorization object must be defined before a user can run the function.</p> |
| IF you ...                           | THEN ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |
| specify an authorization name        | an authorization object with that name must be defined before you can run the function.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |
| do not specify an authorization name | <p>you must define a default DEFINER authorization object.</p> <p>The default authorization object must be defined before a user can run the function.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |
| <i>authorization_name</i>            | <p>an optional authorization name for this DEFINER as defined by CREATE AUTHORIZATION.</p> <p>See <a href="#">“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120.</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |
| INVOKER                              | <p>that the procedure runs using the INVOKER authorization associated with the logged on user who is running the function.</p> <p>See <a href="#">“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120.</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |
| PARAMETER STYLE                      | <p>See “PARAMETER STYLE” in the syntax table for <a href="#">“CREATE FUNCTION/ REPLACE FUNCTION” on page 138.</a></p> <p>If you do not specify a parameter style at this point, you can specify one after you specify a language clause and an SQL data access clause.</p> <p>You cannot specify parameter styles more than once in the same CREATE/REPLACE PROCEDURE statement.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |

## ANSI Compliance

CREATE PROCEDURE (External Form) is ANSI SQL:2008-compliant with extensions.

## Required Privileges

The privileges required to perform CREATE PROCEDURE (External Form) and REPLACE PROCEDURE are different:

- You must have explicit CREATE EXTERNAL PROCEDURE privileges on the database in which the external procedure is to be contained to perform the CREATE PROCEDURE (External Form) statement.

The system does not grant the CREATE EXTERNAL PROCEDURE privilege automatically when you create a database or user: you must grant that privilege explicitly. CREATE EXTERNAL PROCEDURE is not granted implicitly on the databases and external procedures owned by a database or user unless the owner also has an explicit WITH GRANT OPTION privilege defined for itself.

See [“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120](#) for further information.

- You must have explicit DROP PROCEDURE privileges on the external procedure or on the database in which the external procedure is contained to perform the REPLACE PROCEDURE statement on an existing external procedure. You do not need the CREATE EXTERNAL PROCEDURE privilege to replace an external procedure.
- You must have explicit CREATE EXTERNAL PROCEDURE privileges on the database in which the external procedure is to be contained to perform the REPLACE PROCEDURE statement to create a new external procedure.

See [“Required Privileges: CREATE PROCEDURE” on page 326](#) for information about how to use the SQL SECURITY clause.

## Privileges Granted Automatically

When you create a new procedure, the system automatically grants the following privileges on it:

- DROP PROCEDURE
- EXECUTE PROCEDURE

## Example 1: Procedure Definition Using PARAMETER STYLE TD\_GENERAL

The following CREATE PROCEDURE request installs the external stored procedure named *GetRegionXSP* on the Teradata platform:

```
CREATE PROCEDURE GetRegionXSP
  (INOUT region VARCHAR(64))
LANGUAGE C
NO SQL
EXTERNAL NAME 'CS!getregion!xspsrc/getregion.c!F!xsp_getregion'
PARAMETER STYLE TD_GENERAL;
```

The only difference between this definition and the definition provided in [“Example 2: Procedure Definition Using PARAMETER STYLE SQL” on page 296](#) is the PARAMETER STYLE declaration: this procedure uses parameter style TD\_GENERAL.

The following excerpt shows the fragment of the C procedure code that declares a parameter style of TD\_GENERAL:

```
/****** C source file name: getregion.c *****/

#define SQL_TEXT Latin_Text
#include "sqltypes_td.h"
#include <string.h>

void xsp_getregion( VARCHAR_LATIN *region,
                   char          sqlstate[6])
{
    ...
}
```

See *SQL External Routine Programming* for details about coding external stored procedures.

## Example 2: Procedure Definition Using PARAMETER STYLE SQL

The following CREATE PROCEDURE statement installs the external stored procedure named *GetRegionXSP* on the Teradata platform:

```
CREATE PROCEDURE GetRegionXSP
    (INOUT region VARCHAR(64))
LANGUAGE C
NO SQL
EXTERNAL NAME 'CS!getregion!xspsrc/getregion.c!F!xsp_getregion'
PARAMETER STYLE SQL;
```

The only difference between this definition and the definition provided in [“Example 1: Procedure Definition Using PARAMETER STYLE TD\\_GENERAL”](#) on page 295 is the PARAMETER STYLE declaration: this procedure uses parameter style SQL.

The following excerpt shows the fragment of the C procedure code that declares a parameter style of SQL:

```
/****** C source file name: getregion.c *****/

#define SQL_TEXT Latin_Text
#include "sqltypes_td.h"
#include <string.h>

void xsp_getregion( VARCHAR_LATIN *region,
                   int            *region_isnull,
                   char           sqlstate[6],
                   SQL_TEXT       extname[129],
                   SQL_TEXT       specific_name[129],
                   SQL_TEXT       error_message[257] )
{
    ...
}
```

See *SQL External Routine Programming* for details about coding external stored procedures.



### Example 3: External Procedure With SQL CLIV2 Callability

The following C language external procedure definition creates a procedure named *xsp\_abc* that can modify SQL data using the CLIV2 API:

```
CREATE PROCEDURE xsp_abc(IN  param1  INTEGER,
                        OUT result1  INTEGER)

LANGUAGE C
MODIFIES SQL DATA
PARAMETER STYLE SQL
EXTERNAL NAME 'SP!CLI!CS!xsp_abc!xsp_abc.c';
```

### Example 4: Java External Stored Procedures

The following set of examples shows CREATE PROCEDURE statements and relevant Java external procedure code for a variety of different parameter data types.

#### Example 4a: BYTEINT Parameter Data Type

The following example is for a BYTEINT parameter data type:

```
CREATE PROCEDURE mybyteint
  (IN  b BYTEINT
   OUT c BYTEINT)
LANGUAGE JAVA
NO SQL
PARAMETER STYLE JAVA
EXTERNAL NAME 'User_jar:UnitTest.mybyteint';

public static void mybyteint(
  byte a,
  byte[] Result) throws SQLException
```

#### Example 4b: SMALLINT Parameter Data Type

The following example is for a SMALLINT parameter data type:

```
CREATE PROCEDURE mysmallint
  (IN    b smallint,
   INOUT c smallint )
LANGUAGE JAVA
NO SQL
PARAMETER STYLE JAVA
EXTERNAL NAME 'newint_jar:newint.mysmallint';

public static void mysmallint(
  short a,
  short[] Result ) throws SQLException
```

### Example 4c: INTEGER Parameter Data Type

The following example is for an INTEGER parameter data type:

```
CREATE PROCEDURE myint
  (IN  b INTEGER,
   OUT c INTEGER )
LANGUAGE JAVA
NO SQL
PARAMETER STYLE JAVA
EXTERNAL NAME 'user_jar:UnitTest.myint';

public static void myint(int i,
  int[] retval) throws SQLException
```

### Example 4d: DECIMAL/NUMERIC Parameter Data Type

The following example is for a DECIMAL or NUMERIC parameter data type:

```
CREATE PROCEDURE mydecs
  (IN  c DECIMAL(8,2),
   OUT d DECIMAL(8,2))
LANGUAGE JAVA
NO SQL
PARAMETER STYLE JAVA
EXTERNAL NAME 'user_jar:UnitTest.mydec';
public static void mydecs(BigDecimal c, BigDecimal[] d)
  throws SQLException
```

### Example 4e: FLOAT/REAL Parameter Data Type

The following example is for a FLOAT or REAL parameter data type:

```
CREATE PROCEDURE myfloat
  (IN  i FLOAT,
   OUT j FLOAT )
LANGUAGE JAVA
NO SQL
PARAMETER STYLE JAVA
EXTERNAL NAME 'user_jar:UnitTest.myfloat';

public static void myfloat(
  Double c,
  Double[] Result) throws SQLException
```

### Example 4f: DATA Parameter Data Type

The following example is for a DATE parameter data type:

```
CREATE PROCEDURE mydatediagret
  (IN  d DATE,
   OUT o DATE )
LANGUAGE JAVA
NO SQL
PARAMETER STYLE JAVA
EXTERNAL NAME 'user_jar:UnitTest.mydatediagret';

public static void mydatediagret(
  java.sql.Date date,
  java.sql.Date[] Result) throws SQLException
```

### Example 4g: TIME WITH TIME ZONE Parameter Data Type

The following example is for a TIME WITH TIME ZONE parameter data type:

```
CREATE PROCEDURE mytimezdiagret
  (IN  t TIME WITH TIME ZONE,
   OUT d TIME WITH TIME ZONE )
LANGUAGE JAVA
NO SQL
PARAMETER STYLE JAVA
EXTERNAL NAME 'user_jar:UnitTest.mytimezdiagret';
public static void mytimezdiagret(
  java.sql.Time time,
  java.sql.Time[] Result) throws SQLException
```

Because the Java Virtual Machine implementation does not support leap seconds, the maximum value of the SECOND field is 59.999999 rather than 61.999999.

### Example 4h: TIMESTAMP WITH TIME ZONE Parameter Data Type

The following example is for a TIMESTAMP WITH TIME ZONE parameter data type:

```
CREATE PROCEDURE mytszdiagret
  (IN  t TIMESTAMP WITH TIME ZONE,
   OUT d TIMESTAMP WITH TIME ZONE )
LANGUAGE JAVA
NO SQL
PARAMETER STYLE JAVA
EXTERNAL NAME 'user_jar:UnitTest.mytszdiagret';

public static void mytszdiagret (
  java.sql.Timestamp p1,
  java.sql.Timestamp[] result) throws SQLException
```

Because the Java Virtual Machine implementation does not support leap seconds, the maximum value of the SECOND field is 59.999999 rather than 61.999999.

### Example 4i: INTERVAL YEAR Parameter Data Type

The following example is for an INTERVAL YEAR parameter data type:

```
CREATE PROCEDURE intcpy
  (IN  parameter_1 INTERVAL YEAR,
   OUT t           INTERVAL YEAR )
LANGUAGE JAVA
NO SQL
PARAMETER STYLE JAVA
EXTERNAL NAME 'user_jar:UnitTest.intcpy';

public static void intcpy( String param_1,
                          String[] result ) throws SQLException
```

### Example 4j: CHARACTER/VARCHAR Parameter Data Type

The following example is for either a CHARACTER or a VARCHAR parameter data type:

```
CREATE PROCEDURE strcpy
  (IN  parameter_1 VARCHAR(15),
   OUT t           VARCHAR(15) )
LANGUAGE JAVA
NO SQL
PARAMETER STYLE JAVA
EXTERNAL NAME 'user_jar:UnitTest.strcpy';

public static void strcpy( String param_1,
                          String[] result ) throws SQLException
```

### Example 4k: CLOB Parameter Data Type

The following example is for a CLOB parameter data type:

```
CREATE PROCEDURE myclobdiagret2
  (IN  b CLOB)
LANGUAGE JAVA
MODIFIES SQL DATA
PARAMETER STYLE JAVA
EXTERNAL NAME 'user_jar:UnitTest.myclobdiagret2';

public static void myclobdiagret2(
    java.sql.Clob data) throws SQLException
{
    Connection conn =
    DriverManager.getConnection("jdbc:default:connection");
    PreparedStatement p = conn.prepareStatement("ins into tab2
  values(1,?)");

    p.setClob(1, data);
    p.executeUpdate();
}
```

## Example 4l: VARBYTE Parameter Data Type

The following example is for a VARBYTE parameter data type:

```
CREATE PROCEDURE mybvdiagret
  (IN c  varbyte(30),
   OUT d  varbyte(30))
LANGUAGE JAVA
NO SQL
PARAMETER STYLE JAVA
EXTERNAL NAME 'user_jar:UnitTest.mybvdiagret';
public static void mybvdiagret(
  byte[] data,
  byte[][] Result ) throws SQLException
```

## Example 4m: BLOB Parameter Data Type

The following example is for a BLOB parameter data type:

```
CREATE PROCEDURE myblobdiagret
  (IN b  blob,
   OUT c blob)
LANGUAGE JAVA
NO SQL
PARAMETER STYLE JAVA
EXTERNAL NAME 'user_jar:UnitTest.myblobdiagret';

public static void myblobdiagret(
  java.sql.Blob data,
  java.sql.Blob[] Result) throws SQLException
```

## Example 5: Result Set Positioning

This example set provides some examples from the perspective of the calling procedure or client application of the stored procedure.

See *SQL External Routine Programming* for details.

### Example 5a: Nonscrollable Created Result Sets

Suppose a NO SCROLL (Keep Response = Y for an SQL external procedure) SELECT request returns the following 10 rows to the procedure:

| c1 | c2 |
|----|----|
| 1  | 1  |
| 2  | 2  |
| 3  | 3  |
| 4  | 4  |
| 5  | 5  |
| 6  | 6  |
| 7  | 7  |
| 8  | 8  |
| 9  | 9  |
| 10 | 10 |

If the procedure reads 3 of the rows, then the following parcels are returned to the calling procedure or client application if the CALL was submitted in Indicator mode:

```
Success - Statement = 1, Activity count = 1
DataInfo
Record containing OUT and INOUT parameters
EndStatement
Success - Statement = 2, Activity count = 7
ResultSet - Starting row = 1
DataInfo
Record containing 4,4
Record containing 5,5
Record containing 6,6
Record containing 7,7
Record containing 8,8
Record containing 9,9
Record containing 10,10
EndStatement
EndRequest
```

| IF the calling procedure or client application submitted the CALL request with keep_response = ... | THEN it can ...                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Y                                                                                                  | issue a rewind and the same set of parcels, including the header parcels (Success, DataInfo, ResultSet) and result row parcels are returned in the original order. |
| P                                                                                                  | position to rows 0 through 7.<br>Positioning to row 0 is functionally equivalent to a rewind.                                                                      |

Positioning to statement 2, row 1 returns the following parcels:

```
Record containing 4,4
Record containing 5,5
Record containing 6,6
Record containing 7,7
Record containing 8,8
Record containing 9,9
Record containing 10,10
EndStatement
EndRequest
```

Example 5b: Scrollable Created Result Sets

Suppose a SCROLL (Keep Response = P for an SQL external procedure) SELECT request returns the following 10 rows to the procedure:

| c1 | c2 |
|----|----|
| 1  | 1  |
| 2  | 2  |
| 3  | 3  |
| 4  | 4  |
| 5  | 5  |
| 6  | 6  |
| 7  | 7  |
| 8  | 8  |
| 9  | 9  |
| 10 | 10 |

If the procedure reads 3 of the rows, then the following parcels are returned to the calling procedure of client application if the CALL was submitted in Indicator mode:

```
Success - Statement = 1, Activity count = 1
DataInfo
Record containing OUT and INOUT parameters
EndStatement
Success - Statement = 2, Activity count = 10
ResultSet - Starting row = 4
DataInfo
Record containing 4,4
Record containing 5,5
Record containing 6,6
Record containing 7,7
Record containing 8,8
Record containing 9,9
Record containing 10,10
EndStatement
EndRequest
```

| IF the calling procedure or client application submitted the CALL request with keep_response = ... | THEN it can ...                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Y                                                                                                  | issue a rewind and the same set of parcels, including the header parcels (Success, DataInfo, ResultSet) and result row parcels are returned in the original order. |
| P                                                                                                  | position to rows 0 through 10.<br>Positioning to row 0 is functionally equivalent to a rewind.                                                                     |

Positioning to statement 2, row 0 returns the following parcels:

```
Success - Statement = 2, Activity count = 10
ResultSet - Starting row = 4
DataInfo
Record containing 4,4
Record containing 5,5
Record containing 6,6
Record containing 7,7
Record containing 8,8
Record containing 9,9
Record containing 10,10
EndStatement
EndRequest
```

Positioning to statement 2, row 1 returns the following parcels:

```
Record containing 1,1
Record containing 2,2
Record containing 3,3
Record containing 4,4
Record containing 5,5
Record containing 6,6
Record containing 7,7
Record containing 8,8
Record containing 9,9
Record containing 10,10
EndStatement
EndRequest
```



### Example 5c: Nonscrollable Created Multistatement Result Sets

Suppose a NO SCROLL (Keep Response = Y for an SQL external procedure) two-statement select returns the following 20 rows to the procedure:

| c1  | c2  |
|-----|-----|
| 1   | 1   |
| 2   | 2   |
| 3   | 3   |
| 4   | 4   |
| 5   | 5   |
| 6   | 6   |
| 7   | 7   |
| 8   | 8   |
| 9   | 9   |
| 10  | 10  |
|     |     |
| c3  | c4  |
| 10  | 10  |
| 20  | 20  |
| 30  | 30  |
| 40  | 40  |
| 50  | 50  |
| 60  | 60  |
| 70  | 70  |
| 80  | 80  |
| 90  | 90  |
| 100 | 100 |

If the procedure reads 13 of the rows, then the following parcels are returned to the calling procedure or client application if the CALL was submitted in Indicator mode:

```

Success - Statement = 1, Activity count = 1
DataInfo
Record containing OUT and INOUT parameters
EndStatement
Success - Statement = 2, Activity count = 0
ResultSet - Starting row = 0
DataInfo
EndStatement
Success - Statement = 3, Activity count = 7
ResultSet - Starting row = 1
DataInfo
Record containing 40,40
Record containing 50,50
Record containing 60,60
Record containing 70,70
Record containing 80,80
Record containing 90,90
Record containing 100,100
EndStatement
EndRequest
  
```

| IF the calling procedure or client application submitted the CALL request with keep_response = ... | THEN it can ...                                                                                                                                                                                         |
|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Y                                                                                                  | issue a rewind and the same set of parcels, including the header parcels (Success, DataInfo, ResultSet) and result row parcels are returned in the original order.                                      |
| P                                                                                                  | position to rows 0 through 7 for statement 3.<br>The calling procedure or client application can only position to row 0 in statement 2.<br>Positioning to row 0 is functionally equivalent to a rewind. |

Positioning to statement 2 row 0 returns the following parcels:

```
Success - Statement = 2, Activity count = 0
ResultSet - Starting row = 0
DataInfo
EndStatement
Success - Statement = 3, Activity count = 7
ResultSet - Starting row = 1
DataInfo
Record containing 40,40
Record containing 50,50
Record containing 60,60
Record containing 70,70
Record containing 80,80
Record containing 90,90
Record containing 100,100
EndStatement
EndRequest
```

Positioning to statement 3, row 1 returns the following parcels:

```
Record containing 40,40
Record containing 50,50
Record containing 60,60
Record containing 70,70
Record containing 80,80
Record containing 90,90
Record containing 100,100
EndStatement
EndRequest
```

### Example 5d: Scrollable Created Multistatement Result Sets

Suppose a SCROLL (Keep Response = P for an SQL external procedure) two-statement SELECT request returns the following 20 rows to the procedure:

| c1  | c2  |
|-----|-----|
| 1   | 1   |
| 2   | 2   |
| 3   | 3   |
| 4   | 4   |
| 5   | 5   |
| 6   | 6   |
| 7   | 7   |
| 8   | 8   |
| 9   | 9   |
| 10  | 10  |
|     |     |
| c3  | c4  |
| 10  | 10  |
| 20  | 20  |
| 30  | 30  |
| 40  | 40  |
| 50  | 50  |
| 60  | 60  |
| 70  | 70  |
| 80  | 80  |
| 90  | 90  |
| 100 | 100 |

If the procedure reads 13 of the rows, then the following parcels are returned to the calling procedure or client application if the CALL was submitted in Indicator mode:

```

Success - Statement = 1, Activity count = 1
DataInfo
Record containing OUT and INOUT parameters
EndStatement
Success - Statement = 2, Activity count = 10
ResultSet - Starting row = 11
DataInfo
EndStatement
Success - Statement = 3, Activity count = 10
ResultSet - Starting row = 4
DataInfo
Record containing 40,40
Record containing 50,50
Record containing 60,60
Record containing 70,70
Record containing 80,80
Record containing 90,90
Record containing 100,100
EndStatement
EndRequest

```

| IF the calling procedure or client application submitted the CALL request with keep_response = ... | THEN it can ...                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Y                                                                                                  | issue a rewind and the same set of parcels, including the header parcels (Success, DataInfo, ResultSet) and result row parcels are returned in the original order. |
| P                                                                                                  | position to rows 0 through 10 for statements 2 and 3.<br>Positioning to row 0 is functionally equivalent to a rewind.                                              |

Positioning to statement 2 row 0 returns the following parcels:

```
Success - Statement = 2, Activity count = 10
ResultSet - Starting row = 11
DataInfo
EndStatement
Success - Statement = 3, Activity count = 10
ResultSet - Starting row = 4
DataInfo
Record containing 40,40
Record containing 50,50
Record containing 60,60
Record containing 70,70
Record containing 80,80
Record containing 90,90
Record containing 100,100
EndStatement
EndRequest
```

Positioning to statement 2, row 1 returns the following parcels:

```
Record containing 1,1
Record containing 2,2
Record containing 3,3
Record containing 4,4
Record containing 5,5
Record containing 6,6
Record containing 7,7
Record containing 8,8
Record containing 9,9
Record containing 10,10
EndStatement
Success - Statement = 3, Activity count = 10
ResultSet - Starting row = 3
DataInfo
Record containing 40,40
Record containing 50,50
Record containing 60,60
Record containing 70,70
Record containing 80,80
Record containing 90,90
Record containing 100,100
EndStatement
EndRequest
```

Positioning to statement 3, row 1 returns the following parcels:

```
Record containing 10,10
Record containing 20,20
Record containing 30,30
Record containing 40,40
Record containing 50,50
Record containing 60,60
Record containing 70,70
Record containing 80,80
Record containing 90,90
Record containing 100,100
EndStatement
EndRequest
```

## Related Topics

See the following statements for more information about external stored procedures, external authorization objects, and related subjects:

- [“ALTER PROCEDURE \(SQL Form\)” on page 25](#)
- [“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120](#)
- [“CREATE PROCEDURE \(SQL Form\)/ REPLACE PROCEDURE” on page 310](#)
- [“DROP AUTHORIZATION” on page 553](#)
- [“DROP MACRO/ DROP PROCEDURE/ DROP TABLE/ DROP TRIGGER/ DROP VIEW” on page 574](#)
- [“RENAME MACRO/ RENAME PROCEDURE/ RENAME TABLE/ RENAME TRIGGER/ RENAME VIEW” on page 638](#)
- [“HELP PROCEDURE” on page 738](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)

See *SQL External Routine Programming* for guidelines about coding external stored procedures.

See *Teradata JDBC Driver User Guide* for information about how to use the Teradata implementation of the JDBC API.

See either of the following manuals, as appropriate, for information about how to use CLIV2 to issue SQL function calls:

- *Teradata Call-Level Interface Version 2 Reference for Channel-Attached Systems*
- *Teradata Call-Level Interface Version 2 Reference for Network-Attached Systems*

# CREATE PROCEDURE (SQL Form)/ REPLACE PROCEDURE

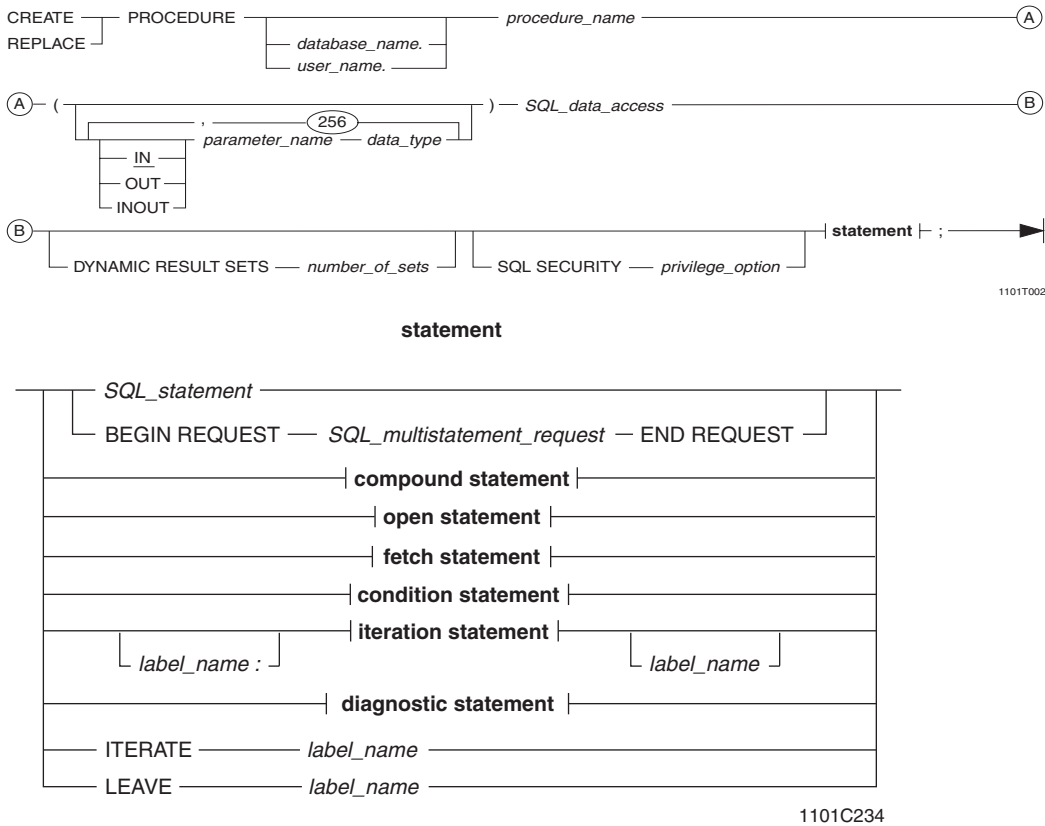
## Purpose

CREATE PROCEDURE directs the stored procedure compiler to create a procedure from the SQL statements in the remainder of the source text.

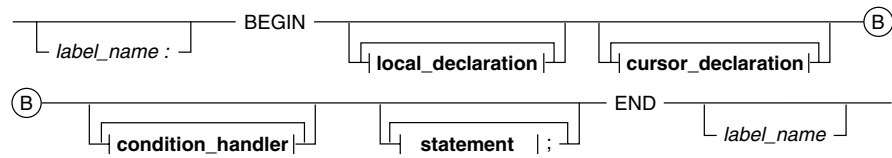
REPLACE PROCEDURE directs the stored procedure compiler to replace the definition of an existing stored procedure.

If the specified stored procedure does not exist, REPLACE PROCEDURE creates a new procedure by that name from the SQL statements in the remainder of the source text.

## Syntax

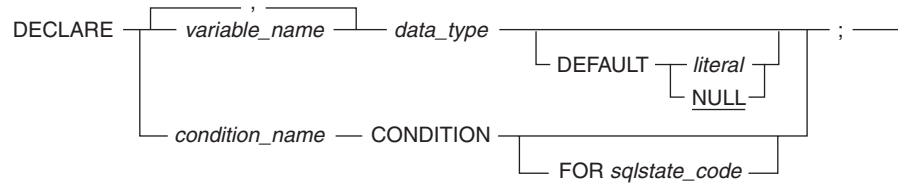


**compound statement**

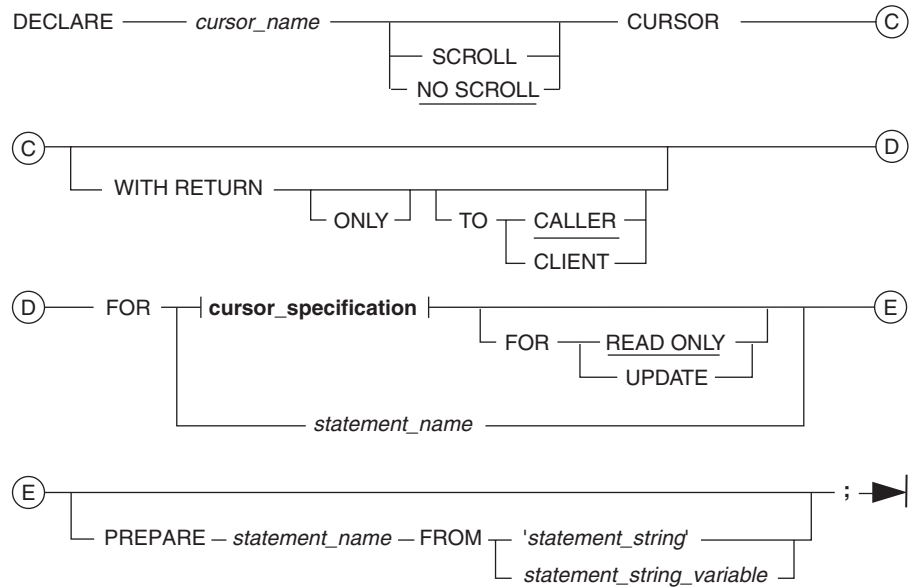


1101A383

**local\_declaration**

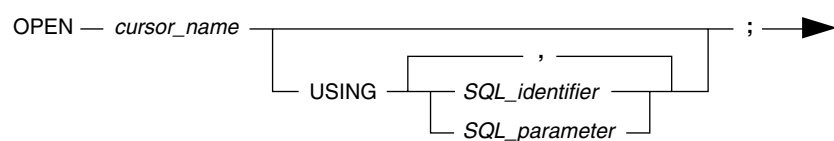


**cursor\_declaration**

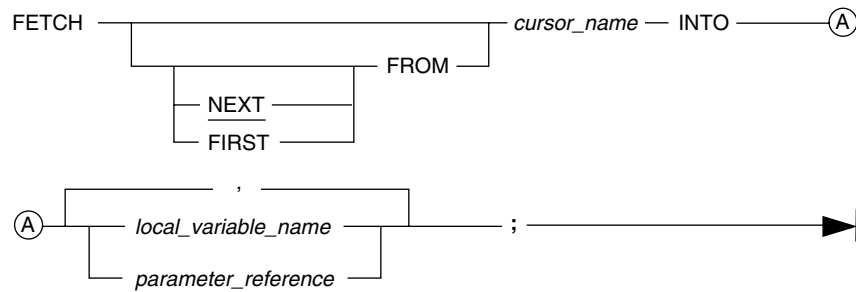


1101C448

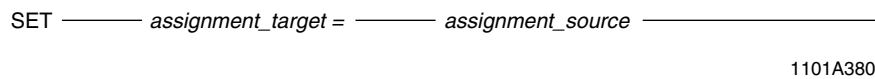
**open statement**



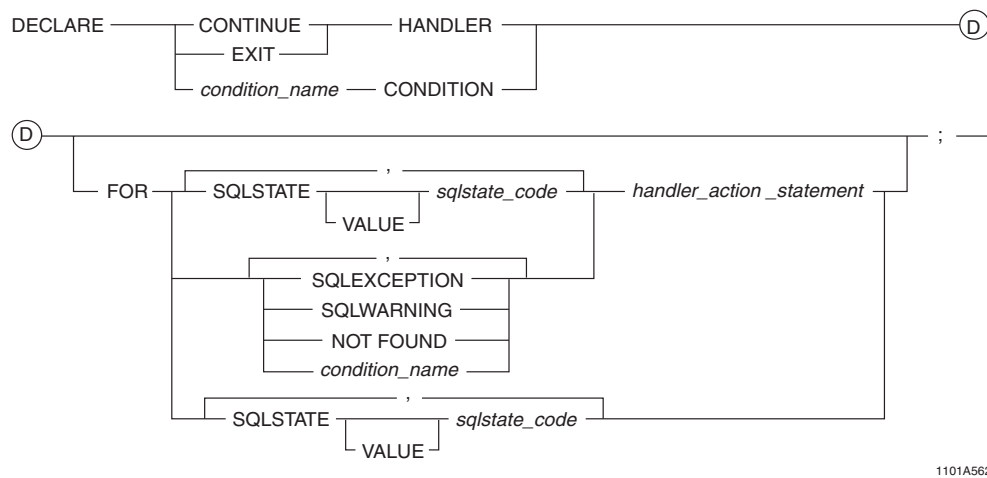
1101A652



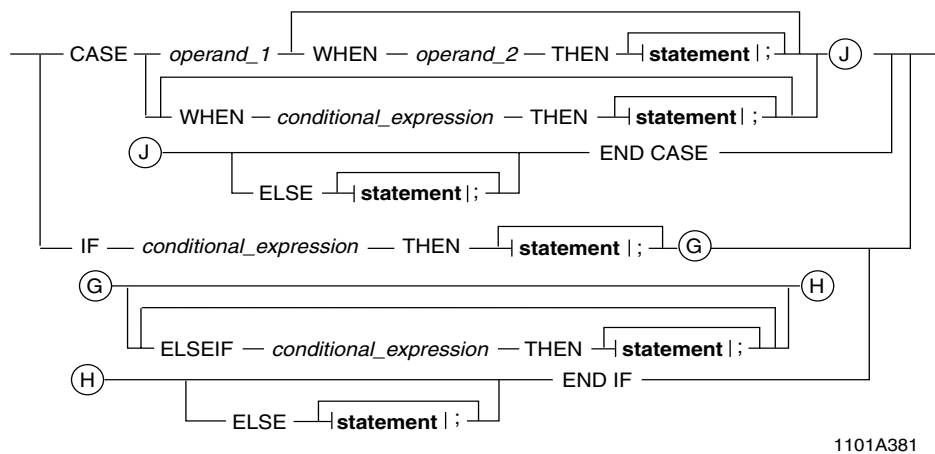
**assignment statement**



**condition\_handler**

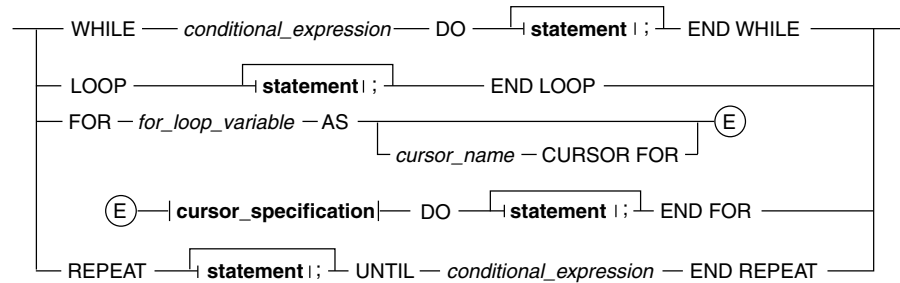


**condition statement**



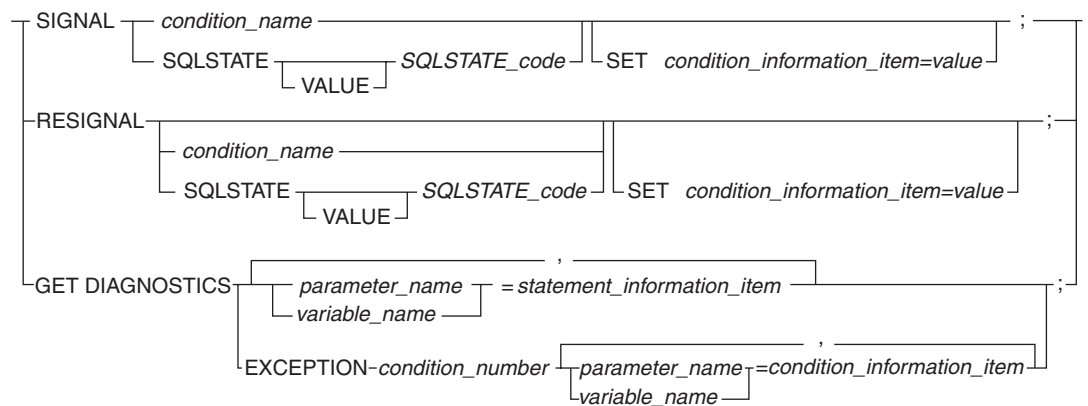


#### iteration statement



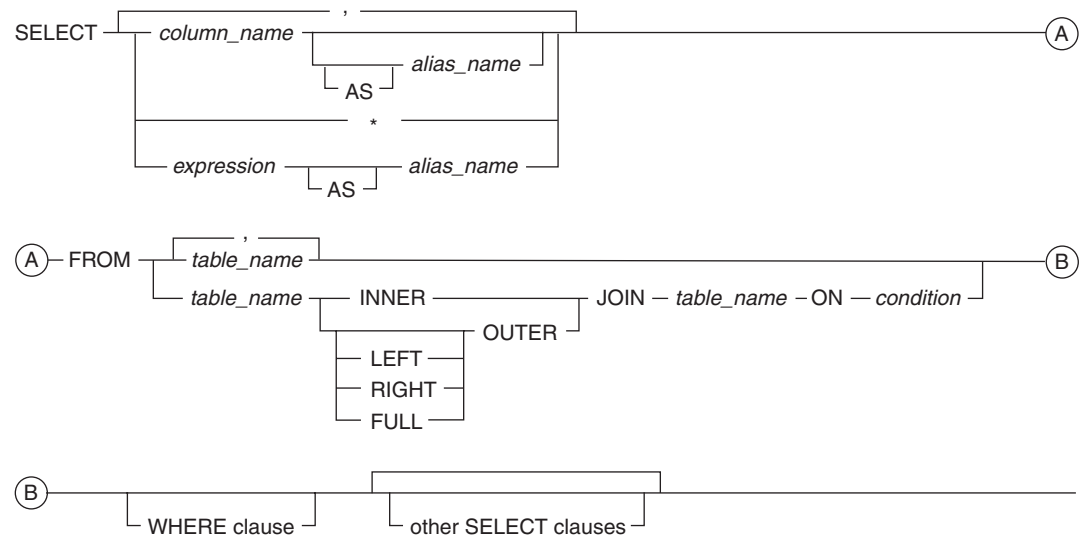
1101A382

#### diagnostic statement

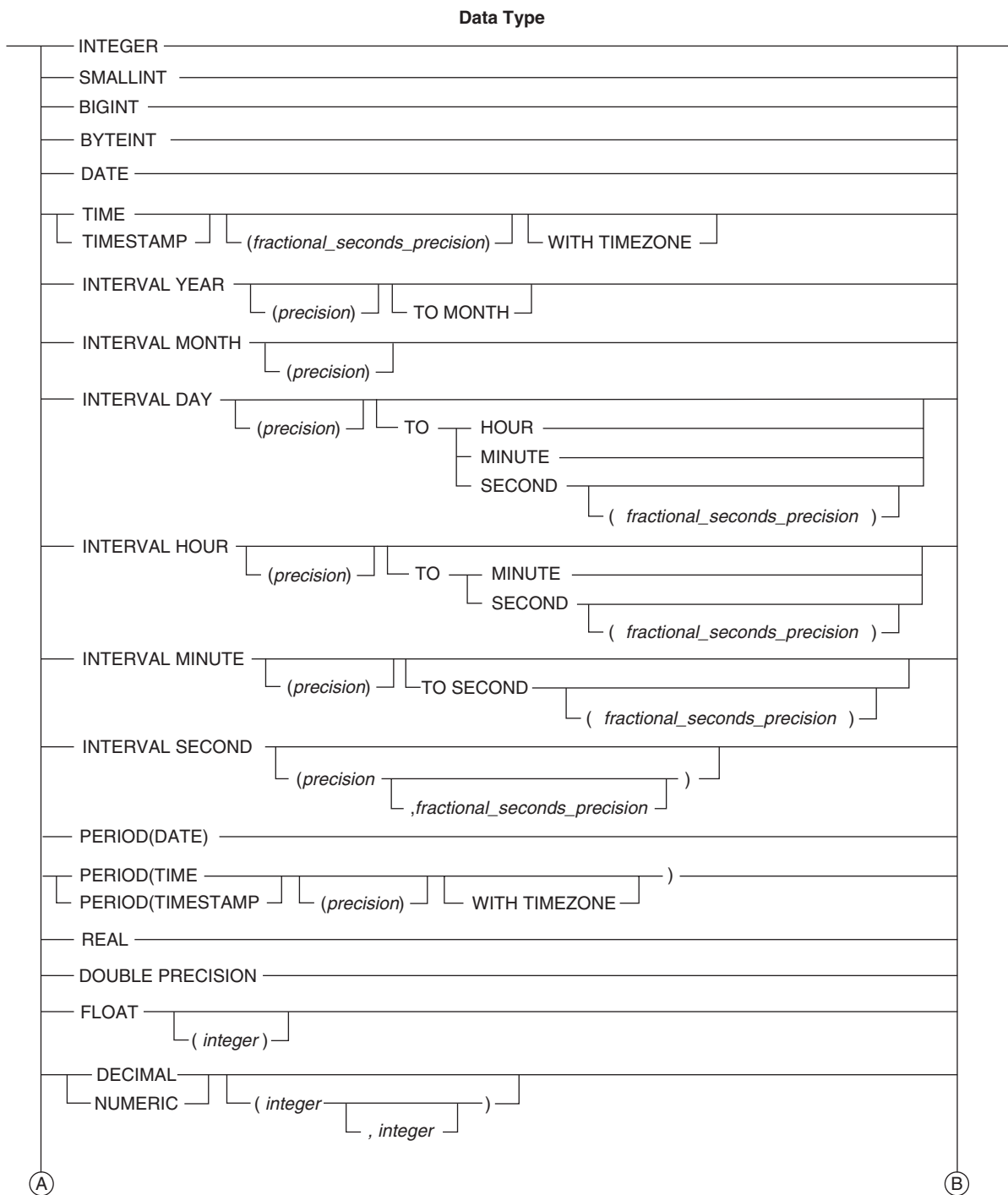


1101A616

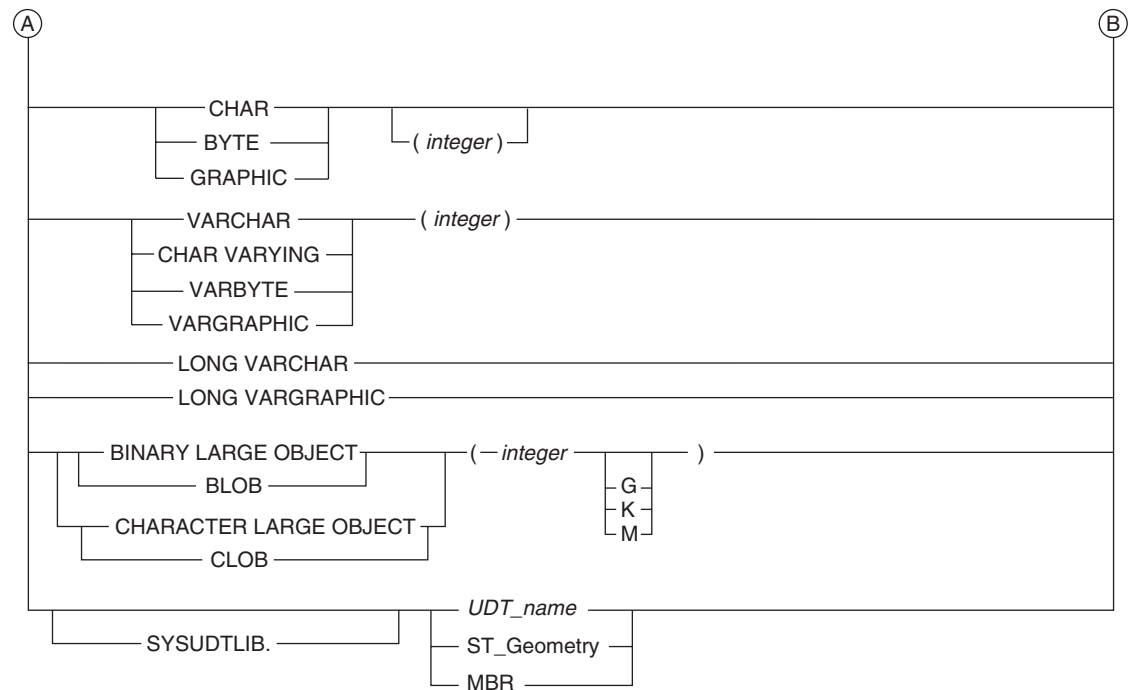
#### cursor\_specification



1101B384



1101A535



1101A536

where:

| Syntax Element ...                        | Specifies ...                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>                      | an optional qualifier for <i>procedure_name</i> .<br>If the <i>database_name</i> is not specified, the current default database is used.                                                                                                                                                                                                     |
| <i>procedure_name</i>                     | the name of the stored procedure to be created.<br><i>procedure_name</i> must be unique within the database.                                                                                                                                                                                                                                 |
| DYNAMIC RESULT SETS <i>number_of_sets</i> | that <i>number_of_sets</i> of dynamic result sets can be returned.<br>The range of valid values for <i>number_of_sets</i> is 0 through 15, inclusive.<br>The default value for <i>number_of_sets</i> is 0.                                                                                                                                   |
| <u>IN</u><br>OUT<br>INOUT                 | type of the parameter being specified.<br><ul style="list-style-type: none"> <li>IN parameter is for input only.</li> <li>OUT parameter is for output only.</li> <li>INOUT can be both input and output.</li> </ul> IN is the default parameter type. If the parameter type is not specified, the parameter is assumed to be of the IN type. |
| <i>parameter_name</i>                     | the name of a parameter that is replaced with an argument during stored procedure execution.<br>A maximum of 256 parameters can be specified with each stored procedure in a comma-separated list.<br>The data type of the parameter must be specified with each <i>parameter_name</i> .                                                     |

| Syntax Element ...     | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>data_type</i>       | <p>the data type definition for local variables or parameters.</p> <p>All supported data types are valid, including UDTs.</p> <p>You <i>cannot</i> specify a VARIANT_TYPE UDT as an IN parameter data type for a stored procedure.</p> <p>You can only specify the VARIANT_TYPE UDT type for callable input parameters within the body of the procedure using a NEW VARIANT_TYPE expression to pass dynamic UDTs into UDFs.</p> <p>Note that the system does not default to the data type you assign to an INOUT parameter at the time the procedure is created when the procedure is called. Instead, it defaults to the smallest data type that can contain the specified input parameter. As a result, memory overflow errors can occur if the output parameter returned to an INOUT parameter cannot be contained by the default data type set for that parameter by the system. See CREATE PROCEDURE (External Form)/REPLACE PROCEDURE (External Form) topic “Memory Considerations for INOUT Parameters” in <i>SQL Data Definition Language Detailed Topics</i> and “CALL” in <i>SQL Data Manipulation Language</i> for details.</p> <p>For parameters, you can specify CHARACTER SET and either CASESPECIFIC or NOT CASESPECIFIC as an attribute of the character data type.</p> <p>If you specify both, you must specify them in the following order:</p> <ul style="list-style-type: none"> <li>CHARACTER SET</li> <li>CASESPECIFIC or NOT CASESPECIFIC</li> </ul> <p>No other data type attribute, such as NOT NULL, UPPERCASE, or FORMAT, is legal for stored procedures.</p> <p>The keyword DEFAULT is not legal before the character set.</p> <p>For local variables, you can specify CHARACTER SET and NOT CASESPECIFIC in any order after <i>data_type</i>.</p> <p>If you do not specify CHARACTER SET, the character set defaults to the character set of the user creating or compiling the stored procedure.</p> <p>See Appendix B in <i>SQL Stored Procedures and Embedded SQL</i> for a list of the data type encodings that stored procedure IN, INOUT, and OUT parameters can return to a client application.</p> |
| <i>SQL_data_access</i> | <p>whether the procedure body accesses the database or contains SQL statements.</p> <p>For more information on valid specification options, see the “CREATE PROCEDURE (SQL Form)/ REPLACE PROCEDURE” topic in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>statement</i>       | <p>the stored procedure body.</p> <p>You must specify either a single statement or a BEGIN-END compound statement.</p> <p>You cannot specify any of the following as a single statement in a stored procedure body:</p> <ul style="list-style-type: none"> <li>Local variable, cursor, or handler declarations</li> <li>Cursor statements</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

| Syntax Element ...                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |             |         |                                                                                                      |                |                                                                                                 |         |                                                                              |       |                                                                                                                             |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------|---------|------------------------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------|---------|------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------------------------------------------------|
| SQL SECURITY<br><i>privilege_option</i> | <p>the optional SQL security privilege set you assign to <i>procedure_name</i>.</p> <p>The keyword you specify for <i>privilege_option</i> determines the privileges that Teradata Database checks for the underlying objects specified in the statement.</p> <p>You cannot specify the OWNER option for this clause unless you have the explicitly granted CREATE OWNER PROCEDURE privilege to permit you to create an SQL stored procedure in a database or user other than your default database or user.</p> <p>Specify the options using the following keywords:</p> <table border="1"> <thead> <tr> <th>Privilege</th><th>Description</th></tr> </thead> <tbody> <tr> <td>CREATOR</td><td>Assign the privileges of the creator of the procedure regardless of its containing database or user.</td></tr> <tr> <td><u>DEFINER</u></td><td>Assign the privileges of the definer of the procedure.<br/>This is the default privilege option.</td></tr> <tr> <td>INVOKER</td><td>Assign the privileges of the user at the top of the current execution stack.</td></tr> <tr> <td>OWNER</td><td>Assign the privileges of the owner of the procedure, which are the privileges possessed by its containing database or user.</td></tr> </tbody> </table> <p>Teradata Database treats procedures as follows when the procedure is defined as a DEFINER whether explicitly or by default. This is for the case when the CREATOR of the procedure is <i>not</i> its OWNER.</p> <ul style="list-style-type: none"> <li>• Teradata Database checks the privileges of the CREATOR during compilation of the procedure. If the CREATOR is missing a privilege for any object that a statement in the procedure references, Teradata Database aborts the request and returns an error.</li> <li>• Teradata Database checks the privileges of the OWNER (the containing database or user for the procedure) during compilation, and if the OWNER is missing any privileges for any object that is referenced by a statement in the procedure, Teradata Database returns a warning message.</li> <li>• During execution, Teradata Database checks the OWNER privileges for any object referenced by any statement in the procedure. Any access failures caused by not having the appropriate privileges return an error to the procedure, which it can handle if it is written to do so.</li> <li>• Teradata Database grants the DROP and EXECUTE privileges to a UDF created in a database or user different from the CREATOR. An OWNER <i>always</i> has the implicit privilege to drop any object it owns. If the OWNER wants to execute the UDF, then it must grant the EXECUTE FUNCTION privilege to that function.</li> </ul> <p>The following rules apply to all procedures:</p> <ul style="list-style-type: none"> <li>• Objects referenced by any statement in the procedure need not have the WITH GRANT OPTION privilege. They require only the GRANT privilege on the referenced object.</li> <li>• Teradata Database check CREATOR and OWNER access rights on DDL statements during execution.</li> </ul> | Privilege | Description | CREATOR | Assign the privileges of the creator of the procedure regardless of its containing database or user. | <u>DEFINER</u> | Assign the privileges of the definer of the procedure.<br>This is the default privilege option. | INVOKER | Assign the privileges of the user at the top of the current execution stack. | OWNER | Assign the privileges of the owner of the procedure, which are the privileges possessed by its containing database or user. |
| Privilege                               | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           |             |         |                                                                                                      |                |                                                                                                 |         |                                                                              |       |                                                                                                                             |
| CREATOR                                 | Assign the privileges of the creator of the procedure regardless of its containing database or user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |             |         |                                                                                                      |                |                                                                                                 |         |                                                                              |       |                                                                                                                             |
| <u>DEFINER</u>                          | Assign the privileges of the definer of the procedure.<br>This is the default privilege option.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |             |         |                                                                                                      |                |                                                                                                 |         |                                                                              |       |                                                                                                                             |
| INVOKER                                 | Assign the privileges of the user at the top of the current execution stack.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |             |         |                                                                                                      |                |                                                                                                 |         |                                                                              |       |                                                                                                                             |
| OWNER                                   | Assign the privileges of the owner of the procedure, which are the privileges possessed by its containing database or user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           |             |         |                                                                                                      |                |                                                                                                 |         |                                                                              |       |                                                                                                                             |

| Syntax Element ...                                                                                                                                                                                                                                                                                                                                                              | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                  |                                                                         |                                                                 |                                                                                                                         |     |                                                                                                                                                                                                                                                                                                                |         |       |                                  |                                                                       |                                                                 |                                                                                                                       |     |                                                                                                           |         |                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------|----------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-----|-----------------------------------------------------------------------------------------------------------|---------|--------------------|
| SQL SECURITY<br><i>privilege_option</i><br>(continued)                                                                                                                                                                                                                                                                                                                          | <p>The following table summarizes how Teradata Database treats privilege violations for procedures during compilation.</p> <table><tr><th>For this type of SQL request ...</th><th>Teradata Database checks the following privileges during compilation...</th></tr><tr><td><ul style="list-style-type: none"><li>DCL</li><li>DDL</li></ul></td><td>CREATOR and OWNER.<br/><br/>The system returns warning messages to the procedure for any privilege violations that occur.</td></tr><tr><td>DML</td><td><ul style="list-style-type: none"><li>CREATOR</li></ul>The system returns error messages to the procedure for any privilege violations that occur.<br/><br/><ul style="list-style-type: none"><li>OWNER</li></ul>The system returns warning messages to the procedure for any privilege violations that occur.</td></tr><tr><td>Dynamic</td><td>None.</td></tr></table> <p>The following table summarizes how Teradata Database treats privilege violations for procedures during execution.</p> <table><tr><th>For this type of SQL request ...</th><th>Teradata Database checks the following privileges during execution...</th></tr><tr><td><ul style="list-style-type: none"><li>DCL</li><li>DDL</li></ul></td><td>CREATOR and OWNER.<br/><br/>The system returns error messages to the procedure for any privilege violations that occur.</td></tr><tr><td>DML</td><td>OWNER.<br/><br/>The system returns error messages to the procedure for any privilege violations that occur.</td></tr><tr><td>Dynamic</td><td>CREATOR and OWNER.</td></tr></table> | For this type of SQL request ... | Teradata Database checks the following privileges during compilation... | <ul style="list-style-type: none"><li>DCL</li><li>DDL</li></ul> | CREATOR and OWNER.<br><br>The system returns warning messages to the procedure for any privilege violations that occur. | DML | <ul style="list-style-type: none"><li>CREATOR</li></ul> The system returns error messages to the procedure for any privilege violations that occur.<br><br><ul style="list-style-type: none"><li>OWNER</li></ul> The system returns warning messages to the procedure for any privilege violations that occur. | Dynamic | None. | For this type of SQL request ... | Teradata Database checks the following privileges during execution... | <ul style="list-style-type: none"><li>DCL</li><li>DDL</li></ul> | CREATOR and OWNER.<br><br>The system returns error messages to the procedure for any privilege violations that occur. | DML | OWNER.<br><br>The system returns error messages to the procedure for any privilege violations that occur. | Dynamic | CREATOR and OWNER. |
| For this type of SQL request ...                                                                                                                                                                                                                                                                                                                                                | Teradata Database checks the following privileges during compilation...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                  |                                                                         |                                                                 |                                                                                                                         |     |                                                                                                                                                                                                                                                                                                                |         |       |                                  |                                                                       |                                                                 |                                                                                                                       |     |                                                                                                           |         |                    |
| <ul style="list-style-type: none"><li>DCL</li><li>DDL</li></ul>                                                                                                                                                                                                                                                                                                                 | CREATOR and OWNER.<br><br>The system returns warning messages to the procedure for any privilege violations that occur.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                  |                                                                         |                                                                 |                                                                                                                         |     |                                                                                                                                                                                                                                                                                                                |         |       |                                  |                                                                       |                                                                 |                                                                                                                       |     |                                                                                                           |         |                    |
| DML                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>CREATOR</li></ul> The system returns error messages to the procedure for any privilege violations that occur.<br><br><ul style="list-style-type: none"><li>OWNER</li></ul> The system returns warning messages to the procedure for any privilege violations that occur.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                  |                                                                         |                                                                 |                                                                                                                         |     |                                                                                                                                                                                                                                                                                                                |         |       |                                  |                                                                       |                                                                 |                                                                                                                       |     |                                                                                                           |         |                    |
| Dynamic                                                                                                                                                                                                                                                                                                                                                                         | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                  |                                                                         |                                                                 |                                                                                                                         |     |                                                                                                                                                                                                                                                                                                                |         |       |                                  |                                                                       |                                                                 |                                                                                                                       |     |                                                                                                           |         |                    |
| For this type of SQL request ...                                                                                                                                                                                                                                                                                                                                                | Teradata Database checks the following privileges during execution...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                  |                                                                         |                                                                 |                                                                                                                         |     |                                                                                                                                                                                                                                                                                                                |         |       |                                  |                                                                       |                                                                 |                                                                                                                       |     |                                                                                                           |         |                    |
| <ul style="list-style-type: none"><li>DCL</li><li>DDL</li></ul>                                                                                                                                                                                                                                                                                                                 | CREATOR and OWNER.<br><br>The system returns error messages to the procedure for any privilege violations that occur.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                  |                                                                         |                                                                 |                                                                                                                         |     |                                                                                                                                                                                                                                                                                                                |         |       |                                  |                                                                       |                                                                 |                                                                                                                       |     |                                                                                                           |         |                    |
| DML                                                                                                                                                                                                                                                                                                                                                                             | OWNER.<br><br>The system returns error messages to the procedure for any privilege violations that occur.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                  |                                                                         |                                                                 |                                                                                                                         |     |                                                                                                                                                                                                                                                                                                                |         |       |                                  |                                                                       |                                                                 |                                                                                                                       |     |                                                                                                           |         |                    |
| Dynamic                                                                                                                                                                                                                                                                                                                                                                         | CREATOR and OWNER.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                  |                                                                         |                                                                 |                                                                                                                         |     |                                                                                                                                                                                                                                                                                                                |         |       |                                  |                                                                       |                                                                 |                                                                                                                       |     |                                                                                                           |         |                    |
| <p><b>Statement</b></p> <p>The following SQL statement sets can be specified <i>as</i> the stored procedure body.</p> <p>You can also specify any of the statements in these categories in a <i>statement_list</i> within compound statements, condition statements (CASE and IF), iteration statements, and in the handler action part of a condition handler declaration.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                  |                                                                         |                                                                 |                                                                                                                         |     |                                                                                                                                                                                                                                                                                                                |         |       |                                  |                                                                       |                                                                 |                                                                                                                       |     |                                                                                                           |         |                    |
| SQL_statement                                                                                                                                                                                                                                                                                                                                                                   | <p>one of the following:</p> <ul style="list-style-type: none"><li>SQL DML, DDL, or DCL statement supported by stored procedures. This includes dynamic SQL statements.</li><li>Control statements.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                  |                                                                         |                                                                 |                                                                                                                         |     |                                                                                                                                                                                                                                                                                                                |         |       |                                  |                                                                       |                                                                 |                                                                                                                       |     |                                                                                                           |         |                    |
| BEGIN REQUEST                                                                                                                                                                                                                                                                                                                                                                   | keywords that stipulate the beginning of the specification of an SQL multistatement request.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                  |                                                                         |                                                                 |                                                                                                                         |     |                                                                                                                                                                                                                                                                                                                |         |       |                                  |                                                                       |                                                                 |                                                                                                                       |     |                                                                                                           |         |                    |

| Syntax Element ...                | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>SQL_multistatement_request</i> | an SQL multistatement request.<br>The format and rules for specifying multistatement requests in a stored procedure are the same as those for all other multistatement request applications.                                                                                                                                                                                                                                                                                               |
| END REQUEST                       | keywords that stipulate the end of the specification of an SQL multistatement request.                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>compound statement</i>         | the BEGIN-END statement enclosing a set of declarations and statements.<br>You can specify local variable declarations, cursor declarations, condition handler declarations and SQL and control statements within a compound statement.<br>Nesting of compound statements is allowed.                                                                                                                                                                                                      |
| <i>assignment statement</i>       | the SET statement.<br>See <i>SQL Stored Procedures and Embedded SQL</i> for details.                                                                                                                                                                                                                                                                                                                                                                                                       |
| <i>condition statement</i>        | either a CASE statement or an IF statement.<br>See <i>SQL Stored Procedures and Embedded SQL</i> for details.                                                                                                                                                                                                                                                                                                                                                                              |
| <i>iteration statement</i>        | a WHILE, LOOP, FOR, or REPEAT statement.<br>See <i>SQL Stored Procedures and Embedded SQL</i> for details.                                                                                                                                                                                                                                                                                                                                                                                 |
| ITERATE                           | a keyword introducing the ITERATE statement to terminate the execution of the current iteration of a labeled iteration statement, and start the next iteration.<br>The <i>label_name</i> references the iteration statement with which the label is associated, and whose current iteration is to be terminated.<br>The next iteration is started conditionally in WHILE or FOR, and unconditionally in LOOP and REPEAT.<br>See <i>SQL Stored Procedures and Embedded SQL</i> for details. |
| <i>diagnostic statement</i>       | a SIGNAL, RESIGNAL, or GET DIAGNOSTICS statement (see <i>SQL Stored Procedures and Embedded SQL</i> for details).                                                                                                                                                                                                                                                                                                                                                                          |
| LEAVE                             | keyword introducing the LEAVE statement to continue execution outside an iterated iteration by leaving a labeled statement.<br>The <i>label_name</i> references the iteration statement with which the label is associated, and on which LEAVE is to be performed.<br>See <i>SQL Stored Procedures and Embedded SQL</i> for details.                                                                                                                                                       |

| Syntax Element ...        | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Compound Statement</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>label_name</i>         | <p>the label for a BEGIN-END compound statement in the stored procedure, or for an iteration statement (WHILE, LOOP, FOR and REPEAT).</p> <p>The beginning label must be suffixed with a COLON character (:). An ending label is not mandatory, but if an ending label is specified, you must also specify an equivalent beginning label.</p> <p>The label name of the BEGIN-END compound statement cannot be reused in an iteration statement. A label name cannot be reused within a group of nested compound statements or nested iteration statements, but can be reused for different non-nested iteration statements or non-nested compound statements.</p> <p>Using label names for each BEGIN-END compound statement is recommended if you specify nested compound statements in a stored procedure.</p> <p>A local variable can be optionally qualified with the label of the corresponding compound statement in which the variable is declared. This helps in avoiding conflicts that might be caused by duplicate local variables in nested compound statements.</p> |
| BEGIN                     | <p>keyword introducing a compound statement.</p> <p>A compound statement defining the stored procedure body contains all the SQL statements and declarations of the stored procedure.</p> <p>You must terminate a compound statement with the END keyword.</p> <p>See <i>SQL Stored Procedures and Embedded SQL</i> for details.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <i>statement_list</i>     | <p>any of the following:</p> <ul style="list-style-type: none"> <li>SQL DML, DDL, or DCL statements supported by stored procedures, including dynamic SQL statements.<br/>You can also use the CALL statement invoking the <i>procedure_name</i> being created.</li> <li>control statements, including the BEGIN-END compound statement.</li> </ul> <p>You can use any number of statements in a <i>statement_list</i>. Each must be terminated by a SEMICOLON (;) character.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| END                       | terminating keyword for a BEGIN-END compound statement.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Local Declaration</b>  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| DECLARE                   | <p>keyword introducing a local variable declaration, cursor declaration, or condition handler declaration statement.</p> <p>DECLARE is followed by a list of local variables, a cursor specification, or a list of handler declarations.</p> <p>You can specify multiple local variable declarations, cursor declarations, or condition handler declarations for each stored procedure.</p> <p>See <i>SQL Stored Procedures and Embedded SQL</i> for details.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>variable_name</i>      | <p>name of the local variable being declared.</p> <p>Any number of local variables of the same data type can be specified as a comma-separated list. These variable names are replaced by data values during execution.</p> <p>Local variables can have UDT types.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |



| Syntax Element ...                           | Specifies ...                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DEFAULT                                      | optional keyword for introducing a default value for the local variables.<br>If more than one local variable is specified along with a default value, that value applies to all of the local variables in the list.                                                                                                                                              |
| <i>literal</i><br>NULL                       | the default value for the variables.<br>This specification can <i>only</i> be a literal or NULL: it cannot be an expression.<br>The literal must be compatible with the data type specified.<br>A variable is initialized to NULL if no default value is specified.                                                                                              |
| <i>condition_name</i>                        | a name for the declared condition that can be used to associate a symbolic condition name with a specific SQLSTATE value                                                                                                                                                                                                                                         |
| <i>SQLSTATE_code</i>                         | the SQLSTATE value assigned to <i>condition_name</i> .                                                                                                                                                                                                                                                                                                           |
| Cursor Declaration                           |                                                                                                                                                                                                                                                                                                                                                                  |
| <i>cursor_name</i>                           | the name of the cursor.                                                                                                                                                                                                                                                                                                                                          |
| SCROLL<br>NO SCROLL                          | whether the cursor can scroll or not.<br>SCROLL allows the cursor to scroll forward to the next row or back to the first row of the response set.<br>NO SCROLL is the default. When NO SCROLL is specified or when no option is specified, the cursor can only scroll forward to the next row.<br>See <i>SQL Stored Procedures and Embedded SQL</i> for details. |
| DYNAMIC RESULT<br>SETS <i>number_of_sets</i> | to return some number of result sets to the caller of the stored procedure.<br><i>number_of_sets</i> specifies the maximum number of result sets that the procedure can return.<br>Valid values range from 0 to 15, inclusive.                                                                                                                                   |
| CURSOR                                       | keyword qualifying the <i>cursor_name</i> as the cursor for the statement set to follow.<br>See <i>SQL Stored Procedures and Embedded SQL</i> for details.                                                                                                                                                                                                       |
| <u>WITHOUT RETURN</u>                        | that the procedure does not return a result set.<br>WITHOUT RETURN is the default.                                                                                                                                                                                                                                                                               |
| WITH RETURN<br>[ONLY]                        | a result set cursor that is returned by the procedure, but that cursor cannot be fetched.                                                                                                                                                                                                                                                                        |
| WITH RETURN TO<br><u>CALLER</u>              | that the result set from the target procedure is to be returned to either of the following: <ul style="list-style-type: none"> <li>the calling stored procedure.</li> <li>the calling client application.</li> </ul> This is the default.                                                                                                                        |
| WITH RETURN TO<br>CLIENT                     | that the result set is to be returned to the client application even if called from a nested stored procedure.<br>If more than one stored procedure specifies TO CLIENT, then the Teradata platform returns the results in the order opened.                                                                                                                     |
| <i>cursor_specification</i>                  | the SELECT statement specifying the column names or expressions from which to fetch data rows in the CURSOR clause.                                                                                                                                                                                                                                              |

| Syntax Element ...                                    | Specifies ...                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PREPARE                                               | that an <i>SQL_statement_name</i> is to be set up to be executed dynamically.<br>The PREPARE statement is valid only for result set cursors.<br>See <i>SQL Stored Procedures and Embedded SQL</i> for details.                                                                                  |
| <i>SQL_string</i>                                     | the SQL text that is to be executed dynamically.<br><i>SQL_string</i> must be enclosed within APOSTROPHE characters.                                                                                                                                                                            |
| <i>SQL_string_variable</i>                            | the name of an SQL local variable that contains the SQL text string that is to be executed dynamically.                                                                                                                                                                                         |
| <i>parameter_reference</i>                            | the name of an SQL parameter or string variable that contains the SQL text string that is to be executed dynamically.                                                                                                                                                                           |
| OPEN <i>cursor_name</i>                               | the name of the cursor to be opened.                                                                                                                                                                                                                                                            |
| USING                                                 | the variables used as input to the SQL statement by <i>cursor_name</i> .<br>The USING clause is valid only for result set cursors.<br>See <i>SQL Stored Procedures and Embedded SQL</i> for details.                                                                                            |
| <i>SQL_identifier</i>  <br><i>parameter_reference</i> | a set of variables to be supplied as input to the prepared SQL request.<br><i>SQL_identifier</i> or <i>parameter_reference</i> must be a valid SQL variable and must be declared prior to the OPEN statement.                                                                                   |
| FOR READ ONLY<br>FOR UPDATE                           | the updatability clause.<br>The FOR UPDATE option makes the cursor updatable, and update or delete operations can be performed on the cursor.<br>FOR READ ONLY is the default option and is implicit.<br>See <i>SQL Stored Procedures and Embedded SQL</i> for details.                         |
| Condition Handler                                     |                                                                                                                                                                                                                                                                                                 |
| CONTINUE<br>EXIT                                      | the type of condition handler being requested<br>See <i>SQL Data Definition Language Detailed Topics</i> and <i>SQL Stored Procedures and Embedded SQL</i> for details.                                                                                                                         |
| HANDLER                                               | keyword introducing the condition handler declaration.                                                                                                                                                                                                                                          |
| FOR                                                   | keyword introducing the FOR clause.                                                                                                                                                                                                                                                             |
| SQLSTATE                                              | keyword introducing an <i>sqlstate</i> value for which the exception or completion condition is to be handled.<br>You can specify any number of <i>sqlstate</i> values prefixed by SQLSTATE [VALUE] in a comma-separated list within each handler declaration.                                  |
| VALUE                                                 | optional keyword prefixing the <i>sqlstate</i> value.                                                                                                                                                                                                                                           |
| <i>sqlstate_code</i>                                  | a five-character string value that indicates a completion condition for the SQL statement. This is always specified within APOSTROPHE (') characters.<br>A given <i>sqlstate</i> value cannot be a part of more than one DECLARE HANDLER statements and cannot be repeated within a FOR clause. |

| Syntax Element ...                                               | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SQLEXCEPTION<br>SQLWARNING<br>NOT FOUND<br><i>condition_name</i> | a keyword identifier for generic conditions.<br>You can specify these individually or in combination with one another, but you cannot specify any of them more than once within a given DECLARE HANDLER statement.<br>SQLEXCEPTION indicates a generic exception condition.<br>SQLWARNING indicates a generic completion condition.<br>NOT FOUND indicates a generic completion condition when no data is found.<br><i>condition_name</i> is a name that can be used to specify conditions for a handler to act on when the procedure definition specifies the condition name in a SIGNAL or RESIGNAL statement.                        |
| <i>handler_action_statement</i>                                  | a single or compound statement that performs the handler action.<br>A single statement can be any one of the following: <ul style="list-style-type: none"> <li>Any standard SQL statement, including dynamic SQL, supported by stored procedures.</li> <li>Any SQL control statement.</li> </ul> The following are not valid as a single statement for <i>handler_action_statement</i> : <ul style="list-style-type: none"> <li>Local variables</li> <li>Cursors</li> <li>Handler declarations</li> </ul>                                                                                                                               |
| Assignment Statement                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| SET                                                              | a keyword introducing the SET statement used for assigning a value to a variable or parameter.<br>You can assign a UDT expression to a UDT variable or parameter; however, the mutator SET clause syntax (see UPDATE in <i>SQL Data Manipulation Language</i> for details about mutator SET clause syntax) is not supported within a SET statement. The workaround for this is to use the standard non-mutator SET clause format, with the column reference on one side of the equal sign and a UDT expression containing the appropriate mutators on the other side.<br>See <i>SQL Stored Procedures and Embedded SQL</i> for details. |
| <i>assignment_target</i>                                         | the name of the variable or parameter to be assigned a value.<br>If you are assigning to a parameter, it cannot be an IN parameter.<br>If you are assigning to any variable, it cannot be named <i>QUERY_BAND</i> .<br>You cannot set values for status variables in stored procedures.                                                                                                                                                                                                                                                                                                                                                 |
| <i>assignment_source</i>                                         | arithmetic and string expressions that contain the value to be assigned to a variable.<br>Stored procedure local variables, status variables, IN or INOUT parameters, and FOR loop column and correlation names can be specified in the <i>assignment_source</i> , which is also known as a value expression.                                                                                                                                                                                                                                                                                                                           |

| Syntax Element ...                   | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Condition Statement</b>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| CASE                                 | keyword introducing the CASE conditional statement to qualify control statements.<br>You can use either the Simple Case statement form or the Searched Case statement.<br>See <i>SQL Stored Procedures and Embedded SQL</i> for details.                                                                                                                                                                                                                                                                                    |
| <i>operand_1</i><br><i>operand_2</i> | value expressions or arithmetic and string expressions.<br>Stored procedure local variables, status variables, IN or INOUT parameters, and FOR loop column and correlation names can be specified in the value expression.                                                                                                                                                                                                                                                                                                  |
| THEN<br>ELSE                         | keywords introducing the statements to be performed in the CASE statement.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>statement</i>                     | a set of valid SQL statements and SQL control statements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <i>conditional_expression</i>        | a boolean search condition used to evaluate whether a statement or statements embedded within an IF, CASE, REPEAT, or WHILE clause should be performed.<br>Arithmetic expressions, logical expressions, UDT expressions, and status variables can all be specified as conditional expressions.<br>You cannot use IN and NOT IN operators if the conditional list contains any local variables, parameters, or cursor correlation names.<br>OUT parameters and subqueries are not allowed in <i>conditional_expression</i> . |
| END CASE                             | keywords marking the end of a CASE statement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| IF                                   | keyword introducing a conditional expression to qualify SQL control statements.<br>You can also use these variations of IF with the following additional clauses: <ul style="list-style-type: none"> <li>• IF-THEN-END IF</li> <li>• IF-THEN-ELSE-END IF</li> <li>• IF-THEN-ELSEIF-END IF</li> <li>• IF-THEN-ELSEIF-ELSE-END IF</li> </ul>                                                                                                                                                                                  |
| THEN<br>ELSE<br>ELSEIF               | a keyword introducing the THEN, ELSE, or ELSEIF clause in an IF statement.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| END IF                               | keywords marking the end of the IF statement.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Iteration Statement</b>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| WHILE                                | a keyword introducing an iteration statement to repeat the execution of one or more statements within its defined scope.<br>The associated condition is checked before each iteration (including the first) and if true, the statements are performed. Otherwise, the WHILE statement completes with no further iterations.<br>See <i>SQL Stored Procedures and Embedded SQL</i> for details.                                                                                                                               |
| DO                                   | a keyword introducing the sequence of statements to be performed in the WHILE statement.                                                                                                                                                                                                                                                                                                                                                                                                                                    |

| Syntax Element ...          | Specifies ...                                                                                                                                                                                                                   |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| END WHILE                   | keywords indicating the ending of the sequence of statements in the WHILE statement.                                                                                                                                            |
| LOOP                        | a keyword introducing an iteration statement that repeats the execution of one or more statements embedded within the defined loop.                                                                                             |
| END LOOP                    | keywords that terminate a LOOP.                                                                                                                                                                                                 |
| FOR                         | a keyword introducing an iteration statement to repeat the execution of one or more statements for each row fetched by the cursor.                                                                                              |
| <i>for_loop_variable</i>    | the name of the FOR loop.                                                                                                                                                                                                       |
| <i>cursor_name</i>          | the name of the cursor.                                                                                                                                                                                                         |
| CURSOR FOR                  | optional keywords qualifying the <i>cursor_name</i> as the cursor for the statement set to follow.                                                                                                                              |
| <i>cursor_specification</i> | the SELECT statement specifying the column names or expressions from which to fetch data rows in the CURSOR statement.                                                                                                          |
| DO                          | a keyword introducing the sequence of statements to be performed in the CURSOR statement.                                                                                                                                       |
| END FOR                     | keywords ending the CURSOR statement.                                                                                                                                                                                           |
| REPEAT                      | a keyword introducing the iteration statement that repeats the execution of one or more statements within the defined REPEAT statement.                                                                                         |
| UNTIL                       | a keyword introducing a conditional expression to qualify the statements in the loop.                                                                                                                                           |
| END REPEAT                  | keywords ending the REPEAT statement.                                                                                                                                                                                           |
| Cursor Specification        |                                                                                                                                                                                                                                 |
| SELECT                      | that the columns or expressions specified by <i>column_name</i> form the cursor.<br>See <i>SQL Stored Procedures and Embedded SQL</i> for details.                                                                              |
| <i>column_name</i>          | name of the column set from which to fetch data.                                                                                                                                                                                |
| AS                          | an optional introduction to <i>column_name_alias</i> .                                                                                                                                                                          |
| <i>alias_name</i>           | an alias for the table referenced by <i>table_name.column_name_alias</i> is also used to name expressions.                                                                                                                      |
| <i>table_name</i>           | the name of a table or view from which rows are to be fetched.                                                                                                                                                                  |
| <i>expression</i>           | any valid SQL expression.                                                                                                                                                                                                       |
| WHERE clause                | an optional search condition that must be satisfied by the row set to be fetched by the SELECT statement.                                                                                                                       |
| other SELECT clauses        | clauses such as ORDER BY, GROUP BY, and HAVING.<br>These clauses are valid only for read-only cursors. None is valid when specified with updatable cursors.<br>WITH ... BY clauses are not allowed in stored procedure cursors. |

| Syntax Element ...                              | Specifies ...                                                                                                                                                                                                                                                     |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Diagnostic Statements</b>                    |                                                                                                                                                                                                                                                                   |
| SIGNAL                                          | a keyword introducing the SIGNAL SQL stored procedure diagnostic statement. See <i>SQL Stored Procedures and Embedded SQL</i> for details.                                                                                                                        |
| RESIGNAL                                        | a keyword introducing the RESIGNAL SQL stored procedure diagnostic statement. See <i>SQL Stored Procedures and Embedded SQL</i> for details.                                                                                                                      |
| <i>condition_name</i>                           | the name of a variable declared to handle a condition within an SQL stored procedure.<br>If <i>condition_name</i> specifies a condition that corresponds to an SQLSTATE value, the value of that SQLSTATE is assigned to RETURNED_SQLSTATE in the Condition Area. |
| SQLSTATE [VALUE]<br><i>SQLSTATE_code</i>        | the value for an SQLSTATE to be assigned to RETURNED_SQLSTATE in the Condition Area.                                                                                                                                                                              |
| <i>condition_information</i>                    | One of the field names from the Condition Area of the Diagnostics Area. See <i>SQL Stored Procedures and Embedded SQL</i> for details.                                                                                                                            |
| <i>value</i>                                    | a text or numeric value, as appropriate, to be assigned to the specified condition information name.                                                                                                                                                              |
| GET DIAGNOSTICS                                 | keywords introducing the GET DIAGNOSTICS SQL stored procedure diagnostic statement. See <i>SQL Stored Procedures and Embedded SQL</i> for details.                                                                                                                |
| <i>parameter_name</i>                           | a parameter whose value is set to the value contained in <i>statement_information_item</i> .                                                                                                                                                                      |
| <i>variable_name</i>                            | a variable whose value is set to the value contained in <i>statement_information_item</i> .                                                                                                                                                                       |
| <i>statement_information_item</i>               | one of the field names from the Statement Area of the Diagnostics Area. See <i>SQL Stored Procedures and Embedded SQL</i> for details.                                                                                                                            |
| EXCEPTION                                       | a language element that indicates to return information from the Condition Area of the Diagnostics Area.                                                                                                                                                          |
| <i>condition_number</i>                         | a number, parameter, or variable that resolves to the number of the Condition Area from which information is to be retrieved.                                                                                                                                     |
| <i>parameter_name</i>  <br><i>variable_name</i> | an output parameter or variable to which the <i>condition_information_item</i> retrieved from the specified Condition Area is assigned.                                                                                                                           |
| <i>condition_information_item</i>               | the name of the Condition Area field from which condition information is to be retrieved. See <i>SQL Stored Procedures and Embedded SQL</i> for a list of the valid condition information item names.                                                             |

## ANSI Compliance

CREATE PROCEDURE is ANSI SQL:2008-compliant with extensions.

REPLACE PROCEDURE is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges: CREATE PROCEDURE

You must have the CREATE PROCEDURE privilege on the containing database or user for the procedure. The creator of a stored procedure is automatically granted the DROP PROCEDURE and EXECUTE privileges WITH GRANT OPTION.

Teradata Database checks stored procedure privileges differently depending on the definition of the SQL SECURITY clause option for the procedure.

Note that you cannot specify the OWNER option for the SQL SECURITY clause unless you have the explicitly granted CREATE OWNER PROCEDURE privilege to permit you to create an SQL stored procedure in a database or user other than your default database or user. This is an extremely important access right for the Security Administrator to safeguard, ensuring that only those users who absolutely require the privilege be granted it.

Following are the rules for SQL stored procedure privileges and how they are checked:

- Both dynamic<sup>1</sup> and static SQL are governed by these rules.
- The default privilege option for stored procedures is DEFINER.
- When the creator of a procedure is also its immediate owner, all static DML and DCL statements within the procedure are valid.

The following table summarizes the rules for SQL stored procedure privilege assignment:

| SQL SECURITY Privilege Option | Dynamic or Static SQL Statement? | Owner <sup>a</sup> /Creator Relationship | Privilege Checking Done at This Time |                        | Default Database or User |
|-------------------------------|----------------------------------|------------------------------------------|--------------------------------------|------------------------|--------------------------|
|                               |                                  |                                          | Compilation <sup>b</sup>             | Execution <sup>c</sup> |                          |
| DEFINER                       | Dynamic                          | O is not C                               | None                                 | O and C                | C                        |
|                               |                                  | O is C                                   | None                                 | O                      | C                        |
|                               | Static                           | O is not C                               | O and C                              | O and C                | C                        |
|                               |                                  | O is C                                   | O                                    | O                      | C                        |
| INVOKER                       | Dynamic                          | O is not C                               | None                                 | I                      | I                        |
|                               |                                  | O is C                                   | None                                 | I                      | I                        |
|                               | Static                           | O is not C                               | C                                    | I                      | I                        |
|                               |                                  | O is C                                   | C                                    | I                      | I                        |
| OWNER                         | Dynamic                          | O is not C                               | COP                                  | O                      | O                        |
|                               |                                  | O is C                                   | None                                 | O                      | O                        |
|                               | Static                           | O is not C                               | COP and O                            | O                      | O                        |
|                               |                                  | O is C                                   | O                                    | O                      | O                        |

1. Loosely defined, the term *dynamic SQL* applies to any SQL statement whose complete text is not known until run time. The ANSI SQL:2008 SQL Foundation standard defines dynamic SQL as the case where "...the SQL-statement is not known when the program is written and will be generated during program execution."

| SQL SECURITY Privilege Option | Dynamic or Static SQL Statement? | Owner <sup>a</sup> /Creator Relationship | Privilege Checking Done at This Time |                        | Default Database or User |
|-------------------------------|----------------------------------|------------------------------------------|--------------------------------------|------------------------|--------------------------|
|                               |                                  |                                          | Compilation <sup>b</sup>             | Execution <sup>c</sup> |                          |
| CREATOR                       | Dynamic                          | O is not C                               | None                                 | C                      | C                        |
|                               |                                  | O is C                                   | None                                 | C                      | C                        |
|                               | Static                           | O is not C                               | C                                    | C                      | C                        |
|                               |                                  | O is C                                   | C                                    | C                      | C                        |

- a. *Owner* refers to the immediate owner.  
b. The appropriate CREATE and DROP privileges are also checked during compilation.  
c. The EXECUTE PROCEDURE privilege is also checked at run time.

where:

| This symbol or text string ... | Means that the user needs this set of privileges to submit a CREATE PROCEDURE or REPLACE PROCEDURE request ...                                                                                                                                     |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| None                           | none.                                                                                                                                                                                                                                              |
| Error                          | one or more privileges it did not have at the time the CREATE PROCEDURE or REPLACE PROCEDURE request was compiled.<br>Because the request aborts when this occurs, the cells for Privilege Check at Execution Time and Default Database are empty. |
| COP                            | CREATE OWNER PROCEDURE.                                                                                                                                                                                                                            |
| C                              | those of the creator of the procedure.                                                                                                                                                                                                             |
| I                              | those of the invoker of the procedure.                                                                                                                                                                                                             |
| O                              | those of the owner of the procedure.                                                                                                                                                                                                               |
| O and C                        | those of the owner of the procedure <i>and</i> those of its creator.                                                                                                                                                                               |
| O or C                         | those of the owner of the procedure <i>or</i> those of its creator.                                                                                                                                                                                |
| CREATOR                        | those of the creator of the stored procedure regardless of its containing user or database.                                                                                                                                                        |
| DEFINER                        | those currently defined.<br>This is the default.                                                                                                                                                                                                   |
| INVOKER                        | those at the top of the current stack.                                                                                                                                                                                                             |
| OWNER                          | those of the immediate owner of the stored procedure (the user or database in which the procedure is contained).                                                                                                                                   |



| This symbol or text string ... | Means that the immediate owner and creator of the procedure are ... |
|--------------------------------|---------------------------------------------------------------------|
| O is not C                     | different.                                                          |
| O is C                         | the same.                                                           |

Using the first row for the INVOKER SQL SECURITY option as a model, you would interpret the table as follows: For the case when an SQL statement is invoked dynamically and the immediate owner of its containing procedure is not the same user as its creator, no privilege checking is done at the time the procedure is compiled, the privileges of the invoker of the procedure are checked at run time, and the default database or user that is used to implicitly qualify any unqualified object references within the SQL statements in the procedure body is that of the invoker.

The following examples show how the various SQL SECURITY options can be used:

- [“Example 5: SQL SECURITY—CREATOR” on page 331](#)
- [“Example 6: SQL SECURITY—DEFINER” on page 333](#)
- [“Example 7: SQL SECURITY—INVOKER” on page 334](#)
- [“Example 8: SQL SECURITY—OWNER” on page 335](#)

## Required Privileges: REPLACE PROCEDURE

You must have the DROP PROCEDURE privilege on the stored procedure or its containing database or user to replace it.

You must have the CREATE PROCEDURE privilege on the stored procedure or its containing database or user if it does not already exist.

The user replacing a stored procedure must have the privileges for all objects it accesses.

Once a stored procedure has been replaced, its immediate owner is its containing database or user, *not* the user who replaced it. The immediately owning database must have all the appropriate privileges for executing the stored procedure, including WITH GRANT OPTION.

## Privileges Granted Automatically

When you create a new procedure, the system automatically grants the following privileges on it:

- DROP PROCEDURE
- EXECUTE PROCEDURE

## Example 1

The following example creates a valid stored procedure named *sp\_sample1* with the following parameters and local variables:

| Variable Type  | Variable Name |
|----------------|---------------|
| IN             | ip            |
| OUT            | op            |
| local variable | var1          |

Because the parameter type for *ip* is not specified, it defaults to IN. This procedure does not contain any condition handlers.

```
CREATE PROCEDURE sp_sample1(    ip INTEGER,
                                OUT op INTEGER)
BEGIN DECLARE var1 INTEGER;
  SELECT col1 INTO var1
    FROM tabl
     WHERE col2 = ip;
  SET op = var1 * 10;
END;
```

## Example 2

The following example is similar to “[Example 1](#)” except that it performs a consume mode SELECT (see *SQL Data Manipulation Language* for information about the SELECT AND CONSUME statement) into a queue table.

```
CREATE PROCEDURE spSampleQ(IN  ip INTEGER,
                            OUT op INTEGER)
BEGIN DECLARE qits    TIMESTAMP(6) DEFAULT CURRENT_TIMESTAMP(6),
             qsn      INTEGER GENERATED ALWAYS AS IDENTITY,
             qcol_1   INTEGER,
             qcol_2   INTEGER;
  SELECT AND CONSUME TOP 1 qits, qsn, qcol_1, qcol_2
    INTO c_qits, c_qsn, c_qcol_1, c_qcol_2
    FROM qtable;
END;
```

Note that you must specify a AND CONSUME TOP 1 phrase in your SELECT statement to consume rows from a queue table. The AND CONSUME keywords indicate that the request is a consume mode request, while TOP 1 indicates that the oldest row from the queue table is to be retrieved.

### Example 3

The following stored procedure consumes a shopping cart queue table row that returns the three variables *sp\_ordernum*, *sp\_product*, and *sp\_quantity*:

```
CREATE PROCEDURE consumecart (OUT sp_ordernum CHARACTER(15),
                              OUT sp_product  CHARACTER(30),
                              OUT sp_quantity INTEGER)
BEGIN
  SELECT AND CONSUME TOP 1 ordernum, product, quantity INTO
    :sp_ordernum, :sp_product, :sp_quantity FROM shoppingcart;
END;
```

The system retrieves the queue table row at the top of the FIFO queue from a single AMP and deletes it from the *shoppingcart* table.

The row was consumed first because it had been in the queue for the longest duration as determined by its QITS value being the oldest of all rows in the queue. The system builds the response row as specified in the expression list and returns it to the requestor in variables.

### Example 4

The following example is for creating a valid stored procedure named *spParams* with six parameters of different data type combinations:

```
CREATE PROCEDURE sp_params (INOUT iop1 SMALLINT,
                            OUT   op1  DECIMAL(10,3),
                            IN    ip2  NUMERIC,
                            INOUT iop2 FLOAT,
                            OUT   op2  REAL,
                            IN    ip3  DOUBLE PRECISION)
BEGIN
  SET iop1=3;
  SET op1=5.2;
  SET iop2=10.2;
  SET op2=iop2;
END;
```

### Example 5: SQL SECURITY—CREATOR

When you specify SQL SECURITY CREATOR, Teradata Database verifies and applies the privileges of the user who created the procedure.

The system uses the name of the creating (definer) user as the default qualifier for implicit qualification of any unqualified object references within the SQL statements in the procedure body.

The following example shows the CREATOR case for static SQL. In this example, *user\_1* creates procedure *dyn\_dml* in the *SYSLIB* database, and *user\_2* calls *SYSLIB.dyn\_dml*.

Teradata Database verifies the following privileges for this example:

| AT this time ... | Teradata Database verifies the following privileges in the order indicated ...                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| compilation      | <div>1 user_1 has the CREATE PROCEDURE privilege on the SYSLIB database.</div> <div>2 user_1 has the INSERT privilege on the database object user_1.t1.</div>                      |
| execution        | <div>1 user_2 has the EXECUTE PROCEDURE privilege on the SQL stored procedure SYSLIB.dyn_dml.</div> <div>2 user_1 has the INSERT privilege on the database object user_1.t1.</div> |

```
.LOGON user_1/user_1
.COMPILE FILE sp.spl

/* sp.spl file
CREATE PROCEDURE SYSLIB.static_dml()
SQL SECURITY CREATOR
BEGIN
  INSERT INTO t1
  SELECT 1,1;
END;
/*

.LOGON user_2,user_2

CALL SYSLIB.static_dml();
```

For the dynamic SQL case, Teradata Database verifies the following privileges:

| AT this time ... | Teradata Database verifies the following privileges in the order indicated ...                                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| compilation      | user_1 has the CREATE PROCEDURE privilege on the SYSLIB database.                                                                                                                  |
| execution        | <div>1 user_2 has the EXECUTE PROCEDURE privilege on the SQL stored procedure SYSLIB.dyn_dml.</div> <div>2 user_1 has the INSERT privilege on the database object user_1.t1.</div> |

```
.LOGON user_1/user_1
.COMPILE FILE sp.spl

/* sp.spl file
CREATE PROCEDURE SYSLIB.dyn_dml()
SQL SECURITY CREATOR
BEGIN
  CALL DBC."sysexecsql" ('INSERT INTO t1 (1,1);');
END;
/*

.LOGON user_2/user_2

CALL SYSLIB.dyn_dml();
```

Example 6: SQL SECURITY—DEFINER

The DEFINER option is the SQL SECURITY clause default.

The following rules apply to the DEFINER option:

- Teradata Database checks the privileges of both the creator and the owner of the procedure at compilation and execution times.
- Static DDL and DML statements are valid in a procedure definition even if the creator and owner are not the same.

Teradata Database uses the name of the creating (definer) user as the default for implicit qualification of any unqualified object references within the stored procedure body.

The following example shows the DEFINER case for static SQL. In this example, *user\_1* creates procedure *dyn\_dml* in the *SYSLIB* database, and *user\_2* calls *SYSLIB.dyn\_dml*.

Teradata Database verifies the following privileges for this example:

| AT this time ... | Teradata Database verifies the following privileges in the order indicated ...                                                                                                                                                                                                                                           |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| compilation      | <div>1 <i>user_1</i> has the CREATE PROCEDURE privilege on the <i>SYSLIB</i> database.</div> <div>2 <i>user_1</i> has the INSERT privilege on <i>user_1</i> on the database object <i>user_1.t1</i>.</div> <div>3 The <i>SYSLIB</i> database has the INSERT privilege on the database object <i>user_1.t1</i>.</div>     |
| execution        | <div>1 <i>user_2</i> has the EXECUTE PROCEDURE privilege on the SQL stored procedure <i>SYSLIB.dyn_dml</i>.</div> <div>2 <i>user_1</i> has the INSERT privilege on the database object <i>user_1.t1</i>.</div> <div>3 The <i>SYSLIB</i> database has the INSERT privilege on the database object <i>user_1.t1</i>.</div> |

```
.LOGON user_1,user_1
.COMPILE FILE sp.spl

/* sp.spl file
CREATE PROCEDURE SYSLIB.static_dml()
SQL SECURITY DEFINER
BEGIN
  INSERT INTO t1
  SELECT 1,1;
END;
/*

.LOGON user_2,user_2

CALL SYSLIB.static_dml();
```

For the dynamic SQL case, Teradata Database verifies the following privileges:

| AT this time ... | Teradata Database verifies the following privileges in the order indicated ...                                                                                                                                                                                                                                                                                                          |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| compilation      | <i>user_1</i> has the CREATE PROCEDURE privilege on the <i>SYSLIB</i> database.                                                                                                                                                                                                                                                                                                         |
| execution        | <div><div>1</div><div><i>user_2</i> has the EXECUTE PROCEDURE privilege on the SQL stored procedure <i>SYSLIB.dyn_dml</i>.</div></div> <div><div>2</div><div><i>user_1</i> has the INSERT privilege on the database object <i>user_1.t1</i>.</div></div> <div><div>3</div><div>The <i>SYSLIB</i> database has the INSERT privilege on the database object <i>user_1.t1</i>.</div></div> |

```
.LOGON user_1/user_1
.COMPILE FILE sp.spl

/* sp.spl file
CREATE PROCEDURE SYSLIB.dyn_dml ()
SQL SECURITY DEFINER
BEGIN
  CALL dbc."sysexecsql" ('INSERT INTO t1 (1,1);');
END;
/*

.LOGON user_2/user_2

CALL SYSLIB.dyn_dml();
```

Example 7: SQL SECURITY—INVOKER

The INVOKER logic always uses the current top of the authorization stack to check for privileges, and the authorization identifier sitting on the top of the stack is used as the default qualifier for implicit qualification of any unqualified object references within the SQL statements in the procedure. Therefore, when you specify SQL SECURITY INVOKER, Teradata Database uses the privileges on the top of the stack.

For static SQL, Teradata Database checks the privileges of the invoker during the creation of the procedure.

For dynamic SQL, there are no privileges that can be checked during the creation of the procedure. Teradata Database generates a warning message only if the object does not exist. The system checks *all* privileges during the execution of the procedure.

The following example shows the INVOKER case for dynamic SQL. In this example, *user\_1* creates procedure *dyn\_dml* in the *SYSLIB* database, and *user\_2* calls *SYSLIB.dyn\_dml*.

Teradata Database verifies the following privileges for this example:

| AT this time ... | Teradata Database verifies the following privileges in the order indicated ...                                                                                                  |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| compilation      | 1 <i>user_1</i> has the CREATE PROCEDURE privilege on the <i>SYSLIB</i> database.                                                                                               |
| execution        | 1 <i>user_2</i> has the EXECUTE PROCEDURE privilege on the SQL stored procedure <i>SYSLIB.dyn_dml</i> .<br>2 <i>user_2</i> has the INSERT privilege on table <i>user_2.t1</i> . |

```
.LOGON user_1,user_1
.COMPILE FILE sp.spl

/* sp.spl file
CREATE PROCEDURE SYSLIB.dyn_dml()
SQL SECURITY INVOKER
BEGIN
  CALL dbc."sysexecsql" ('INSERT INTO t1 (1,1);');
END;
/*

.LOGON user_2,user_2

CALL SYSLIB.dyn_dml();
```

## Example 8: SQL SECURITY—OWNER

When you specify SQL SECURITY OWNER, Teradata Database verifies and applies the privileges of the owner of the procedure, which means those of its containing database or user.

The SQL SECURITY OWNER clause is not a valid option for stored procedure creation unless you have been granted the CREATE OWNER PROCEDURE privilege to permit you to create an SQL stored procedure in another database. CREATE OWNER PROCEDURE is an explicit right that must be granted explicitly to a user or database.

Teradata Database uses the owner identifier as the default qualifier for implicit qualification of any unqualified object references within the SQL statements in the procedure.

The following example shows the OWNER case for static SQL. In this example, *user\_1* creates the SQL stored procedure *dyn\_dml* in the *SYSLIB* database, and *user\_2* calls *SYSLIB.dyn\_dml*.

Teradata Database verifies the following privileges for this static SQL example:

| AT this time ... | Teradata Database verifies the following privileges in the order indicated ...                                                                                                               |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| compilation      | 1 <i>user_1</i> has the CREATE OWNER PROCEDURE privilege on the <i>SYSLIB</i> database.<br>2 The <i>SYSLIB</i> database has the INSERT privilege on table <i>SYSLIB.t1</i> .                 |
| execution        | 1 <i>user_2</i> has the EXECUTE PROCEDURE privilege on the SQL stored procedure <i>SYSLIB.dyn_dml</i> .<br>2 The <i>SYSLIB</i> database has the INSERT privilege on table <i>SYSLIB.t1</i> . |

```
.LOGON user_1,user_1
.COMPILE FILE sp.spl

/* sp.spl file
CREATE PROCEDURE SYSLIB.static_dml()
SQL SECURITY OWNER
BEGIN
    INSERT INTO t1
    SELECT 1,1;
END;
/*

.LOGON user_2,user_2

CALL SYSLIB.static_dml;
```

For the dynamic SQL case, Teradata Database verifies the following privileges:

| AT this time ... | Teradata Database verifies the following privileges in the order indicated ...                                                                                                                      |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| compilation      | <i>user_1</i> has either the CREATE OWNER PROCEDURE privilege or the CREATE PROCEDURE privilege on the <i>SYSLIB</i> database.                                                                      |
| execution        | <b>1</b> <i>user_2</i> has the EXECUTE PROCEDURE privilege on the SQL stored procedure <i>SYSLIB.dyn_dml</i> .<br><b>2</b> The SYSLIB database has the INSERT privilege on table <i>SYSLIB.t1</i> . |

```
.LOGON user_1,user_1
.COMPILE FILE sp.spl

/* sp.spl file
CREATE PROCEDURE syslib.dyn_dml()
SQL SECURITY OWNER
BEGIN
    CALL dbc."sysexecsql" ('INSERT INTO t1 (1,1);');
END;
/*

.LOGON user_2,user_2

CALL SYSLIB.dyn_dml();
```



## Example 9: Passing the Value of $n$ for a TOP $n$ Operator To a Stored Procedure

The following procedure passes the value for  $n$  to the TOP  $n$  operator in its SELECT request as the integer parameter  $a$ .

```
CREATE PROCEDURE fct (IN a INTEGER)
BEGIN
    DECLARE hc1 INTEGER;
    DECLARE hc2 INTEGER;
    FOR
        RecordPointer AS c_sptable CURSOR FOR
        SELECT TOP :a x1 AS c_c1, y1 AS c_c2
        FROM t1
    DO
        SET hc1 = RecordPointer.c_c1;
        SET hc2 = RecordPointer.c_c2;
        INSERT INTO t2 VALUES (:hc1,:hc2);
    END FOR ;
    ROLLBACK;
END;
```

## Example 10

The following example shows the CREATE PROCEDURE statement for creating a stored procedure named *sp\_sample3* with local variable declarations, cursor declarations, and condition handler declarations:

```
CREATE PROCEDURE sp_sample3(OUT p1 CHARACTER(80))
BEGIN
    DECLARE i INTEGER;
    DECLARE emp_cursor CURSOR WITHOUT RETURN FOR
        SELECT emp_name, salary FROM emp_details ORDER BY dept_code;
    DECLARE dept_cursor CURSOR WITHOUT RETURN FOR
        SELECT dept_name from department;

    DECLARE EXIT HANDLER
    FOR sqlstate '42000'
    BEGIN
        OPEN emp_cursor;
        SET p1='FAILED TO INSERT ROW';
    END;
    DECLARE CONTINUE HANDLER
    FOR SQLSTATE value '23505'
    BEGIN
        SET p1='FAILED TO INSERT ROW';
    END;
    DECLARE CONTINUE HANDLER
    FOR SQLEXCEPTION
    BEGIN
        SET p1='FAILED TO INSERT ROW';
    END;

    INSERT INTO table1 VALUES(1000,'aaa');
END;
```

## Example 11: Stored Procedures With a Single Statement

The following are examples of stored procedures with a single statement that is not enclosed in a BEGIN ... END compound statement:

- A stored procedure with a single SET statement:

```
CREATE PROCEDURE sp_sample4a (IN in_param INTEGER,  
                             OUT out_param INTEGER)  
    SET out_param = in_param + 1;
```

- A stored procedure with a WHILE statement:

```
CREATE PROCEDURE sp_sample4b (IN in_param INTEGER,  
                             OUT out_param INTEGER)  
    WHILE (in_param < 20)  
        SET out_param = in_param + 1;  
    END WHILE;
```

## Example 12: Nested Compound Statements

The following example shows nesting of compound statements.

The local variable and cursor name of the outer compound statement labeled *L1* are used in the inner compound statement labeled *L2*.

```
CREATE PROCEDURE sp_sample1(IN p_name CHAR(30), INOUT p_amt INTEGER)  
L1: BEGIN  
    DECLARE cvar1, v_amt INTEGER;  
    DECLARE cursor1 CURSOR WITHOUT RETURN FOR  
        SELECT c1 AS c_c1, c2 AS c_c2  
        FROM temp;  
    L2: BEGIN  
        DECLARE v_name CHARACTER(30);  
        DECLARE CONTINUE HANDLER FOR SQLSTATE '42000'  
        BEGIN  
            OPEN cursor1;  
            INSERT INTO temp VALUES (v_name, v_amt);  
        END;  
        SET vName = p_name;  
        -- tabl table does not exist  
        INSERT INTO tabl VALUES (v_name, v_amt);  
        FETCH cursor1 INTO cvar1, p_amt;  
    END L2;  
END L1;
```

### Example 13: Splitting a CLOB Value In Half and Inserting the Pieces Into Two Different Tables

The following example shows a stored procedure used to split a CLOB in half and then insert the halves into two separate tables.

First the table definitions:

```
CREATE TABLE tabc1 (
  a1 INTEGER,
  b1 CLOB);
```

```
CREATE TABLE tabc2 (
  a2 INTEGER,
  b2 CLOB);
```

The following SQL code defines the stored procedure:

```
CREATE PROCEDURE clobsplitter(IN    a1 INTEGER,
                              IN    a2 INTEGER,
                              INOUT b  CLOB )
BEGIN
  DECLARE localclob CLOB;
  DECLARE len INTEGER;
  SET len = CHARACTERS(b);
  SET localclob = SUBSTR(b, 1, len/2);
  INSERT tabc1 (:a1, localclob);
  INSERT tabc2 (:a2, SUBSTR(b, len/2 + 1));
  SET b = localclob || SUBSTR(b, len/2 + 1);
END;
```

The stages in the process followed by this procedure are as follows:

- 1 The first half of CLOB *b* is assigned to local variable named *localclob*.
  - 2 The contents of CLOB are inserted into table *tabc1*.
  - 3 The second half of CLOB *b* is inserted into table *tabc2* without using a local LOB variable.
  - 4 Local variable *localclob* is concatenated with the second half of *b* and assigned to *b*.
  - 5 The contents of *b* are returned to the application.
- If *clobsplitter* is called by another procedure, then *b* is passed to the other procedure.
- 6 End of process.

### Example 14: Converting a CLOB Containing XML Data Into Rows for Insertion Into a Table

The following example creates a stored procedure that converts a CLOB value containing XML sales data into a set of rows that are inserted into a *sales* table.

First the table definitions:

```
CREATE TABLE sales (
  partnum    INTEGER,
  qtysold    INTEGER,
  storecode  INTEGER,
  salesdate  DATE)
PRIMARY INDEX (partnum, qtysold, storecode, salesdate);
```

```
CREATE TABLE saleslog (  
    storecode INTEGER,  
    salesdate DATE,  
    sales      CLOB,  
    logdate    DATE,  
    logtime    TIME)  
PRIMARY INDEX (storecode, salesdate, logdate, logtime);
```

The following SQL code defines the stored procedure:

```
CREATE PROCEDURE stores_sales_procedure (storecode INTEGER,  
   salesdate DATE,  
   salesclob CLOB)  
  
BEGIN  
    INSERT INTO saleslog (:storecode, :salesdate, :salesclob,  
                          CURRENT_DATE, CURRENT_TIME);  
    INSERT INTO sales  
        SELECT * FROM TABLE (xmlparser(:salesclob));  
END;
```

The stages in the process followed by this procedure are as follows:

- 1 The sales CLOB is inserted into a log table named *saleslog*.
- 2 The CLOB is passed by means of the variable *salesclob* to a user-defined table function named *xmlparser* (see [“CREATE FUNCTION/ REPLACE FUNCTION” on page 138](#)).
- 3 The system invokes table function *xmlparser* on every AMP.
- 4 The table function invokes *fnc\_loblocal* (the definitions for *xmlparser* and *fnc\_loblocal* are not shown for this example) to detect whether the CLOB is located on the same AMP on which the function is executing.
- 5 The function that has local access to the CLOB strips out the XML sales data and returns standard relational table rows to be inserted into *sales*.
- 6 End of process.

## Example 15: Stored Procedure With Multistatement Request

The following stored procedure executes the statements in the multistatement request in parallel:

```
CREATE PROCEDURE salesadjust(IN item      INTEGER,  
                             IN numsold  INTEGER)  
  
BEGIN  
    DECLARE price DECIMAL(8,2);  
  
    SELECT item_price INTO price  
    FROM pricetbl  
    WHERE item = pricetbl.item_no;  
    BEGIN REQUEST  
        UPDATE sales_summary  
        SET total_sales = total_sales + price * numsold  
        WHERE item = sales_summary.item_no  
        ;UPDATE inventory  
        SET item_no = item_no - numsold  
        WHERE item = inventory.item_no;
```

```
END REQUEST;
END;
```

The stages in the process followed by this procedure are as follows:

- 1 The price of an item is retrieved from *pricetbl*.
- 2 The total sales amount is computed by multiplying the total price by the number of items sold.
- 3 Two update requests are dispatched to the AMPs in parallel:
  - a The first updates a *total\_sales* summary table that keeps track of the cash made on all items sold.
  - b The second adjusts *inventory* to reflect the remaining quantity stocked for that particular item.
- 4 End of process.

## Example 16: Setting the Transaction Query Band Using a Parameter

The following procedures both set the transaction query band using a parameter named *qbin*:

```
CREATE PROCEDURE setqbmsr (
  IN qbin VARCHAR(60))
BEGIN REQUEST
  SET QUERY_BAND = :qbin FOR TRANSACTION;
  INS abc(1,2);
END REQUEST;
```

```
CREATE PROCEDURE qbparm1 (
  IN par1 INTEGER,
  IN qbin VARCHAR(60),
  OUT qbout VARCHAR(60))
BEGIN REQUEST
  BEGIN TRANSACTION;
  SET QUERY_BAND = :qbin FOR TRANSACTION;
  SELECT GetQueryBand() INTO qbout;
  END TRANSACTION;
END REQUEST;
```

```
CALL qbparm1(10, 'kid=kate;', par3);
```

```
*** Procedure has been executed.
*** Total elapsed time was 1 second.
```

```
qbout
```

```
-----
=T> kid=kate;
```

## Example 17: Stored Procedure With Multistatement Request Using a Dynamic SQL Call Statement

The following example is a repeat of “[Example 15: Stored Procedure With Multistatement Request](#)” on page 340, except it substitutes a dynamic SQL call using *DBC.SysExecSQL* in place of the two UPDATE statements.

```
CREATE PROCEDURE salesadjust(IN item      INTEGER,
                             IN numsold  INTEGER)
BEGIN
  DECLARE price DECIMAL(8,2);
  DECLARE update1, update2 VARCHAR(128);
  SELECT item_price INTO price
  FROM PriceTbl
  WHERE item = pricetbl.item_no;
  SET update1 = 'UPDATE sales_summary' ||
    'SET total_sales = total_sales + ' ||
    price ' || ' * ' || numsold ||
    'WHERE ' || item || ' = sales_summary.item_no;';
  SET update2 = 'UPDATE inventory' ||
    'SET item_no = item_no - ' || numsold
    'WHERE ' || item || ' = inventory.item_no;';

  BEGIN REQUEST
    CALL dbc.SysExecSQL(update1 || update2);
  END REQUEST;
END;
```

## Example 18: Stored Procedures With Dynamic SQL Using the SQL PREPARE Statement

The following CREATE PROCEDURE request creates a stored procedure that contains dynamic SQL using a PREPARE statement:

```
CREATE PROCEDURE abc (IN data1v VARCHAR(10),
                     IN data2v VARCHAR(10))
  DYNAMIC RESULT SETS 1
BEGIN
  DECLARE sql_stmt1 VARCHAR(100);
  DECLARE sales DECIMAL(8,2);
  DECLARE item INTEGER;
  DECLARE cstmt CURSOR WITH RETURN FOR stmt1;

  SET sql_stmt1 = 'SELECT T1.item, T1.sales FROM T1 WHERE'
    data1v | '=' store_name AND ' | data2v | '=' region;';
  PREPARE stmt1 FROM sql_stmt1;

  OPEN cstmt;
  FETCH NEXT FROM cstmt INTO item, sales;
END;
```

The PREPARE can also be written as follows using parameter markers as seen in the following stored procedure code fragment:

```
SET sql_stmt1 = 'SELECT t1.item, t1.sales FROM t1 WHERE ?'
               '= store_name AND ? = region;';
PREPARE stmt1 FROM sql_stmt1;

OPEN cstmt USING data1v, data2v;
FETCH NEXT FROM cstmt INTO item, sales;
```

## Example 19: Stored Procedure Using UDTs

This procedure sets the background color of a rectangle to blue if its area is equal to that of the input rectangle and its background color is not blue. The rectangle and old background color are logged into a table.

```
CREATE PROCEDURE SP1(IN p1 rectangle)
BEGIN
    DECLARE var1 rectangle;                /* UDT local variable */
    DECLARE var2 VARCHAR(20);
    DECLARE var3 INTEGER;
    DECLARE var4 FLOAT;
    DECLARE rect_cursor CURSOR WITHOUT RETURN FOR
        SELECT rect_col, background_color, id
        FROM table1 FOR UPDATE;
    SET var4 = p1.area();                  /* UDT expression */
/* DDL */
CREATE TABLE LogTab(
    id          INTEGER,
    Rect        rectangle,
    OldBGColor  VARCHAR(20));
L1: LOOP
    FETCH RectCursor INTO var1, var2, var3; /* Fetch into UDT var */
    IF (SQLCODE <> 0) THEN
        LEAVE L1;
    END IF;
    IF (var1.area() = var4 AND var2 <> 'Blue') THEN
        BEGIN TRANSACTION;
        INSERT INTO LogTab
            VALUES (:var3, :var1, :var2);
        UPDATE Employee
            SET BackgroundColor = 'Blue'
            WHERE CURRENT OF RectCursor;
        END TRANSACTION;
    END IF;
END LOOP L1;
END;
```

## Example 20: More Examples Using UDTs

The following examples and example excerpts show various applications of UDTs within SQL stored procedures:

### Cursor Fetching:

```
OPEN cursor1;
LSUB1:
LOOP
    FETCH cursor1 INTO predefinedcol, distincttype, structuredtype;
    IF (SQLSTATE <> 0) THEN LEAVE LSUB1;
    END IF;
    SET rowcount = rowcount +1;
    INSERT INTO resultstable VALUES (:rowcount, :predefinedtype,
:distincttype,
:structuredtype.attribute1(), 'FETCH');
END LOOP;
CLOSE Cursor1;
```

### Declaring a Structured Type:

```
CREATE PROCEDURE sp1()
BEGIN
    DECLARE var1 INTEGER;
    DECARE var2 VARCHAR(300);
    DECLARE structuredtype STATEUDT;
    SET var1 = 92069;
    SET var2 = 'California";
    INSERT INTO T1 VALUES (var1, structuredtype.state(var2));
```

### Using a Mutator Method in a SET Expression:

```
UPDATE resultstable SET structuredcol=:structuredtype.attribute1();
```

### Create Procedure:

```
CREATE PROCEDURE ups02(IN pi udtint)
BEGIN
    FOR fcode AS b_code CURSOR WITHOUT RETURN FOR
        SELECT udt2 FROM tab2 WHERE col1 = :pi.method1()
    DO
        UPDATE tab2
        SET col2 = :fcode.udt2.method1()
        WHERE col1 = :pi.method1()
    ELSE
        INSERT INTO tab2(:pi, :fcode.udt2.method1());
    END FOR;
END;
```

### Create Procedure:

```
CREATE PROCEDURE cas01 (OUT p1 invs_structured_date)
BEGIN
    DECLARE vudt invs_structured_date AS NEW invs_structured_date();
    SET p1= NEW invs_structured_date(CAST('02/02/02' AS DATE));
END;
```

See *SQL Stored Procedures and Embedded SQL* for details about how UDTs interact with stored procedure control language features.



## Example 21: Specifying a Dynamic UDT Within an SQL Stored Procedure

The following example shows one way to specify a dynamic UDT within an SQL stored procedure.

First create the procedure:

```
CREATE PROCEDURE testsp2
  (INOUT p2 INTEGER,
   OUT  p3 INTEGER)
BEGIN
  SET p2 = testudf1(NEW VARIANT_TYPE (p2 AS p1));
  SET p3 = testudf1(NEW VARIANT_TYPE (1 AS p1));
END;

.COMPILE FILE test2.spl

*** Procedure has been created.
*** Total elapsed time was 1 second.
```

Now call the newly created procedure, adding 2 to the input value, to show that it works properly:

```
CALL testsp2(1,p3);

*** Procedure has been executed.
*** Total elapsed time was 1 second.
```

|      |       |
|------|-------|
| 1    | p3    |
| ---- | ----- |
| 3    | 3     |

For more information about the CALL statement, see *SQL Data Manipulation Language*. For more information about the NEW VARIANT\_TYPE expression, see *SQL Functions, Operators, Expressions, and Predicates*.

## Example 22: Creating an SQL Procedure That Specifies Recursion

The following CREATE PROCEDURE definition specifies recursion.

```
CREATE PROCEDURE rqspl(
  OUT rowcnt INTEGER)
BEGIN
  DECLARE target1 INTEGER DEFAULT 0;
  DECLARE target2 INTEGER DEFAULT 0;
  DECLARE target3 INTEGER DEFAULT 0;
  DECLARE finalcount INTEGER DEFAULT 0;
  DECLARE pscursor SCROLL CURSOR FOR
  WITH RECURSIVE RQ(x,y,depth) AS
  (
    SELECT a1, b1, 0
    FROM t1
    UNION ALL
    SELECT a1, y, depth+1
    FROM RQ,t1
    WHERE y = a1
    AND   depth < 10
  )
```

```
SELECT *
FROM RQ;
OPEN pscursor;
FETCH pscursor INTO target1, target2, target3;
-- if there is no row from the cursor,
-- SQLCODE=7632, SQLSTATE=02000
WHILE (SQLCODE <> 7632)
DO
    FETCH pscursor INTO target1, target2, target3;
    SET finalcount = finalcount+1;
END WHILE;
CLOSE pscursor;
SET rowcnt = finalcount;
END;
```

## Related Topics

See the following manuals and statements for related information:

- [SQL Data Manipulation Language](#)
- [SQL Stored Procedures and Embedded SQL](#)
- [“ALTER PROCEDURE \(SQL Form\)” on page 25](#)
- [“DROP MACRO/ DROP PROCEDURE/ DROP TABLE/ DROP TRIGGER/ DROP VIEW” on page 574](#)
- [“RENAME MACRO/ RENAME PROCEDURE/ RENAME TABLE/ RENAME TRIGGER/ RENAME VIEW” on page 638](#)
- [“SET QUERY\\_BAND” on page 649](#)
- [“HELP PROCEDURE” on page 738](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)

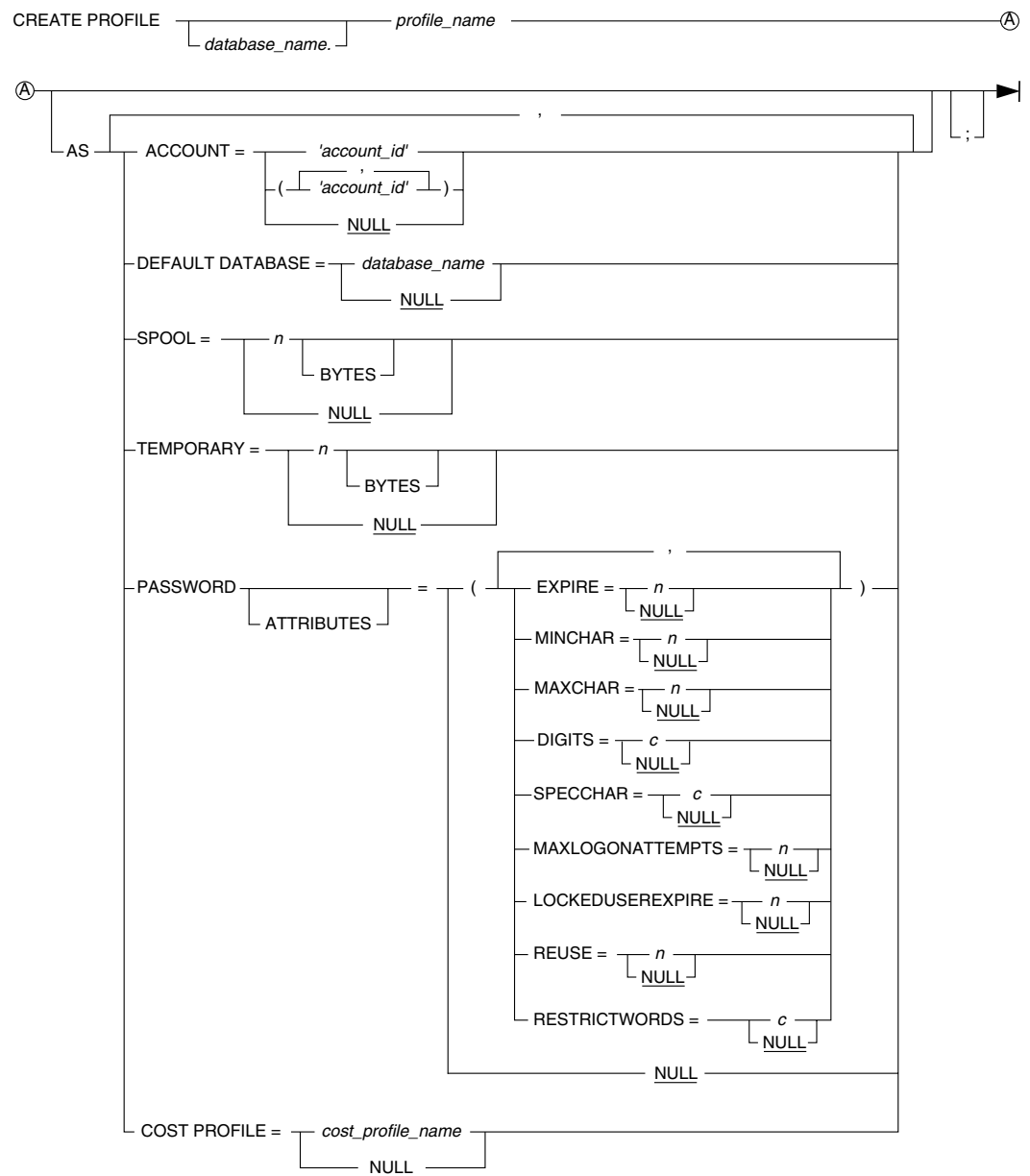
Also see [“CREATE PROCEDURE \(External Form\)/ REPLACE PROCEDURE \(External Form\)” on page 276](#) and *SQL External Routine Programming* for information about how to create external stored procedures.

# CREATE PROFILE

## Purpose

Creates a profile that defines a set of system parameters that can be assigned to a group of users.

## Syntax



1101B466

where:

| Syntax Element ...  | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>profile_name</i> | <p>the name of the profile to be created.</p> <p>A profile name must be unique among profiles.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| ACCOUNT             | <p>a keyword allowing you to specify the account for a user with this profile.</p> <p>If no account is defined in the profile assigned to a user, the system uses the setting defined for the user.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <i>account_id</i>   | <p>an APOSTROPHE character-quoted identifier or a list of identifiers of the accounts to charge for the space used by users with this profile. The first identifier becomes the default account for the user.</p> <p>If <i>account_id</i> is null or is not defined in the profile assigned to a user, the system uses the setting defined for the user.</p> <p>Each <i>account_id</i> can be up to 30 characters and must be enclosed by APOSTROPHE characters. See <i>SQL Fundamentals</i> for a description of Teradata Database identifiers and a list of the characters they can contain.</p> <p>A list of <i>account_ids</i> must be separated by commas and enclosed by LEFT PARENTHESIS and RIGHT PARENTHESIS characters.</p> <p>Accounts in a profile assigned to a user override any other accounts the user might have.</p> <p>You can associate a Priority Scheduler performance group with each account ID you specify. This assignment specifies the relative service priority for the account based on the Priority Scheduler parameters specified for it by the system administrator.</p> <p>Each performance group for an account is named using the syntax <code>\$group_name\$</code>. <i>group_name</i> is limited to 16 single-byte characters (or 16 bytes for multibyte character sets). Validation of a performance group name occurs only at logon.</p> <p>When you log on, the system validates the performance group name you specify against existing performance group names. If no match is found, the system assigns one to you by default. The default is one of the following, depending on the situation:</p> <ul style="list-style-type: none"> <li>• First account string defined for the profile.</li> <li>• First account string defined for the user.</li> <li>• Performance group M if the user has no account string with a defined performance group.</li> </ul> |

| Syntax Element ...            | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>account_id</i> (continued) | <p>The following interactive mode BTEQ logon commands are valid examples of how to specify a performance group:</p> <pre>.LOGON elnino/GMK '\$L2\$&amp;D&amp;TacctPUB'</pre> <pre>.LOGON elnino/KGM '\$L&amp;D&amp;TacctPUB'</pre> <p>Performance group names, their relative levels of service, and other related parameters are defined either by default or as individually customized variables by your system administrator. For more information about performance groups and other Priority Scheduler parameters, see <i>Utilities</i>.</p>       |
| DEFAULT DATABASE              | <p>a keyword allowing you to specify the default database for a user with this profile.</p> <p>If no default database is defined in the profile assigned to a user, the system uses the setting defined for the user.</p>                                                                                                                                                                                                                                                                                                                                |
| <i>database_name</i>          | <p>the name of the default database established each time a user with this profile logs onto the Teradata Database.</p> <p><i>database_name</i> need not be an existing database. The system returns an error when a user with this profile tries to create or reference an object within a nonexistent database.</p> <p>If the default database is NULL or is not defined in the profile assigned to a user, the system uses the setting defined for the user.</p>                                                                                      |
| SPOOL                         | <p>a keyword allowing you to specify the bytes allowed for spool files.</p> <p>If no spool space is defined in the profile assigned to a user, the system uses the setting defined for the user.</p>                                                                                                                                                                                                                                                                                                                                                     |
| <i>n</i> [BYTES]              | <p>the number of bytes (<i>n</i>) allowed for spool files. The default is null, which causes the system to use the setting defined for the user.</p> <p><i>n</i> cannot exceed the spool space parameter in the profile of the creator. If no spool space is defined for that profile, then the spool space limit defined for the user setting of the creator is used.</p> <p><i>n</i> can be an INTEGER value, a DECIMAL value, or a FLOATING POINT value.</p> <p><i>n</i> refers to bytes, whether or not the optional BYTES keyword is specified.</p> |
| TEMPORARY                     | <p>a keyword allowing you to define how much space to allow for creating materialized global temporary tables.</p> <p>If no temporary space is defined in the profile assigned to a user, the system uses the setting defined for the user.</p> <p>Temporary space is reserved prior to spool space for any user defined with this characteristic.</p> <p>Disk usage for a materialized global temporary table is charged to the temporary space allocation of the user who referenced the table.</p>                                                    |

| Syntax Element ...                                             | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |             |                                                                |                                                              |                                                                |                                                |                                                                |                                                             |
|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------|----------------------------------------------------------------|--------------------------------------------------------------|----------------------------------------------------------------|------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------|
| <i>n</i> BYTES                                                 | <p>the number of bytes (<i>n</i>) to allocate for global temporary table space. The default is NULL, which causes the system to use the setting defined for the user.</p> <p><i>n</i> cannot exceed the temporary space parameter in the profile of the creator. If no temporary space limit is defined for that profile, then the temporary space limit defined for the user setting of the creator is used.</p> <p><i>n</i> can be an integer, a decimal value, or a floating point value.</p> <p><i>n</i> refers to bytes, whether or not the optional BYTES keyword is specified.</p>                                                              |                   |             |                                                                |                                                              |                                                                |                                                |                                                                |                                                             |
| PASSWORD<br>[ATTRIBUTES]                                       | <p>a keyword allowing you to define password security attributes for users authenticated by Teradata Database. This does <i>not</i> affect externally authenticated user passwords, which are not known to Teradata Database.</p> <p>The default value is NULL for password attributes that are not defined in the profile for a user. This causes the system to use the system setting.</p> <p>Password security attributes defined in a profile take effect the next time a user logs on.</p> <p>Password formatting does not apply to multibyte client character sets on systems enabled with Japanese language support.</p>                        |                   |             |                                                                |                                                              |                                                                |                                                |                                                                |                                                             |
| EXPIRE = <i>n</i>                                              | <p>the number of days to elapse before the password expires.</p> <p>A value of 0 for <i>n</i> indicates the password never expires.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                   |             |                                                                |                                                              |                                                                |                                                |                                                                |                                                             |
| MINCHAR = <i>n</i>                                             | <p>the minimum number of characters in a password string.</p> <p>The valid range for <i>n</i> is 1 to 30.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |             |                                                                |                                                              |                                                                |                                                |                                                                |                                                             |
| MAXCHAR = <i>n</i>                                             | <p>the maximum number of characters in a password string.</p> <p>The valid range for <i>n</i> is 1 to 30.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |             |                                                                |                                                              |                                                                |                                                |                                                                |                                                             |
| DIGITS = <i>c</i>                                              | <p>whether at least one digit must appear in a password string.</p> <table border="1"> <thead> <tr> <th>Value of <i>c</i></th><th>Description</th></tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> <li>Y</li> <li>y</li> </ul> </td><td>Digits are permitted in a password string, but not required.</td></tr> <tr> <td> <ul style="list-style-type: none"> <li>N</li> <li>n</li> </ul> </td><td>Digits are not permitted in a password string.</td></tr> <tr> <td> <ul style="list-style-type: none"> <li>R</li> <li>r</li> </ul> </td><td><i>At least</i> one digit is required in a password string.</td></tr> </tbody> </table> | Value of <i>c</i> | Description | <ul style="list-style-type: none"> <li>Y</li> <li>y</li> </ul> | Digits are permitted in a password string, but not required. | <ul style="list-style-type: none"> <li>N</li> <li>n</li> </ul> | Digits are not permitted in a password string. | <ul style="list-style-type: none"> <li>R</li> <li>r</li> </ul> | <i>At least</i> one digit is required in a password string. |
| Value of <i>c</i>                                              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |             |                                                                |                                                              |                                                                |                                                |                                                                |                                                             |
| <ul style="list-style-type: none"> <li>Y</li> <li>y</li> </ul> | Digits are permitted in a password string, but not required.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |             |                                                                |                                                              |                                                                |                                                |                                                                |                                                             |
| <ul style="list-style-type: none"> <li>N</li> <li>n</li> </ul> | Digits are not permitted in a password string.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                   |             |                                                                |                                                              |                                                                |                                                |                                                                |                                                             |
| <ul style="list-style-type: none"> <li>R</li> <li>r</li> </ul> | <i>At least</i> one digit is required in a password string.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |             |                                                                |                                                              |                                                                |                                                |                                                                |                                                             |

| Syntax Element ...                                                 | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                            |             |                                                                    |                                                                                         |                                                                    |                                                |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------|------------------------------------------------|
| SPECCHAR = <i>c</i>                                                | <p>whether user names, mixed case characters, or special characters are allowed, not required, or not allowed in a password string.</p> <p>The valid values for <i>c</i>, all of which are case insensitive, are as follows:</p> <ul style="list-style-type: none"> <li>• A or a</li> <li>• B or b</li> <li>• C or c</li> <li>• D or d</li> <li>• E or e</li> <li>• F or f</li> <li>• G or g</li> <li>• H or h</li> <li>• I or i</li> <li>• J or j</li> <li>• K or k</li> <li>• L or l</li> <li>• M or m</li> <li>• N or n</li> <li>• O or o</li> <li>• P or p</li> <li>• R or r</li> <li>• Y or y</li> </ul> <p>See the CREATE PROFILE topic “SPECCHAR Option Rules” in <i>SQL Data Definition Language Detailed Topics</i> for the meanings of these characters and the password rules they implement.</p> |                            |             |                                                                    |                                                                                         |                                                                    |                                                |
| MAXLOGONATTEMPTS = <i>n</i>                                        | <p>the number of incorrect logon attempts allowed before locking the user from further attempts.</p> <p>A value of 0 for <i>n</i> indicates never to lock the user.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |             |                                                                    |                                                                                         |                                                                    |                                                |
| LOCKEDUSEREXPIRE = <i>n</i>                                        | <p>the number of minutes to elapse before unlocking a locked user.</p> <table border="1"> <thead> <tr> <th>Special Values of <i>n</i></th><th>Description</th></tr> </thead> <tbody> <tr> <td>0</td><td>Unlocks the user immediately.</td></tr> <tr> <td>-1</td><td>Locks the user indefinitely.</td></tr> </tbody> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Special Values of <i>n</i> | Description | 0                                                                  | Unlocks the user immediately.                                                           | -1                                                                 | Locks the user indefinitely.                   |
| Special Values of <i>n</i>                                         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |             |                                                                    |                                                                                         |                                                                    |                                                |
| 0                                                                  | Unlocks the user immediately.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                            |             |                                                                    |                                                                                         |                                                                    |                                                |
| -1                                                                 | Locks the user indefinitely.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                            |             |                                                                    |                                                                                         |                                                                    |                                                |
| REUSE = <i>n</i>                                                   | <p>the number of days to elapse before a password can be reused.</p> <p>A value of 0 for <i>n</i> allows the password to be reused immediately.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                            |             |                                                                    |                                                                                         |                                                                    |                                                |
| RESTRICTWORDS = <i>c</i>                                           | <p>whether certain words are restricted from use within a password string.</p> <table border="1"> <thead> <tr> <th>Value of <i>c</i></th><th>Description</th></tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> <li>• Y</li> <li>• y</li> </ul> </td><td>Any words listed in <i>DBC.PasswordRestrictions</i> cannot be used in password strings.</td></tr> <tr> <td> <ul style="list-style-type: none"> <li>• N</li> <li>• n</li> </ul> </td><td>No words are restricted from password strings.</td></tr> </tbody> </table> <p>See <i>Security Administration</i> and <i>Database Administration</i> for details.</p>                                                                                                                                                                       | Value of <i>c</i>          | Description | <ul style="list-style-type: none"> <li>• Y</li> <li>• y</li> </ul> | Any words listed in <i>DBC.PasswordRestrictions</i> cannot be used in password strings. | <ul style="list-style-type: none"> <li>• N</li> <li>• n</li> </ul> | No words are restricted from password strings. |
| Value of <i>c</i>                                                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |             |                                                                    |                                                                                         |                                                                    |                                                |
| <ul style="list-style-type: none"> <li>• Y</li> <li>• y</li> </ul> | Any words listed in <i>DBC.PasswordRestrictions</i> cannot be used in password strings.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |             |                                                                    |                                                                                         |                                                                    |                                                |
| <ul style="list-style-type: none"> <li>• N</li> <li>• n</li> </ul> | No words are restricted from password strings.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |             |                                                                    |                                                                                         |                                                                    |                                                |
| COST PROFILE =<br><i>cost_profile_name</i>                         | <p>the cost profile to be associated with <i>profile_name</i>.</p> <p>The default is NULL, meaning use the default system profile.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                            |             |                                                                    |                                                                                         |                                                                    |                                                |

## ANSI Compliance

CREATE PROFILE is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

To use CREATE PROFILE, you must have the CREATE PROFILE privilege.

New users do not implicitly have the CREATE PROFILE privilege. User *DBC* or a user who has the CREATE PROFILE privilege WITH GRANT OPTION can grant this privilege to another user.

## Privileges Granted Automatically

None.

## Example 1

The following statement creates a profile called *human\_resources* that defines the default database to be *personnel*:

```
CREATE PROFILE human_resources AS
  DEFAULT DATABASE = personnel;
```

The following statement assigns the *human\_resources* profile to a new user:

```
CREATE USER marks AS
  PROFILE = human_resources;
```

## Example 2

The following statement defines user-level password security attributes for a profile called *human\_resources*:

```
CREATE PROFILE human_resources AS
  DEFAULT DATABASE = personnel
  , PASSWORD =
  (EXPIRE = 90
  , MAXLOGONATTEMPTS = 10
  , LOCKEDUSEREXPIRE = -1);
```

The following statement assigns the *human\_resources* profile to user marks:

```
MODIFY USER marks AS
  PROFILE = human_resources;
```



## Related Topics

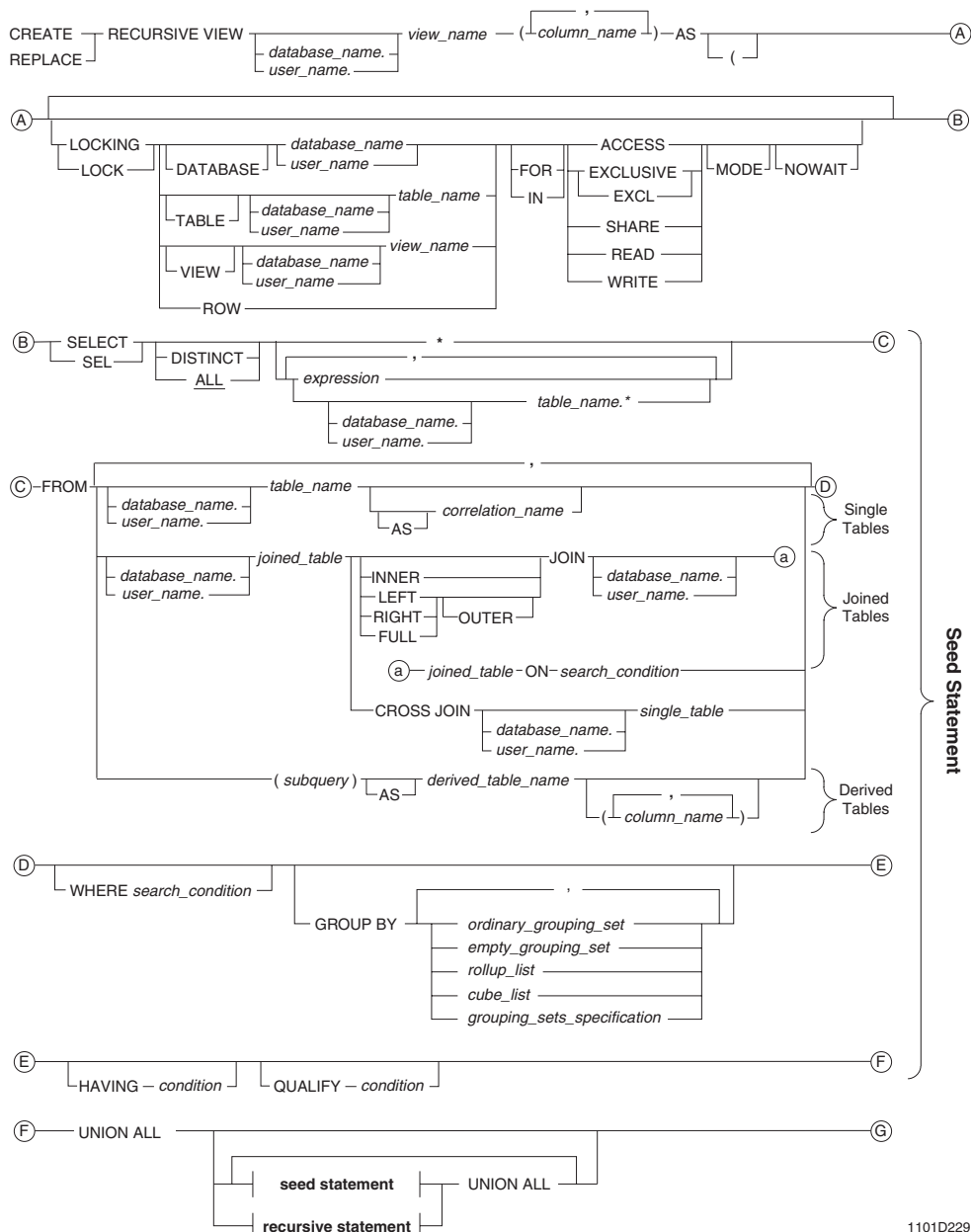
| FOR more information on ...              | SEE ...                                                                                                                                         |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| assigning profiles to users              | <ul style="list-style-type: none"><li>• <a href="#">“CREATE USER” on page 524</a></li><li>• <a href="#">“MODIFY USER” on page 623</a></li></ul> |
| changing system parameters for a profile | <a href="#">“MODIFY PROFILE” on page 617</a>                                                                                                    |
| obtaining the CREATE PROFILE privilege   | “GRANT (SQL Form)” in <i>SQL Data Control Language</i>                                                                                          |
| system-level password attributes         | <i>Security Administration</i>                                                                                                                  |

# CREATE RECURSIVE VIEW/ REPLACE RECURSIVE VIEW

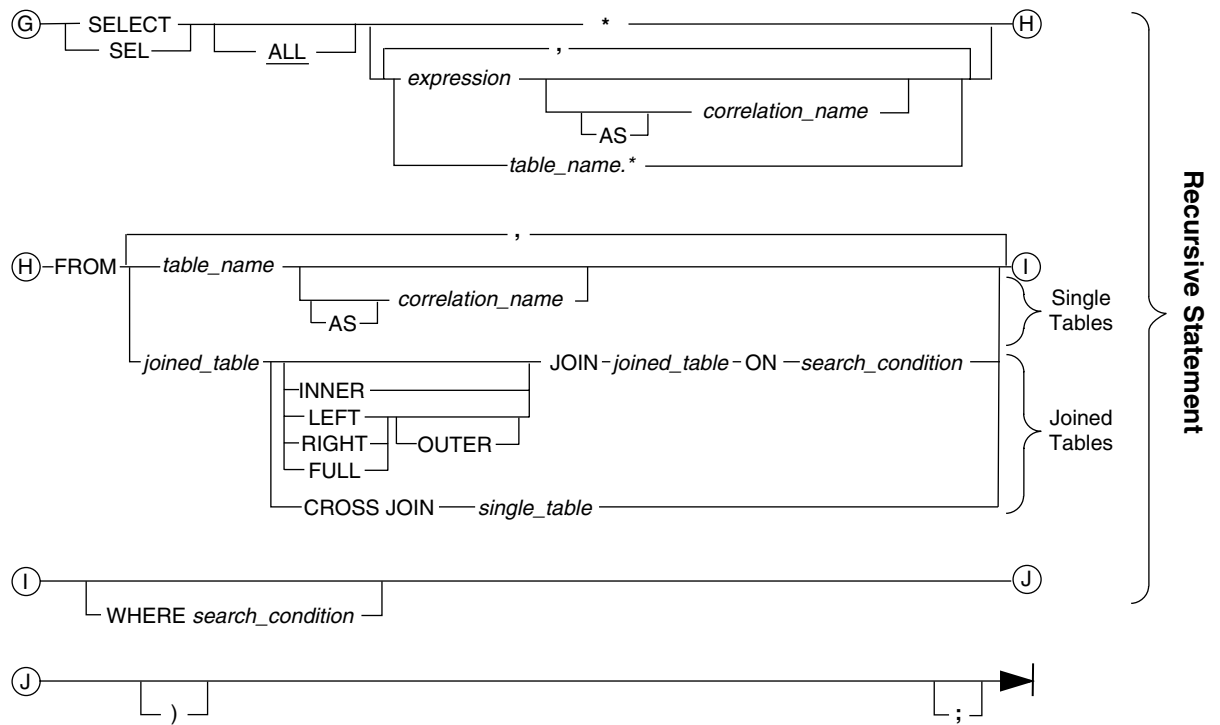
## Purpose

Creates or replaces a recursive view definition.

## Syntax



1101D229



1101A230

where:

| Syntax Element ...                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>view_name</i> if something other than the current database or user.                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>view_name</i>                        | the name of the recursive view to be created or replaced.<br>If <i>view_name</i> is not fully qualified, the default database is used.                                                                                                                                                                                                                                                                                                                                                         |
| <i>column_name</i>                      | the mandatory name of a view column or column set. If more than one column is specified, list their names in the order in which each is to be displayed for the view.                                                                                                                                                                                                                                                                                                                          |
| AS                                      | an introduction to the view definition.                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| LOCKING Clause                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| LOCK[ING]                               | the type of lock to be placed on a database, table, view, or row hash. This setting will override any default lock placed on that object by the system (see the CREATE VIEW/REPLACE VIEW topic “Views and the LOCKING Request Modifier” in <i>SQL Data Definition Language Detailed Topics</i> and <i>SQL Data Manipulation Language</i> ).<br>You can specify a LOCKING clause in the seed portion of a recursive view definition, but <i>not</i> in the recursive portion of its definition. |
| DATABASE                                | that a lock is to be placed at the database level for this view definition.                                                                                                                                                                                                                                                                                                                                                                                                                    |

| Syntax Element ...                            | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>  <br><i>user_name</i>    | the name of the database or user to be locked.                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| TABLE<br>VIEW                                 | that a lock is to be placed at the table or view level for this view definition.                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>database_name</i>  <br><i>user_name</i>    | the name of the containing database or user for <i>table_name</i> or <i>view_name</i> if different from the current database or user                                                                                                                                                                                                                                                                                                                                                              |
| <i>table_name</i>                             | the name of a user base table to be locked for this view definition.<br><br>You can create views that reference global temporary tables and volatile tables.<br><br>A view can reference a global temporary trace table (see <a href="#">“CREATE GLOBAL TEMPORARY TRACE TABLE” on page 186</a> ), but such a view is not updatable.                                                                                                                                                               |
| <i>view_name</i>                              | the name of a view to be locked for this view definition.                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| ROW                                           | that a lock is to be placed at the row hash level for this view definition.                                                                                                                                                                                                                                                                                                                                                                                                                       |
| FOR<br>IN                                     | a noise keyword that introduces the severity of the lock to be placed.                                                                                                                                                                                                                                                                                                                                                                                                                            |
| ACCESS<br>READ<br>SHARE<br>WRITE<br>EXCLUSIVE | the severity of the lock to be placed when accessing base tables through this view.<br><br>SHARE is a synonym for READ.                                                                                                                                                                                                                                                                                                                                                                           |
| MODE                                          | an optional keyword.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| NOWAIT                                        | that if the indicated lock cannot be obtained, the statement using this view should be aborted.<br><br>This feature is used to handle conditions such as a potential deadly embrace situation, where it is not desirable to have a statement waiting for resources, possibly tying up other resources in the process of waiting for a lock to become available.                                                                                                                                   |
| SELECT Clause                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| SELECT                                        | that the <i>expression</i> to be associated with the <i>column_name</i> list is to select from one or more existing user base tables or views.                                                                                                                                                                                                                                                                                                                                                    |
| DISTINCT                                      | that only one row is to be returned from any set of duplicates that might result from a given <i>expression</i> list.<br><br>Two rows are considered duplicates only if each value in one is equal to each corresponding value in the other.<br><br>The DISTINCT operator is only valid when used within a seed statement (see the CREATE RECURSIVE VIEW/REPLACE RECURSIVE VIEW topic “Seed Statement Component of the View Definition” in <i>SQL Data Definition Language Detailed Topics</i> ). |

| Syntax Element ...                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ALL                                     | that all rows, including duplicates, are to be returned in the results of the expression list.<br>This is the default value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <i>expression</i>                       | a valid SQL expression.<br>You can specify both aggregate and arithmetic operators in the seed query of a view definition expression, but <i>not</i> in its recursive query.<br>The presence of aggregates in a view definition renders that view non-updatable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| *                                       | that all columns from all tables referenced in the FROM clause are to be returned.<br>When qualified by <i>table_name</i> , * specifies that all columns of only the user base table or view specified by <i>table_name</i> are to be returned.<br>View columns are explicitly enumerated when views are defined; therefore, if a table is changed after a view is defined, those changes will not appear if the SELECT * construct is used.                                                                                                                                                                                                                                                                                                                          |
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>table_name</i> if something other than the current database or user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <i>table_name</i>                       | the name of a user base table or view.<br>This can itself be a recursive reference in the recursive statement portion of the view definition. You cannot make a reference to a recursive view in the seed statement of the view definition.<br>Use a <i>table_name</i> .* specification in the SELECT list to define the specific table from which rows are to be returned when two or more tables are referenced in the FROM clause.<br>You cannot create or replace a view on a queue table (see “CREATE TABLE (Queue Table Form)” on page 462).                                                                                                                                                                                                                    |
| FROM Clause                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| FROM                                    | the names of one or more tables or views from which <i>expression</i> is to be derived.<br>The FROM clause in a seed statement (see the CREATE RECURSIVE VIEW/REPLACE RECURSIVE VIEW topic “Seed Statement Component of the View Definition” in <i>SQL Data Definition Language Detailed Topics</i> ) must <i>not</i> reference <i>view_name</i> .<br>Either the FROM clause in a recursive statement (see the CREATE RECURSIVE VIEW/REPLACE RECURSIVE VIEW topic “Recursive Statement Component of the View Definition” in <i>SQL Data Definition Language Detailed Topics</i> ) or a subquery specified within the recursive statement <i>must</i> reference <i>view_name</i> .<br>See <i>SQL Data Manipulation Language</i> for information about the FROM clause. |

| Syntax Element ...                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>table_name</i> if something other than the current database.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <i>table_name</i> .*                    | to project all the columns from <i>table_name</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| [AS]<br><i>correlation_name</i>         | an alias name for the user base table that is referenced by <i>table_name</i> .<br><br>Correlation names are used to name table expressions and must always be specified for a self-join operation on the table.<br><br>Correlation names are also referred to as range variables.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>joined_table</i> if something other than the current database or user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <i>joined_table</i>                     | the name of a joined user base table or view.<br><br>You cannot create or replace a view on a queue table (see “ <a href="#">CREATE TABLE (Queue Table Form)</a> ” on page 462).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| [INNER]                                 | a join in which qualifying rows from one table are combined with qualifying rows from another table according to a specified join condition.<br><br>INNER is the form specified by the ANSI SQL-2003 standard. Teradata also supports an extension that allows you to separate join relations using COMMA characters.<br><br>Inner join is the default join type for view definitions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| [OUTER]                                 | a join in which qualifying rows from one table or view that do not have matches in the other table or view, are included in the join result. The rows from the outer table or view are extended with nulls.<br><br>Outer joins are only valid selectively in recursive view definitions. See the individual outer join types for specific information.<br><br>See <i>SQL Data Manipulation Language</i> for more information about outer joins.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| [LEFT] [OUTER]                          | an outer join on the table or view that was listed first in the FROM clause.<br><br>In a LEFT OUTER JOIN, the rows from the left table or view that are not returned in the result of the inner join of the two tables/views are returned in the outer join result and extended with nulls.<br><br>A left outer join is valid when coded within a seed statement (see the CREATE RECURSIVE VIEW/REPLACE RECURSIVE VIEW topic “Seed Statement Component of the View Definition” in <i>SQL Data Definition Language Detailed Topics</i> ).<br><br>Left outer joins are only valid within a recursive statement (see the CREATE RECURSIVE VIEW/REPLACE RECURSIVE VIEW topic “Recursive Statement Component of the View Definition” in <i>SQL Data Definition Language Detailed Topics</i> ) when the recursive query reference is the inner, or left, table in the outer join definition. |

| Syntax Element ...                       | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [RIGHT] [OUTER]                          | <p>an outer join on the table or view that was listed second in the FROM clause.</p> <p>In a RIGHT OUTER JOIN, the rows from the right table or view that are not returned in the result of the inner join of the two tables/views are returned in the outer join result and extended with nulls.</p> <p>A right outer join is valid when coded within a seed statement (see the CREATE RECURSIVE VIEW/REPLACE RECURSIVE VIEW topic “Seed Statement Component of the View Definition” in <i>SQL Data Definition Language Detailed Topics</i>).</p> <p>Right outer joins are only valid within a recursive statement (see the CREATE RECURSIVE VIEW/REPLACE RECURSIVE VIEW topic “Recursive Statement Component of the View Definition” in <i>SQL Data Definition Language Detailed Topics</i>) when the recursive query reference is the outer, or right, table in the outer join definition.</p> |
| [FULL] [OUTER]                           | <p>a join that returns rows, including nonqualifying rows, from both tables or views.</p> <p>In a FULL OUTER JOIN, rows from both tables that have not been returned in the result of the inner join are returned in the outer join result, and extended with nulls.</p> <p>Full outer joins are only valid when coded within a seed statement (see the CREATE RECURSIVE VIEW/REPLACE RECURSIVE VIEW topic “Recursive Statement Component of the View Definition” in <i>SQL Data Definition Language Detailed Topics</i>).</p>                                                                                                                                                                                                                                                                                                                                                                    |
| JOIN                                     | an introduction to the name of the second table to participate in the join.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <i>database_name</i><br><i>user_name</i> | the containing database or user for <i>joined_table</i> if something other than the current database or user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>joined_table</i>                      | <p>the name of the joined user base table, view, or derived table.</p> <p>This can itself be a recursive reference in the recursive statement portion of the view definition. You cannot make a reference to a recursive view in the seed statement of the view definition.</p> <p>You cannot create or replace a view on a queue table (see “<a href="#">CREATE TABLE (Queue Table Form)</a>” on page 462).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| ON <i>search_condition</i>               | one or more conditional expressions that must be satisfied by the result rows. An ON condition clause is required if the FROM clause specifies outer join syntax.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| CROSS JOIN                               | A CROSS JOIN is an unconstrained, or Cartesian join. The Cartesian product of two tables/views returns a concatenated product of all rows from all tables or views specified in the FROM clause.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>database_name</i><br><i>user_name</i> | the containing database or user for <i>single_table</i> if something other than the current database or user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>single_table</i>                      | <p>the name of a user base table or view participating in the join.</p> <p>You cannot create or replace a view on a queue table (see “<a href="#">CREATE TABLE (Queue Table Form)</a>” on page 462).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

| Syntax Element ...                                                                                                                                                                                                                                                                                                                                                                     | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p style="text-align: center;"><b>Derived Tables</b></p> <p>The derived table allows the FROM list to specify a spool file composed of selected data from underlying tables. The derived table acts like a viewed table.</p> <p>Derived tables are valid when coded as part of a seed query.</p> <p>Derived tables are <i>never</i> valid when coded as part of a recursive query.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <i>subquery</i>                                                                                                                                                                                                                                                                                                                                                                        | a SELECT statement that defines the derived table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| AS                                                                                                                                                                                                                                                                                                                                                                                     | an optional introductory clause to derived table name.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <i>derived_table_name</i>                                                                                                                                                                                                                                                                                                                                                              | the name of a derived table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <i>column_name</i>                                                                                                                                                                                                                                                                                                                                                                     | <p>a column name for a member of the set of all column names specified in the subquery SELECT list.</p> <p>Specify only an unqualified column name here; do not use fully qualified forms such as the following:</p> <ul style="list-style-type: none"> <li>• <i>databasename.tablename.columnname</i></li> <li>• <i>tablename.columnname</i></li> </ul>                                                                                                                                                                                                                                                                                                     |
| <p style="text-align: center;"><b>WHERE Clause</b></p>                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| WHERE                                                                                                                                                                                                                                                                                                                                                                                  | an introduction to the search condition list in the SELECT statement.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>search_condition</i>                                                                                                                                                                                                                                                                                                                                                                | a conditional search expression that must be satisfied by the row set returned by the specified SELECT statement.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| GROUP BY                                                                                                                                                                                                                                                                                                                                                                               | <p>an introduction to an optional reference to one or more expressions in the select expression list used to group rows in the result set.</p> <p>A GROUP BY clause is valid when coded as part of a seed statement (see the CREATE RECURSIVE VIEW/REPLACE RECURSIVE VIEW topic “Seed Statement Component of the View Definition” in <i>SQL Data Definition Language Detailed Topics</i>).</p> <p>GROUP BY is <i>never</i> valid when coded as part of a recursive statement (see the CREATE RECURSIVE VIEW/REPLACE RECURSIVE VIEW topic “Recursive Statement Component of the View Definition” in <i>SQL Data Definition Language Detailed Topics</i>).</p> |



| Syntax Element ...                 | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                  |            |                    |                                                                                                                                                                                                                                                                              |                        |                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ordinary_grouping_set</i>       | <p>a column expression by which the rows returned by the request are grouped.</p> <p><i>ordinary_grouping_set</i> falls into three general categories:</p> <table> <tr> <th>Ordinary Grouping Set Expression</th><th>Definition</th></tr> <tr> <td><i>column_name</i></td><td> <p>a set of column names drawn from the list of tables specified in the FROM clause of the SELECT statement that is used in the GROUP BY clause to specify the columns by which data is to be grouped.</p> <p>You cannot include LOB columns in the grouping expression.</p> </td></tr> <tr> <td><i>column_position</i></td><td> <p>the sequential numeric position of columns within the <i>column_list</i> clause of the SELECT statement that is used in the GROUP BY clause to specify the order in which data is to be grouped.</p> <p>This must be a positive integer.</p> <p>You cannot include LOB columns in the grouping expression.</p> <p>Use of <i>column_position</i> is a Teradata extension to the ANSI SQL-2003 standard.</p> </td></tr> <tr> <td><i>expression</i></td><td> <p>any list of valid SQL expressions specified for the GROUP BY clause.</p> <p>You can specify <i>column_name</i>, <i>column_position</i>, and <i>expression</i> either as individual entries or as a list.</p> <p>You cannot include LOB columns in the ordinary grouping set.</p> <p>Use of <i>expression</i> is a Teradata extension to the ANSI SQL-2003 standard.</p> </td></tr> </table> | Ordinary Grouping Set Expression | Definition | <i>column_name</i> | <p>a set of column names drawn from the list of tables specified in the FROM clause of the SELECT statement that is used in the GROUP BY clause to specify the columns by which data is to be grouped.</p> <p>You cannot include LOB columns in the grouping expression.</p> | <i>column_position</i> | <p>the sequential numeric position of columns within the <i>column_list</i> clause of the SELECT statement that is used in the GROUP BY clause to specify the order in which data is to be grouped.</p> <p>This must be a positive integer.</p> <p>You cannot include LOB columns in the grouping expression.</p> <p>Use of <i>column_position</i> is a Teradata extension to the ANSI SQL-2003 standard.</p> | <i>expression</i> | <p>any list of valid SQL expressions specified for the GROUP BY clause.</p> <p>You can specify <i>column_name</i>, <i>column_position</i>, and <i>expression</i> either as individual entries or as a list.</p> <p>You cannot include LOB columns in the ordinary grouping set.</p> <p>Use of <i>expression</i> is a Teradata extension to the ANSI SQL-2003 standard.</p> |
| Ordinary Grouping Set Expression   | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                  |            |                    |                                                                                                                                                                                                                                                                              |                        |                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                                                                                                                                                                                                                                                                                                                                                            |
| <i>column_name</i>                 | <p>a set of column names drawn from the list of tables specified in the FROM clause of the SELECT statement that is used in the GROUP BY clause to specify the columns by which data is to be grouped.</p> <p>You cannot include LOB columns in the grouping expression.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                  |            |                    |                                                                                                                                                                                                                                                                              |                        |                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                                                                                                                                                                                                                                                                                                                                                            |
| <i>column_position</i>             | <p>the sequential numeric position of columns within the <i>column_list</i> clause of the SELECT statement that is used in the GROUP BY clause to specify the order in which data is to be grouped.</p> <p>This must be a positive integer.</p> <p>You cannot include LOB columns in the grouping expression.</p> <p>Use of <i>column_position</i> is a Teradata extension to the ANSI SQL-2003 standard.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                  |            |                    |                                                                                                                                                                                                                                                                              |                        |                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                                                                                                                                                                                                                                                                                                                                                            |
| <i>expression</i>                  | <p>any list of valid SQL expressions specified for the GROUP BY clause.</p> <p>You can specify <i>column_name</i>, <i>column_position</i>, and <i>expression</i> either as individual entries or as a list.</p> <p>You cannot include LOB columns in the ordinary grouping set.</p> <p>Use of <i>expression</i> is a Teradata extension to the ANSI SQL-2003 standard.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                  |            |                    |                                                                                                                                                                                                                                                                              |                        |                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                                                                                                                                                                                                                                                                                                                                                            |
| <i>empty_grouping_set</i>          | a contiguous LEFT PARENTHESIS, RIGHT PARENTHESIS pair with no argument. In general, this syntax is used to request a grand total.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                  |            |                    |                                                                                                                                                                                                                                                                              |                        |                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                                                                                                                                                                                                                                                                                                                                                            |
| <i>rollup_list</i>                 | a ROLLUP expression that reports result rows in a single dimension with one or more levels of detail. See <i>SQL Data Manipulation Language</i> for further information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                  |            |                    |                                                                                                                                                                                                                                                                              |                        |                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                                                                                                                                                                                                                                                                                                                                                            |
| <i>cube_list</i>                   | a CUBE expression that reports result rows in multiple dimensions with one or more levels of detail. See <i>SQL Data Manipulation Language</i> for further information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                  |            |                    |                                                                                                                                                                                                                                                                              |                        |                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                                                                                                                                                                                                                                                                                                                                                            |
| <i>grouping_sets_specification</i> | <p>a GROUPING SETS expression that reports result rows in one of two ways:</p> <ul style="list-style-type: none"> <li>As a single dimension, but without a full ROLLUP.</li> <li>As multiple dimensions, but without a full CUBE.</li> </ul> <p>See <i>SQL Data Manipulation Language</i> for further information.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                  |            |                    |                                                                                                                                                                                                                                                                              |                        |                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                                                                                                                                                                                                                                                                                                                                                            |

| Syntax Element ...    | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>HAVING Clause</b>  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| HAVING                | <p>an introduction to a conditional grouping clause in the SELECT statement.</p> <p>A HAVING clause is valid when coded as part of a seed statement (see the CREATE RECURSIVE VIEW/REPLACE RECURSIVE VIEW topic “Seed Statement Component of the View Definition” in <i>SQL Data Definition Language Detailed Topics</i>).</p> <p>HAVING is <i>never</i> valid when coded as part of a recursive statement (see the CREATE RECURSIVE VIEW/REPLACE RECURSIVE VIEW topic “Recursive Statement Component of the View Definition” in <i>SQL Data Definition Language Detailed Topics</i>).</p>                                |
| <i>condition</i>      | <p>one or more conditional Boolean expressions that must be satisfied by the results groups.</p> <p>You can use aggregate operators in a HAVING condition.</p> <p>You cannot include BLOB, CLOB, UDT, or Period columns in the HAVING condition.</p> <p>HAVING <i>condition</i> filters rows from a single group defined in the select expression list that has only aggregate results, or it selects rows from the group or groups defined in a GROUP BY clause.</p>                                                                                                                                                     |
| <b>QUALIFY Clause</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| QUALIFY               | <p>an introduction to a conditional ordered analytical function filtering clause in the SELECT statement.</p> <p>A QUALIFY clause is valid when coded as part of a seed statement (see the CREATE RECURSIVE VIEW/REPLACE RECURSIVE VIEW topic “Seed Statement Component of the View Definition” in <i>SQL Data Definition Language Detailed Topics</i>).</p> <p>QUALIFY is <i>never</i> valid when coded as part of a recursive statement (see the CREATE RECURSIVE VIEW/REPLACE RECURSIVE VIEW topic “Recursive Statement Component of the View Definition” in <i>SQL Data Definition Language Detailed Topics</i>).</p> |
| <i>condition</i>      | <p>one or more conditional Boolean expressions that must be satisfied by the results groups.</p> <p>You can use aggregate operators in a QUALIFY condition.</p> <p>You cannot include BLOB, CLOB, UDT, or Period columns in the QUALIFY condition.</p> <p>QUALIFY <i>condition</i> filters rows from a previously computed ordered analytical function.</p>                                                                                                                                                                                                                                                               |

## ANSI Compliance

CREATE RECURSIVE VIEW is compliant with the ANSI SQL:2008 standard.

REPLACE RECURSIVE VIEW is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

To create<sup>2</sup> a recursive view, you must have the CREATE VIEW privilege.

To replace an existing recursive view, you must have the DROP VIEW privilege on the view or its containing database.

The creator receives the DROP VIEW and SELECT privileges on the newly created recursive view WITH GRANT OPTION.

If a user other than the owner needs to access a recursive view, then all of the relevant privileges required by the immediate owner of the recursive view to access underlying tables and views must also be held by the user of the recursive view WITH GRANT OPTION.

You cannot update, in the most general use of the word, a base table through a recursive view. In other words, you cannot reference a recursive view using any of the following SQL DML statements:

- DELETE
- INSERT
- MERGE
- UPDATE

If you attempt to update a view using any of these statements, the system returns an error to the requestor.

Because of this, there are no privileges associated with update operations on a recursive view.

## Privileges Granted Automatically

When you create a new view, the following privileges are automatically granted to it:

- DELETE
- DROP VIEW
- GRANT
- INSERT
- SELECT
- UPDATE

2. In this context, *create* means either to create a new recursive view using the CREATE RECURSIVE VIEW syntax or to create a new recursive view using the REPLACE RECURSIVE VIEW syntax. You can only use the REPLACE syntax to create a recursive view if that view does not already exist.

## Example 1: Controlling Infinite Recursion

The following example uses the flights table (see the CREATE RECURSIVE VIEW/REPLACE RECURSIVE VIEW topic “The Concept of Recursion” in *SQL Data Definition Language Detailed Topics*) to indicate a method for limiting the possibility of infinitely recursive processing of cyclic data:

```
CREATE RECURSIVE VIEW reachable_from (destination, cost, depth) AS (  
    SELECT root.destination, root.cost, 0 AS depth  
    FROM flights AS root  
    WHERE root.source = 'Paris'  
UNION ALL  
    SELECT out.destination, in.cost + out.cost, in.depth + 1 AS depth  
    FROM reachable_from AS in, flights AS out  
    WHERE in.destination = out.source  
    AND    in.depth <= 20);
```

This recursive view is written to be queried by the following SELECT statement:

```
SELECT *  
FROM reachable_from;
```

In this example, the variable depth is used as a counter, initialized to 0 within the seed query for the recursive view definition and incremented by 1 within the recursive query for the definition.

The AND condition of the WHERE clause then tests the counter to ensure that it never exceeds a value of 20. Because the depth counter was initialized to 0, this condition limits the recursion to 21 cycles.

## Example 2: A Simple Recursive View

This example uses the following base table as its base to build a simple recursive review definition with a counter to control the possibility of infinite recursion:

**partlist**

| Part | Subpart | Quantity |
|------|---------|----------|
| 00   | 01      | 5        |
| 00   | 05      | 3        |
| 01   | 02      | 2        |
| 01   | 03      | 3        |
| 01   | 04      | 4        |
| 02   | 05      | 7        |
| 02   | 06      | 6        |

This view is designed to be used to answer questions such as the following: Which parts are required to build part 01?<sup>3</sup>

The recursive view definition is as follows:

```
CREATE RECURSIVE VIEW rpl (part, subpart, quantity, depth) AS (
  SELECT root.part, root.subpart, root.quantity, 0 AS depth
  FROM partlist AS root
  WHERE root.part = '01'
  UNION ALL
  SELECT child.part, child.subpart, child.quantity, parent.depth + 1
  FROM rpl AS parent, partlist AS child
  WHERE parent.subpart = child.part
  AND   parent.depth <= 100;
```

The query to answer the question of which parts are required to build part 01 is the following SELECT statement:

```
SELECT part, subpart, quantity
FROM rpl
ORDER BY part, subpart, quantity;
```

The result set for this query is the following:

| Part | Subpart | Quantity |
|------|---------|----------|
| 01   | 02      | 2        |
| 01   | 03      | 3        |
| 01   | 04      | 4        |
| 02   | 05      | 7        |
| 02   | 06      | 6        |

### Example 3: Aggregate and Ordered Analytic Function Usage

The first recursive view definition demonstrates the valid use of an ordered analytic function, which is highlighted in **bold** typeface. The usage is valid because it is within the seed statement rather than the recursive statement of the definition.

```
CREATE RECURSIVE VIEW reachable_from (source, destination, cost,
  depth) AS (
  SELECT source, destination, MSUM(flights.cost, 25,
    flights.destination), 0 AS depth
  FROM flights
  UNION ALL
  SELECT in1.source, out1.destination, in1.cost + out1.cost,
    in1.depth + 1
  FROM reachable_from in1, flights AS out1
  WHERE in1.destination = out1.source
  AND   in1.depth <= 100);
```

3. Notice that as written, this query does not really answer the question because there might be more than 100 levels in the data. Strictly speaking, the question it asks is this: Which parts, up to a maximum of 100 levels, are required to build part 01.

The second recursive view definition demonstrates a non-valid use of the same ordered analytic function, which is again highlighted in **bold** typeface. The usage is not valid because it is within the recursive statement rather than the seed statement of the definition.

```
CREATE RECURSIVE VIEW oaf_problem (source, destination, mcost,
                                depth) AS (
    SELECT source, destination, MSUM(cost, 25, destination),
           0 AS depth
    FROM flights
    UNION ALL
    SELECT in1.source, out1.destination,
           MSUM(in1.mcost + out1.cost, 25, out1.destination),
           in1.depth + 1
    FROM oaf_problem AS in1, flights AS out1
    WHERE in1.destination = out1.source
    AND   in1.depth <= 100;
```

#### Example 4: GROUP BY Clause Usage

Similarly to aggregates and ordered analytic functions, a GROUP BY clause is valid when coded as part of the seed statement in a recursive view definition, but is not valid when coded as part of the recursive statement.

The first example demonstrates correct usage of a GROUP BY clause. In this example, the GROUP BY is coded as part of the seed statement.

```
CREATE RECURSIVE VIEW aggregation (source,destination,mycount) AS (
    SELECT source, destination, 0 AS mycount
    FROM flights
    GROUP BY source, destination
    UNION ALL
    SELECT in1.source, out1.destination, in1.mycount + 1
    FROM aggregation AS in1, flights AS out1
    WHERE in1.destination = out1.source
    AND   in1.mycount <=100);
```

The second example demonstrates non-valid usage of a GROUP BY clause. In this example, the GROUP BY clause is coded as part of the recursive statement.

```
CREATE RECURSIVE VIEW aggregation (source,destination,mycount) AS (
    SELECT source, destination, 0 AS mycount
    FROM flights
    UNION ALL
    SELECT in1.source, out1.destination, in1.mycount + 1
    FROM aggregation AS in1, flights AS out1
    WHERE in1.destination = out1.source
    AND   in1.mycount <=100
    GROUP BY in1.source, out1.destination);
```

## Example 5: Left Outer Join Usage

The first recursive view definition demonstrates a correct use of a left outer join, which is highlighted in **bold**. The usage is valid because the recursive relation in the recursive statement of the view definition is used as the outer relation in the left outer join.

```
CREATE RECURSIVE VIEW rec (f1, mycount) AS (  
    SELECT a1, 0 AS mycount  
    FROM nonrec  
    UNION ALL  
    SELECT a2, mycount + 1  
    FROM rec LEFT OUTER JOIN nonrec ON nonrec.a1 = rec.f1  
    WHERE rec.mycount <= 100);
```

The second recursive view definition demonstrates a non-valid use of a left outer join, which is highlighted in **bold**. The usage is not valid because the recursive relation in the recursive statement of the view definition is used as the inner relation in the left outer join.

```
CREATE RECURSIVE VIEW rec (f1, mycount) AS (  
    SELECT a1, 0 AS mycount  
    FROM nonrec  
    UNION ALL  
    SELECT a2, mycount + 1  
    FROM nonrec LEFT OUTER JOIN rec ON nonrec.a1 = rec.f1  
    WHERE rec.mycount <= 100);
```

Left outer joins can be used without restriction in the seed statement of a recursive view definition.

## Example 6: Right Outer Join Usage

The first recursive view definition demonstrates a correct use of a right outer join, which is highlighted in **bold** typeface. The usage is valid because the recursive relation in the recursive statement of the view definition is used as the outer relation in the right outer join.

```
CREATE RECURSIVE VIEW rec (f1, mycount) AS (  
    SELECT a1, 0 AS mycount  
    FROM nonrec  
    UNION ALL  
    SELECT a2, mycount + 1  
    FROM nonrec RIGHT OUTER JOIN rec ON nonrec.a1 = rec.f1  
    WHERE rec.mycount <= 100);
```

The second recursive view definition demonstrates a non-valid use of a right outer join, which is highlighted in **bold** typeface. The usage is not valid because the recursive relation in the recursive statement of the view definition is used as the inner relation in the right outer join.

```
CREATE RECURSIVE VIEW rec (f1, mycount) AS (  
    SELECT a1, 0 AS mycount  
    FROM nonrec  
    UNION ALL  
    SELECT a2, mycount + 1  
    FROM rec RIGHT OUTER JOIN nonrec ON nonrec.a1 = rec.f1  
    WHERE rec.mycount <= 100);
```

Right outer joins can be used without restriction in the seed statement of a recursive view definition.

## Example 7: Full Outer Join Usage

You cannot code a full outer join within the recursive statement of a recursive view definition.

Full outer joins can be used without restriction in the seed statement of a recursive view definition.

The first recursive view definition demonstrates a correct use of a full outer join, which is highlighted in **bold typeface**. The usage is valid because the full outer join is coded within the seed statement of the view definition.

```
CREATE RECURSIVE VIEW rec (f1, mycount) AS (  
    SELECT a1, 0 AS mycount  
    FROM nonrec1 FULL OUTER JOIN nonrec2 ON nonrec1.a1 = nonrec2.a2  
    UNION ALL  
    SELECT a2, mycount + 1  
    FROM nonrec, rec  
    WHERE rec.mycount <= 100);
```

The second recursive view definition demonstrates a non-valid use of a full outer join, which is highlighted in **bold typeface**. The usage is not valid because the recursive relation in the recursive statement of the view definition is used as the inner relation in the full outer join.

```
CREATE RECURSIVE VIEW rec (f1, mycount) AS (  
    SELECT a1, 0 AS mycount  
    FROM nonrec  
    UNION ALL  
    SELECT a2, mycount + 1  
    FROM nonrec FULL OUTER JOIN rec ON nonrec.a1 = rec.f1  
    WHERE rec.mycount <= 100);
```

## Example 8: Mutual Recursion

This example demonstrates mutual recursion, which is *not* supported for recursive view definitions.

Mutual recursion occurs when *both* of the following are true:

- Recursive view A invokes, either directly or indirectly, recursive view B.
- Recursive view B invokes, either directly or indirectly, recursive view A.

In the two mutually recursive view definitions provided here, the view named odd references the view named even, and vice versa.

```
CREATE RECURSIVE VIEW even (n) AS (  
    SELECT *  
    FROM (SELECT 0) AS a(i)  
    UNION ALL  
    SELECT m + 1  
    FROM odd);  
  
CREATE RECURSIVE VIEW odd (m) AS (  
    SELECT *  
    FROM (SELECT 1) AS a(i)  
    UNION ALL  
    SELECT n + 1  
    FROM even);
```



### Example 9: Simple REPLACE RECURSIVE VIEW

The following example replaces the existing definition for the recursive view named `rec` with the specified SQL code:

```
REPLACE RECURSIVE VIEW rec(p, mycount) AS (  
    SELECT n, 0 AS mycount  
    FROM t  
    WHERE n = 1  
    UNION ALL  
    SELECT rec.p, rec.mycount + 1  
    FROM t, rec  
    WHERE rec.p = t.n  
    AND    rec.mycount <= 20
```

### Example 10: RECURSIVE Specified for a Nonrecursive View

The view definition in the following example does not contain a reference to the recursive relation, `rec`, inside its own definition. Because of that omission, even though the statement specifies the keyword `RECURSIVE`, it does not define a recursive view. The result is that the view definition specifies a normal, non-recursive, view.

```
REPLACE RECURSIVE VIEW rec (p) AS (  
    SELECT n  
    FROM t  
    WHERE n = 1  
    UNION ALL  
    SELECT t.n  
    FROM t  
    WHERE t.n = 0;
```

The `RECURSIVE` keyword means only that a view definition is *potentially* recursive. This is analogous to the situation where a query written with an outer join specification only potentially makes an outer join, and, depending on how the conditions are specified, might make only an inner join.

Conversely, if you do not specify the `RECURSIVE` keyword, then the view *cannot* be recursive.

## Related Topics

See the following topic for more information related to recursive views specifically and view in general:

- [“CREATE VIEW/ REPLACE VIEW” on page 535](#)
- [“DROP MACRO/ DROP PROCEDURE/ DROP TABLE/ DROP TRIGGER/ DROP VIEW” on page 574](#)
- [“RENAME MACRO/ RENAME PROCEDURE/ RENAME TABLE/ RENAME TRIGGER/ RENAME VIEW” on page 638](#)
- [“HELP VIEW” on page 785](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)

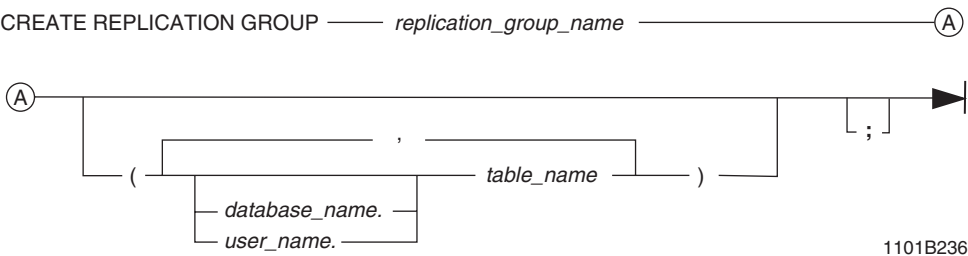
See *SQL Data Manipulation Language* for more information about recursion and recursive queries.

# CREATE REPLICATION GROUP

## Purpose

Creates a replication group definition.

## Syntax



where:

| Syntax element ...                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>group_name</i>                       | <p>a name for the defined replication group.</p> <p>A replication group name must be unique among the complete set of replication group names on a Teradata platform. It cannot be qualified.</p> <p>You cannot define a total combination of more than 1,300 replication groups, or tables that belong to replication groups, or replication group-to-RSG connections per system.</p> |
| <i>database_name</i>   <i>user_name</i> | <p>the optional qualifying name of the database or user that contains <i>table_name</i>.</p> <p>Note that <i>database_name</i> or <i>user_name</i> is required if <i>table_name</i> is not contained within the current database.</p>                                                                                                                                                  |

| Syntax element ... | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>table_name</i>  | <p>the optional name of a base table to be included in the defined replication group.</p> <p>You cannot define a total combination of more than 1,300 replication groups, or tables that belong to replication groups, or replication group-to-RSG connections per system.</p> <p>The following restrictions apply to any table included in the table list for this replication group:</p> <ul style="list-style-type: none"><li>• It must be a base table.</li><li>• It cannot be defined as a member of any other replication group.</li><li>• Its definition must already exist before you attempt to create the replication group (see <a href="#">“CREATE TABLE” on page 382</a>).</li></ul> <p>If you create a group without specifying a <i>table_name</i> set, the group is referred to as an empty group because it has no members.</p> <p>In this case, you must define a set of user-defined DDL capture rules using either the CREATE REPLICATION RULESET statement (see <a href="#">“CREATE REPLICATION RULESET/ REPLACE REPLICATION RULESET” on page 374</a>) or the ALTER REPLICATION GROUP ... ADD statement (see <a href="#">“ALTER REPLICATION GROUP” on page 30</a>).</p> |

ANSI Compliance

CREATE REPLICATION GROUP is a Teradata extension to the ANSI SQL:2008 standard.

Required Privileges

You must have the REPLCONTROL privilege to create a replication group.

Privileges Granted Automatically

None.

Example

The following example creates a replication group named *payables\_group* that includes the following three base tables, all of which are contained within the *payables* database on the primary platform, in its definition:

- Invoices
- Purchorders
- Transactions

```
CREATE REPLICATION GROUP payables_group (  
    payables.invoices,  
    payables.purchorders,  
    payables.transactions);
```

## Related Topics

Refer to the following resources for further information about replication services:

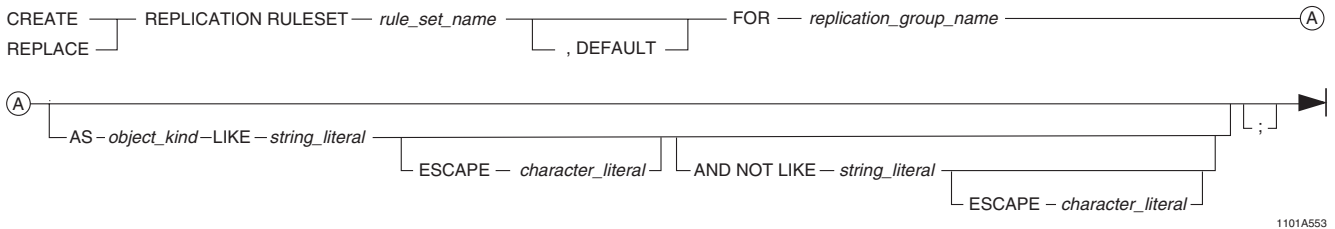
- [“ALTER TABLE” on page 33](#)
- [“CREATE REPLICATION RULESET/ REPLACE REPLICATION RULESET” on page 374](#)
- [“DROP REPLICATION GROUP” on page 580](#)
- [“DROP REPLICATION RULESET” on page 582](#)
- [“SET SESSION OVERRIDE REPLICATION” on page 678](#)
- [“SET SESSION SUBSCRIBER” on page 680](#)
- [“HELP REPLICATION GROUP” on page 740](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)
- *Performance Management*
- *Teradata Replication Solutions - GoldenGate Replication Products Overview*
- *GoldenGate™ Tutorial (Version 7.3 or later)*
- *GoldenGate™ Operations Guide for Windows and Unix (Version 7.3 or later)*
- *GoldenGate™ Reference Guide for Windows and Unix (Version 7.3 or later)*

# CREATE REPLICATION RULESET/ REPLACE REPLICATION RULESET

## Purpose

Creates a set of replication rules and associates them with the specified replication group and rule set name.

## Syntax



where:

| Syntax element ...         | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| rule_set_name              | the name to be assigned to the newly created rule set or the name of the existing rule set that is to be replaced by a new definition.<br><br>If you do not specify a rule set name, Teradata Database creates an empty rule set. You can use an empty rule set to enable automatic DDL replication.                                                                                                                 |
| DEFAULT                    | that all the rules in the rule set are default rules.<br><br>Teradata Database applies a default rule only if no other rule matches the replication object.<br><br>Nondefault rules must not match the same object as a nondefault rule that is associated with another replication group.<br><br>A default rule must not match the same object as a default rule that is associated with another replication group. |
| FOR replication_group_name | the name of the replication group to which this rule set is to be assigned.                                                                                                                                                                                                                                                                                                                                          |

| Syntax element ...                 | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AS <i>object_kind</i>              | <p>one or more types of database objects to be added to this replication rule set.</p> <p>The valid object kinds are specified using the following keywords:</p> <ul style="list-style-type: none"> <li>• INDEX</li> <li>• MACRO</li> <li>• TABLE</li> <li>• TEMPORARY TABLE</li> <li>• TRIGGER</li> <li>• VIEW</li> </ul> <p>If you do not specify a rule specification clause, the defined rule set is an empty rule set (see “CREATE REPLICATION RULESET/ REPLACE REPLICATION RULESET” in <i>SQL Data Definition Language Detailed Topics</i>).</p>                                                                                                                                                                                                                                                       |
| LIKE <i>string_literal</i>         | <p>pattern strings to match against the fully qualified names of the objects of certain SQL statements, as defined in the following CREATE REPLICATION RULESET/REPLACE REPLICATION RULESET topics in <i>SQL Data Definition Language Detailed Topics</i>: “LIKE and NOT LIKE Matching Patterns for Tables,” “LIKE and NOT LIKE Matching Patterns for Global Temporary Tables,” “LIKE and NOT LIKE Matching Patterns for Views,” “LIKE and NOT LIKE Matching Patterns for Macros,” “LIKE and NOT LIKE Matching Patterns for Hash and Join Indexes,” and “LIKE and NOT LIKE Matching Patterns for Triggers.”</p> <p>The specified string literals can contain wildcard characters. Pattern string matching is not case specific because object names in Teradata Database are not case sensitive.</p>          |
| ESCAPE <i>character_literal</i>    | <p>an escape character.</p> <p>The string literal specified with the [NOT] LIKE operator and the optional ESCAPE character are used together in the same way as the LIKE predicate operator (see <i>SQL Functions, Operators, Expressions, and Predicates</i>).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| AND NOT LIKE <i>string_literal</i> | <p>pattern strings not to be matched against the fully qualified names of the objects of certain SQL statements, as defined in the following CREATE REPLICATION RULESET/REPLACE REPLICATION RULESET topics in <i>SQL Data Definition Language Detailed Topics</i>: “LIKE and NOT LIKE Matching Patterns for Tables,” “LIKE and NOT LIKE Matching Patterns for Global Temporary Tables,” “LIKE and NOT LIKE Matching Patterns for Views,” “LIKE and NOT LIKE Matching Patterns for Macros,” “LIKE and NOT LIKE Matching Patterns for Hash and Join Indexes,” and “LIKE and NOT LIKE Matching Patterns for Triggers.”</p> <p>The specified string literals can contain wildcard characters. Pattern string matching is not case specific because object names in Teradata Database are not case sensitive.</p> |

## ANSI Compliance

CREATE REPLICATION RULESET is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have the REPLCONTROL privilege to perform CREATE REPLICATION RULESET or REPLACE REPLICATION RULESET.

## Privileges Granted Automatically

None.

### Example 1

Create a rule set named *sales1* for the replication group named *myrepgroup* to capture any table that is created in the *salesdb* database and also capture any DDL that affects any view in *salesdb* where the view name does *not* have the suffix *\_s*.

```
CREATE REPLICATION RULESET sales1 FOR myrepgroup AS
TABLE LIKE 'SalesDB.%',
VIEW LIKE 'SalesDB.%' AND NOT LIKE '%z_s' ESCAPE 'z';
```

Note the use of an ESCAPE character to override the normal treatment of the UNDERSCORE character (*\_*) as a wildcard.

### Example 2

Create an empty rule set to enable automatic replication as described in the CREATE REPLICATION RULESET/REPLACE REPLICATION RULESET topics: “Automatic Replication of DDL Affecting Group Members” and “Automatic Replication of Replication Group Properties” in *SQL Data Definition Language Detailed Topics*.

```
CREATE REPLICATION RULESET dummyruleset FOR myrepgroup;
```

### Example 3

Conflicting rules in a rule set are generally not detected at the time a rule set is created. Instead, they are usually detected when the rules are applied to the specified DDL statement.

```
CREATE REPLICATION RULESET sales1 FOR myrepgroup AS
TABLE LIKE 'SalesDB.Sales%' AND NOT LIKE 'SalesDB.%';
```

The system successfully creates this rule set, however there can never be a match for any DDL request such as the following:

```
CREATE VIEW salesdb.salesv AS SELECT ... FROM sales;
```

### Example 4

Rules for an object kind from different rule sets defined for a replication group are ORed together when the system is attempting to match with an object name. For example, the TABLE rules from rule sets *sales1* and *sales2* are ORed together to form the following TABLE rule:

```
(( 'SalesDB.SalesNW_1' LIKE 'SalesDB.SalesNW%' )
OR
( 'SalesDB.SalesNW_1' LIKE 'SalesDB.SalesSE%' ))
```



The table *salesdb.salesnw\_1* satisfies the TABLE rule from rule set *sales1*.

```
CREATE REPLICATION RULESET Sales1 FOR MyRepGroup AS
TABLE LIKE 'SalesDB.SalesNW%';

CREATE REPLICATION RULESET Sales2 FOR MyRepGroup AS
TABLE LIKE 'SalesDB.SalesSE%';

CREATE TABLE SalesDB.SalesNW_1 (
    Trans_Id Integer,
    Trans_Date TimeStamp,
    Trans_Qty Integer);
```

In the following example, the TABLE rule condition for the replication group *myrepgroup* is the following:

```
((('SalesDB.SalesNW_1' LIKE 'SalesDB.SalesNW%')
AND
('SalesDB.SalesNW_1' NOT LIKE 'SalesDB.SalesSE%'))
OR
(('SalesDB.SalesNW_1' LIKE 'SalesDB.SalesSE%')
AND
('SalesDB.SalesNW_1' NOT LIKE 'SalesDB.SalesNW%')))
```

The table *salesdb.salesnw\_1* satisfies the TABLE rule from rule set *sales1*.

```
CREATE REPLICATION RULESET sales1 FOR myrepgroup AS
TABLE LIKE 'SalesDB.SalesNW%' AND NOT LIKE 'SalesDB.SalesSE%';

CREATE REPLICATION RULESET sales2 FOR myrepgroup AS
TABLE LIKE 'SalesDB.SalesSE%' AND NOT LIKE 'SalesDB.SalesNW%';

CREATE TABLE salesdb.salesnw_1 (
    trans_id    INTEGER,
    trans_date  TIMESTAMP,
    trans_qty   INTEGER);
```

## Example 5

Rule matching is not case sensitive. In the following example, the table *salesdb.salesnw\_1* matches the TABLE rule defined by rule set *sales1*.

```
CREATE REPLICATION RULESET Sales1 FOR myrepgroup AS
TABLE LIKE 'SalesDB.SalesNW%';

CREATE TABLE salesdb.salesnw_1 (
    trans_id    INTEGER,
    trans_date  TIMESTAMP,
    trans_qty   INTEGER);
```

## Related Topics

Refer to the following resources for further information about replication services:

- [“ALTER REPLICATION GROUP” on page 30](#)
- [“CREATE REPLICATION GROUP” on page 371](#)
- [“DROP REPLICATION GROUP” on page 580](#)
- [“HELP REPLICATION GROUP” on page 740](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)

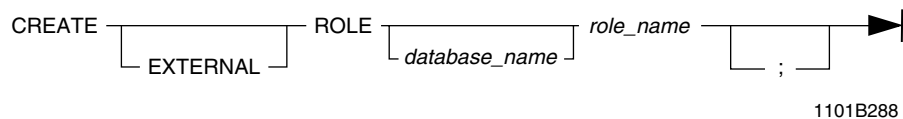
# CREATE ROLE

## Purpose

Creates a role for managing user access privileges on database objects.

A role is a shell database object to which sets of privileges can be granted using GRANT requests.

## Syntax



where:

| Syntax Element ... | Specifies ...                                                                                                                                                                                                                                                                                                                                   |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EXTERNAL           | that the role named by <i>role_name</i> is external.                                                                                                                                                                                                                                                                                            |
| <i>role_name</i>   | the name of the new role.<br><br>Database and external roles share the same name space.<br><br>Both database and external roles can have the same name as a profile, table, column, view, macro, trigger, table UDF, external stored procedure, method, UDT, or stored procedure; however, role names must be unique among users and databases. |

## ANSI Compliance

CREATE ROLE is ANSI SQL:2008-compliant.

## Required Privileges

You must have the CREATE ROLE privilege to create a role. This applies both to standard database roles and to EXTERNAL roles.

New users do not implicitly have the CREATE ROLE privilege.

User *DBC* or a user who has the CREATE ROLE WITH GRANT OPTION privilege can grant this privilege to another user, but you cannot grant the WITH GRANT OPTION privilege to others using a role.

| IF a newly created role is this type ... | THEN the system ...                                                                                                                    |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| database                                 | grants the WITH ADMIN OPTION privilege to its creator implicitly. This permits the creator to grant the role to other users and roles. |
| external                                 | does <i>not</i> grant the WITH ADMIN OPTION privilege to its creator.                                                                  |

## Privileges Granted Automatically

None.

### Example 1

The following requests create roles named management and administration:

```
CREATE ROLE management;
```

```
CREATE ROLE administration;
```

### Example 2

The following request creates an external role named *rh* that is managed by the Teradata Database:

```
CREATE EXTERNAL ROLE rh;
```

## Related Topics

| FOR more information on ...                      | See ...                                                                                                                   |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| granting privileges on database objects to roles | “GRANT (SQL Form)” in <i>SQL Data Control Language</i>                                                                    |
| obtaining the CREATE ROLE privilege              |                                                                                                                           |
| granting roles to users or other roles           | “GRANT (Role Form)” in <i>SQL Data Control Language</i>                                                                   |
| assigning default roles to users                 | <ul style="list-style-type: none"><li>• “CREATE USER” on page 524</li><li>• “MODIFY USER” on page 623</li></ul>           |
| changing the current role for a session          | “SET ROLE” on page 656                                                                                                    |
| external roles                                   | <ul style="list-style-type: none"><li>• <i>Security Administration</i></li><li>• <i>Database Administration</i></li></ul> |

## CHAPTER 5 **CREATE TABLE**

---

DDL statements define, modify, and remove database object definitions.

This chapter documents the syntax for, and provides examples of, the Teradata Database DDL statement `CREATE TABLE`.

---

# CREATE TABLE

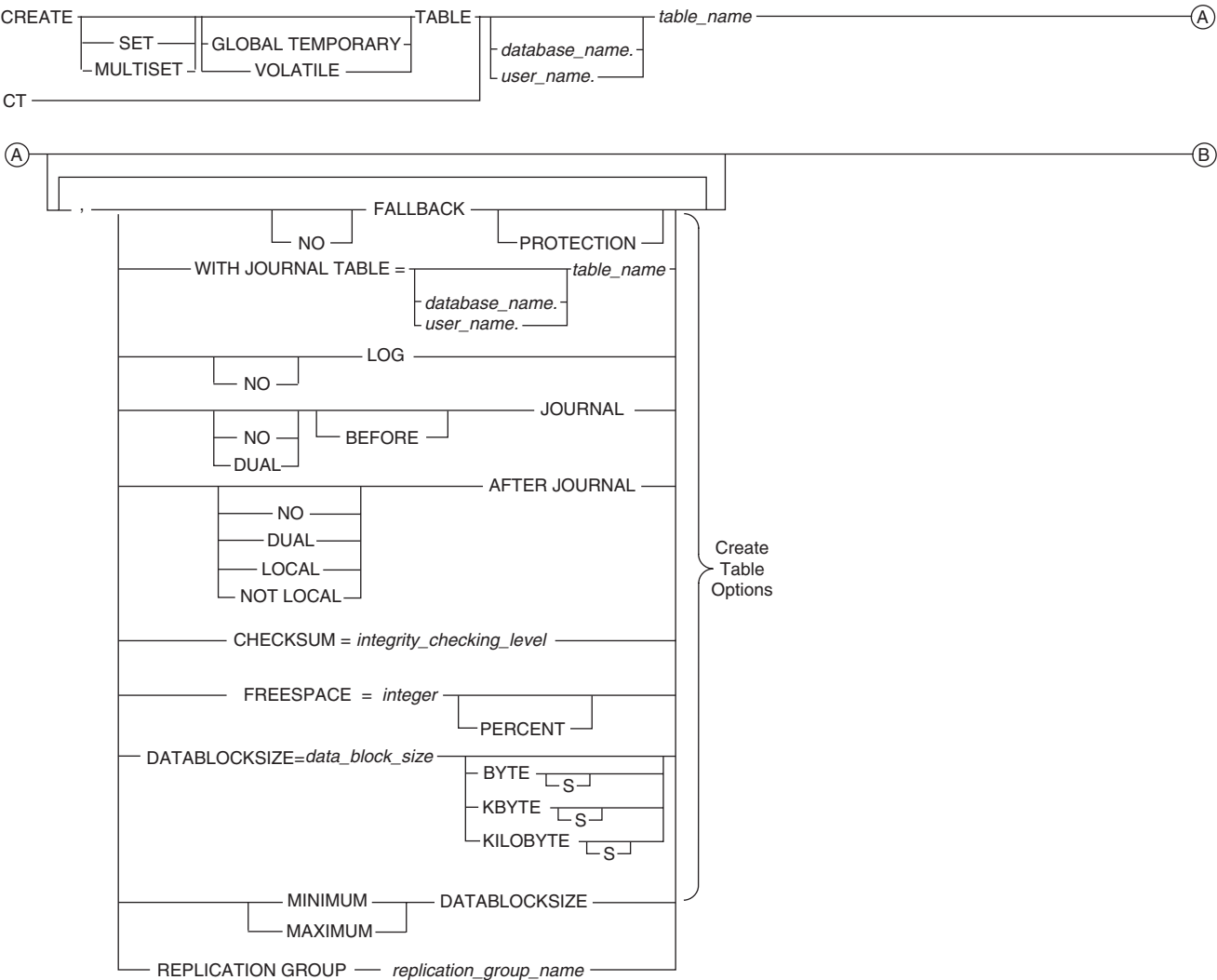
## Purpose

Defines the column names, column data types and attributes, primary<sup>1</sup> and secondary indexes, column- and table-constraints, and other attributes of a new table.<sup>2</sup>

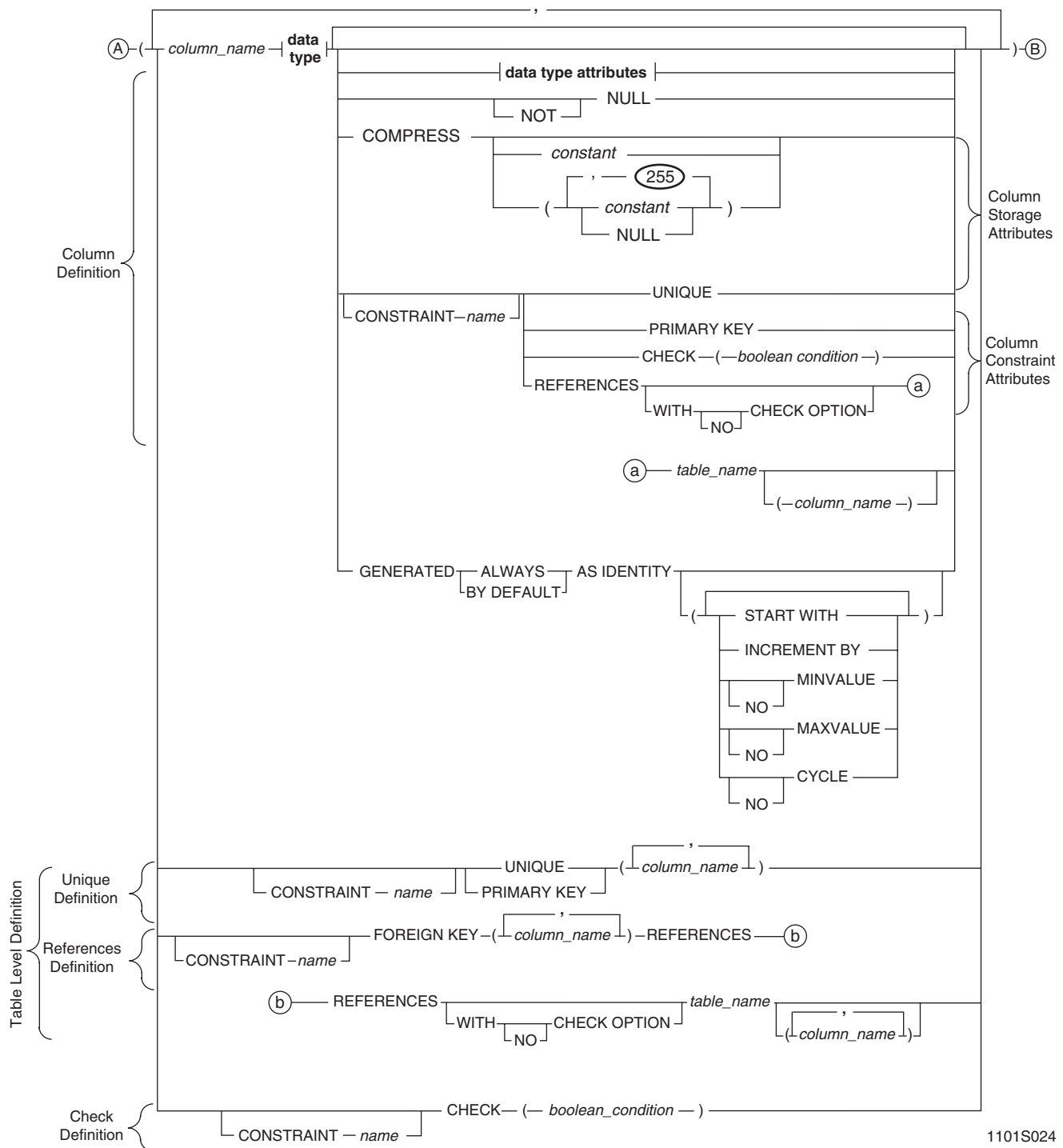
The CREATE TABLE AS form copies specified column definitions and optionally copies their data and statistics to a new table.

1. A table can also be defined with NO PRIMARY INDEX.
2. This does *not* include global temporary trace tables, which are documented in [“CREATE GLOBAL TEMPORARY TRACE TABLE” on page 186](#).

Create Table Syntax

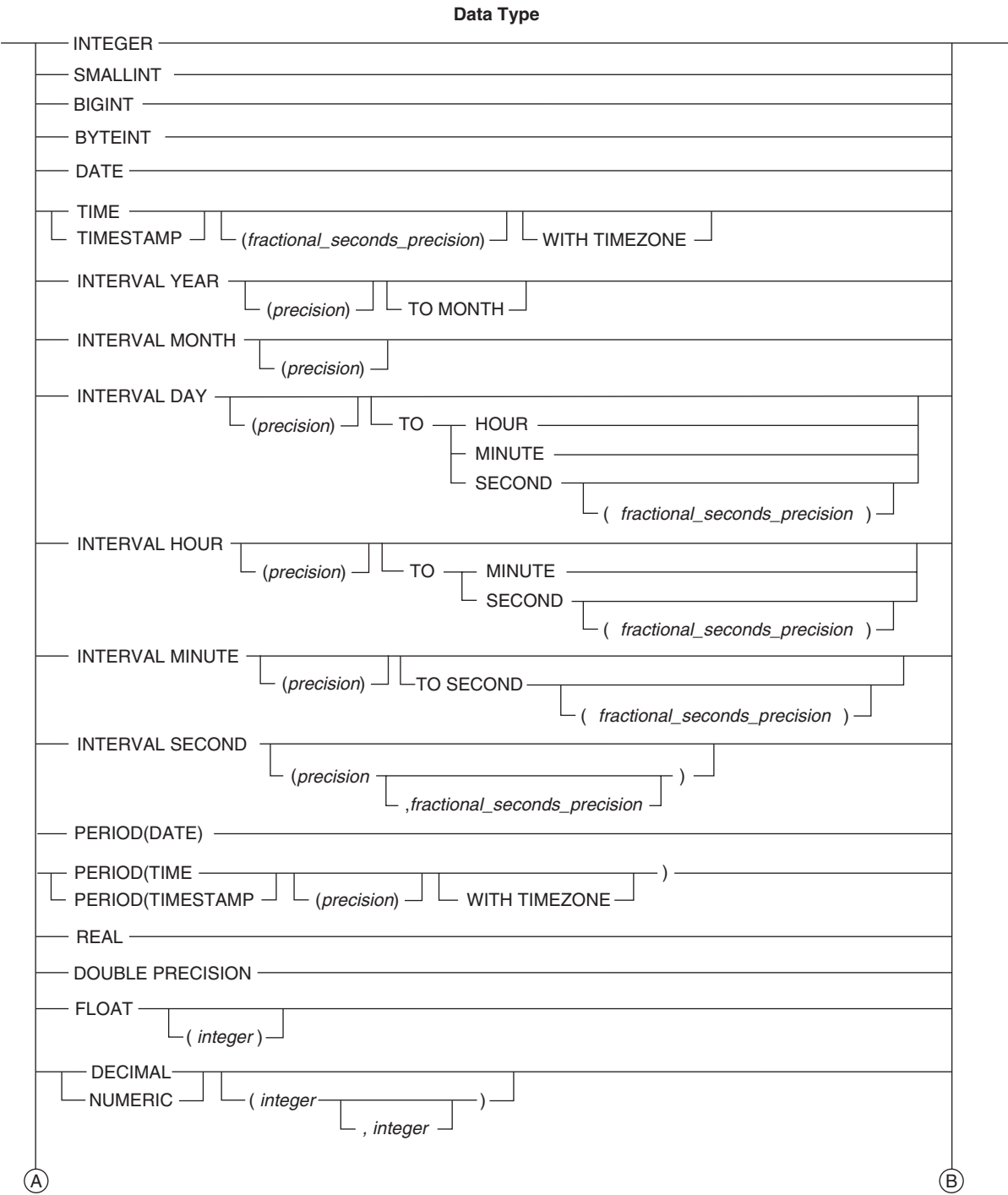


1101U020

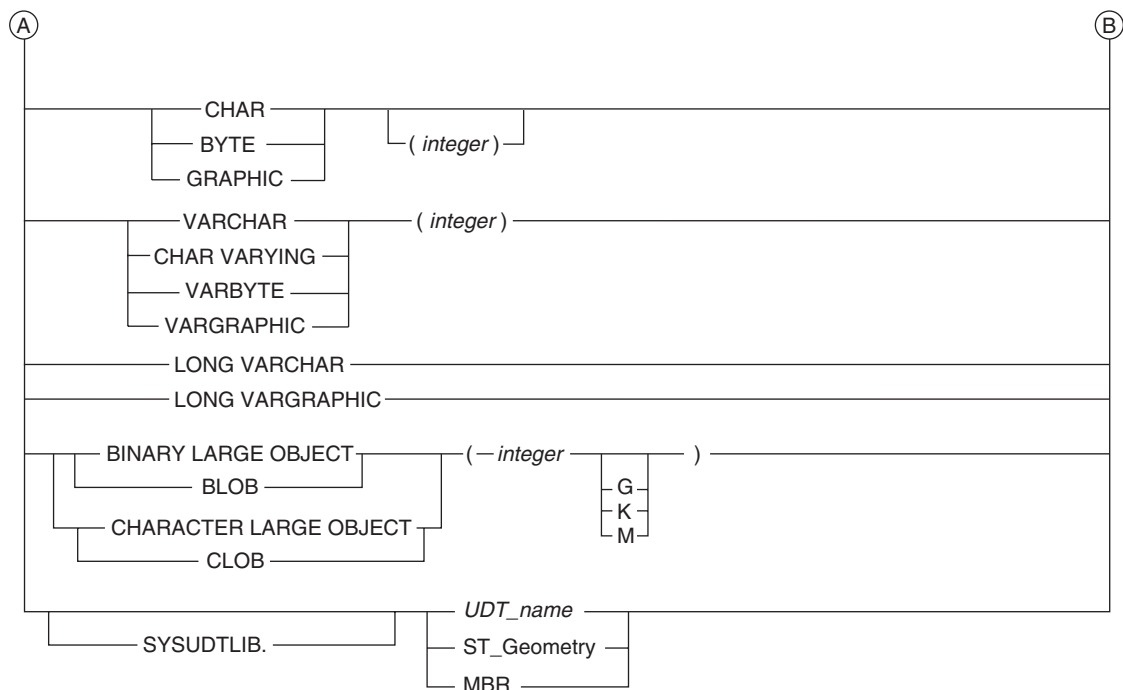


1101S024



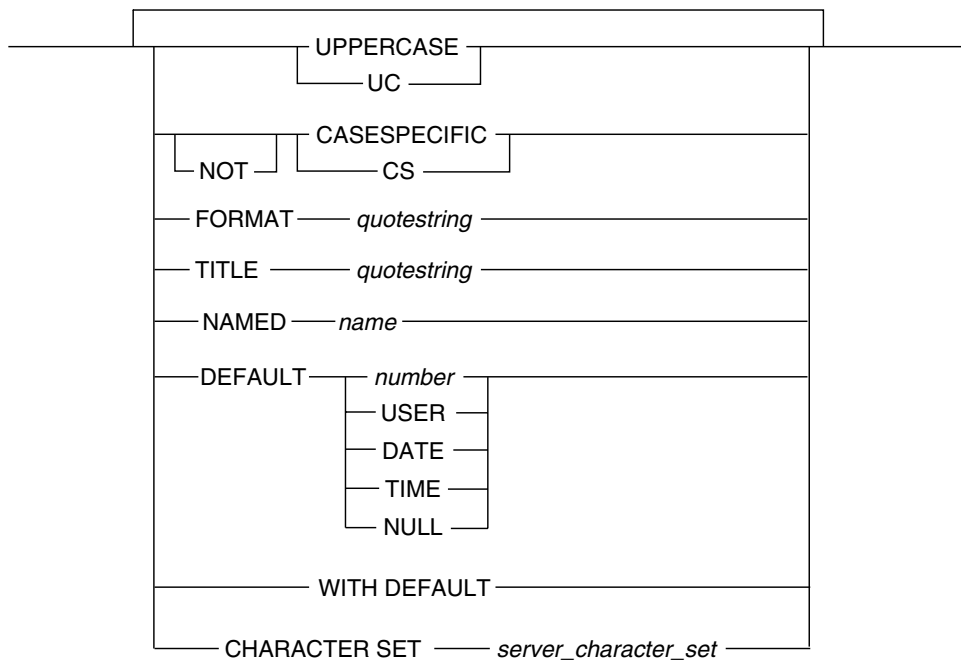


1101A535



1101A536

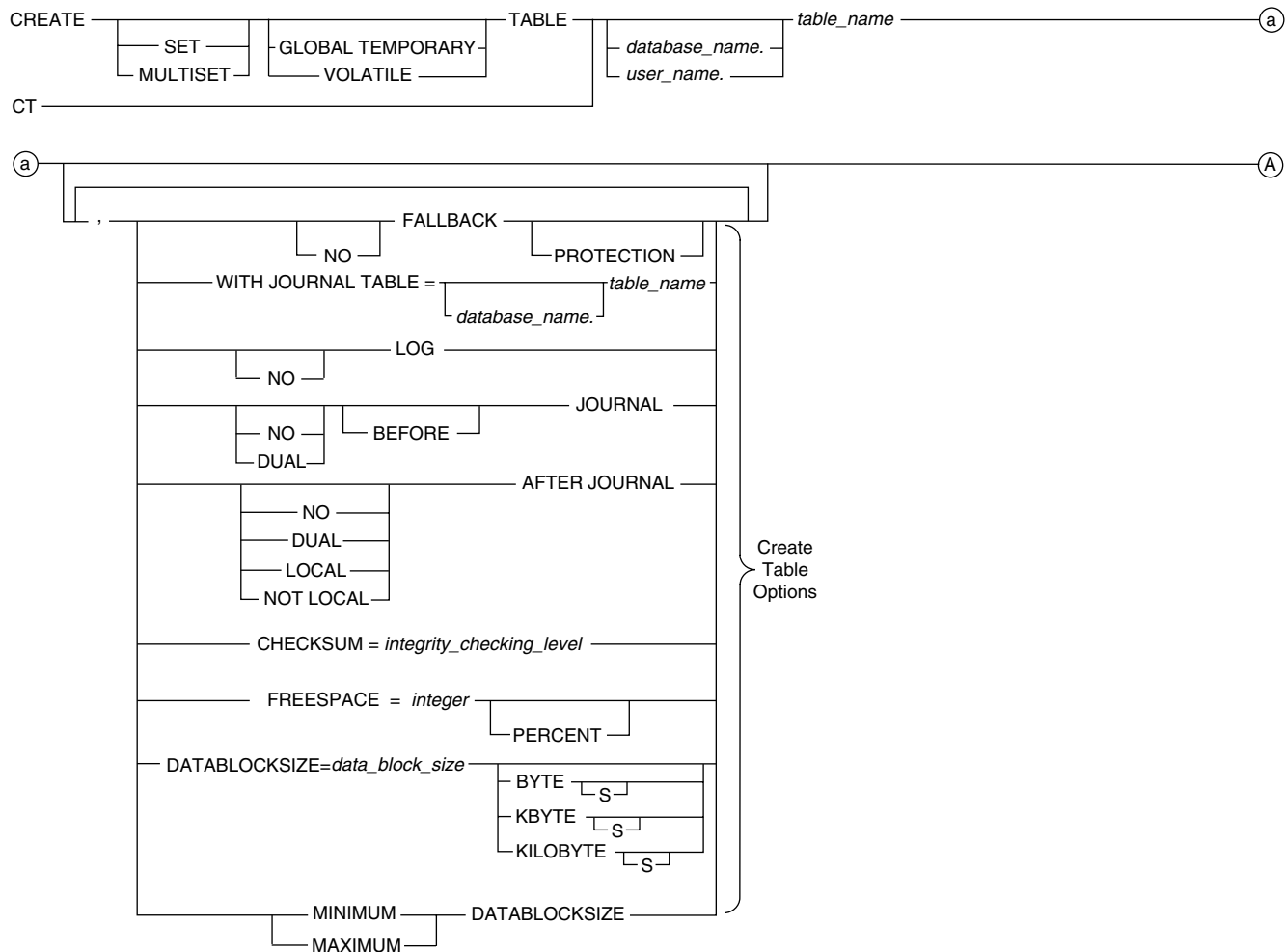
Data Type Attributes



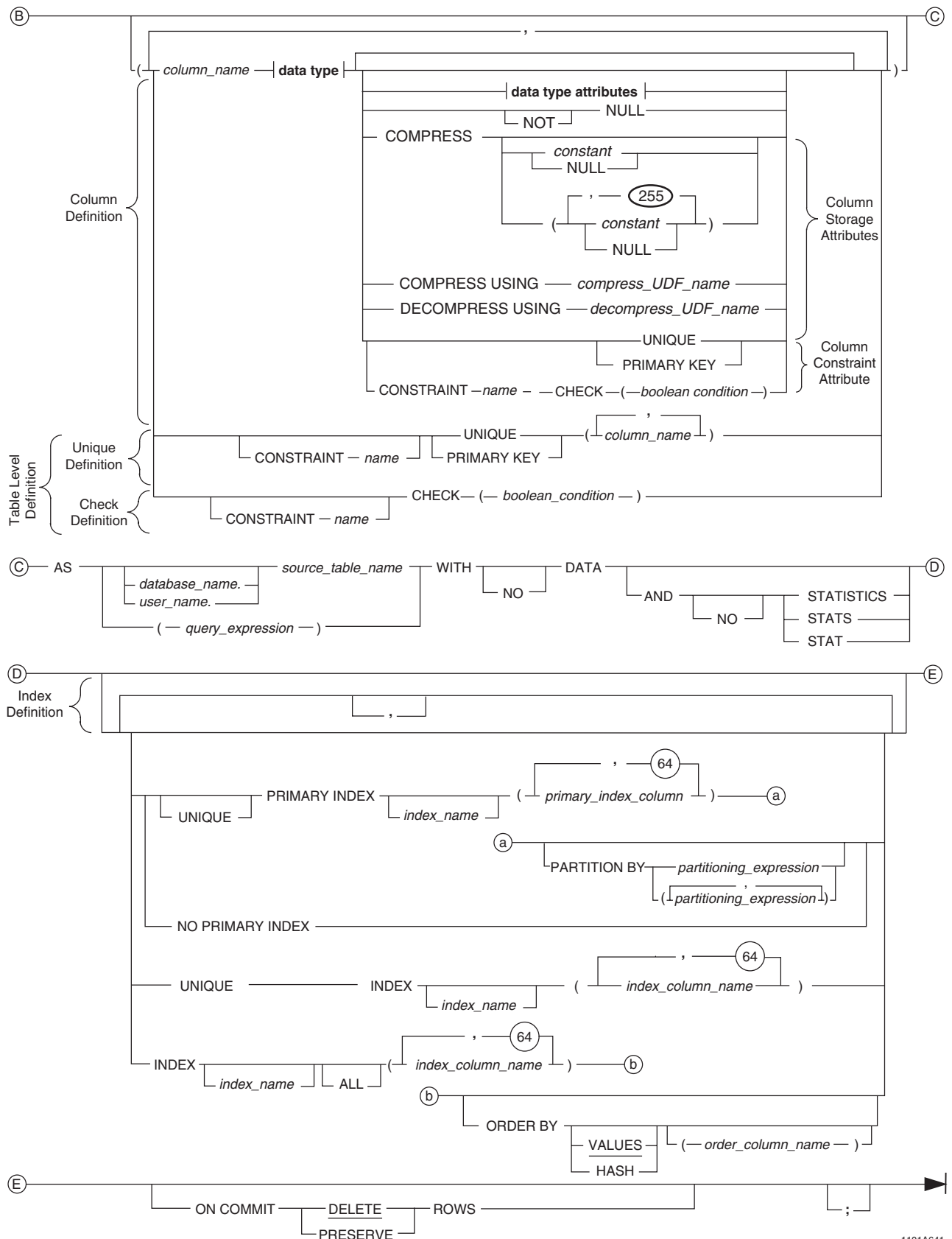
1101G205

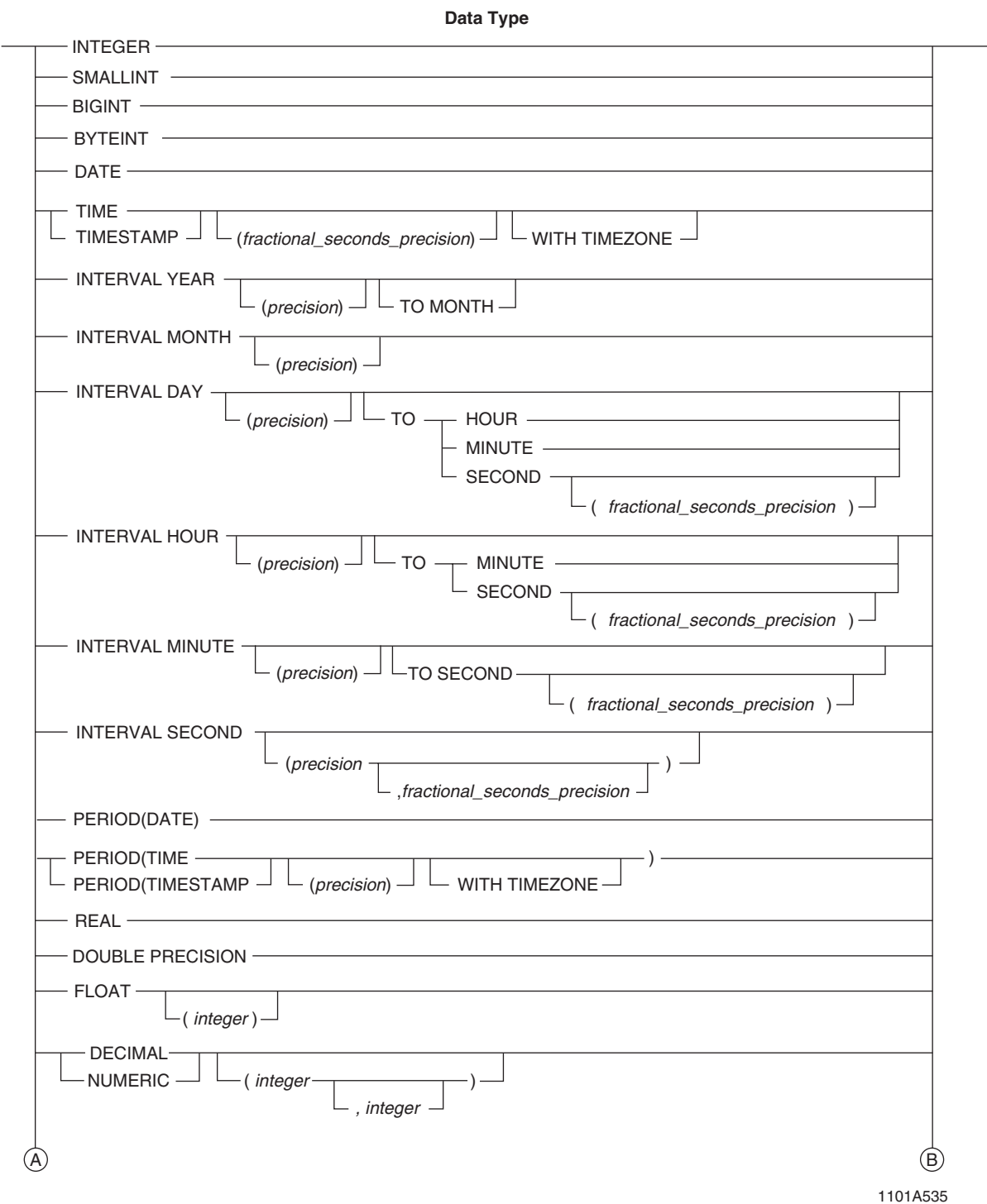


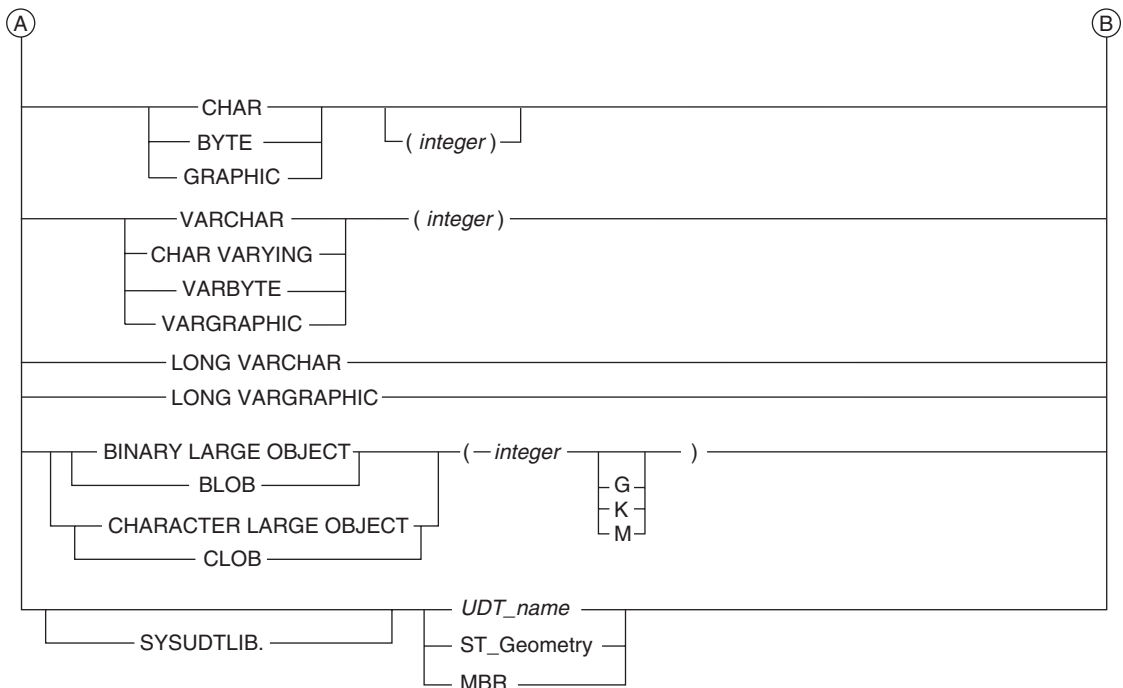
## Copy Table Syntax



1101T020

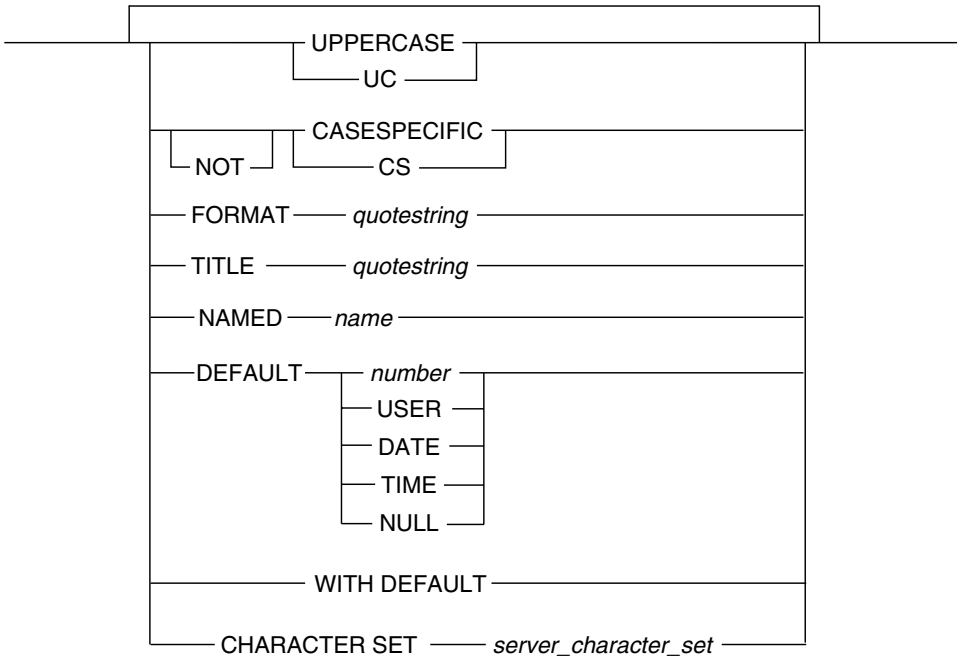






1101A536

**Data Type Attributes**



1101G205

where:

| Syntax Element ...                         | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                  |                             |     |              |          |                                                         |      |                                                                                          |                           |                               |      |          |          |     |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-----------------------------|-----|--------------|----------|---------------------------------------------------------|------|------------------------------------------------------------------------------------------|---------------------------|-------------------------------|------|----------|----------|-----|
| Table Kind Clause                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                  |                             |     |              |          |                                                         |      |                                                                                          |                           |                               |      |          |          |     |
| MULTISET<br>SET                            | <p>duplicate row control.</p> <p>If there are uniqueness constraints on any column or set of columns in the table definition, then the table cannot have duplicate rows even if it is declared as MULTISET.</p> <p>Some client utilities have restrictions with respect to MULTISET tables. See the CREATE TABLE (Table Kind Clause) topic “SET and MULTISET” in <i>SQL Data Definition Language Detailed Topics</i>.</p> <table><tr><th>IF this keyword is specified ...</th><th>THEN duplicate rows are ...</th></tr><tr><td>SET</td><td>not allowed.</td></tr><tr><td>MULTISET</td><td>allowed, in compliance with the ANSI SQL-2003 standard.</td></tr><tr><td>none</td><td>allowed or not depending on the current session mode, as defined in the following table:</td></tr></table> <table><tr><th>For this session mode ...</th><th>The default table kind is ...</th></tr><tr><td>ANSI</td><td>MULTISET</td></tr><tr><td>Teradata</td><td>SET</td></tr></table> <p>The exception to this rule is the case where you copy a table definition using the non-subquery form of the CREATE TABLE ... AS syntax. In this case, the default table kind is the table kind of the source table irrespective of the current session mode.</p> <p>You cannot create a NoPI table as a SET table.</p>           | IF this keyword is specified ... | THEN duplicate rows are ... | SET | not allowed. | MULTISET | allowed, in compliance with the ANSI SQL-2003 standard. | none | allowed or not depending on the current session mode, as defined in the following table: | For this session mode ... | The default table kind is ... | ANSI | MULTISET | Teradata | SET |
| IF this keyword is specified ...           | THEN duplicate rows are ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                  |                             |     |              |          |                                                         |      |                                                                                          |                           |                               |      |          |          |     |
| SET                                        | not allowed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                  |                             |     |              |          |                                                         |      |                                                                                          |                           |                               |      |          |          |     |
| MULTISET                                   | allowed, in compliance with the ANSI SQL-2003 standard.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                  |                             |     |              |          |                                                         |      |                                                                                          |                           |                               |      |          |          |     |
| none                                       | allowed or not depending on the current session mode, as defined in the following table:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                  |                             |     |              |          |                                                         |      |                                                                                          |                           |                               |      |          |          |     |
| For this session mode ...                  | The default table kind is ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                  |                             |     |              |          |                                                         |      |                                                                                          |                           |                               |      |          |          |     |
| ANSI                                       | MULTISET                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                  |                             |     |              |          |                                                         |      |                                                                                          |                           |                               |      |          |          |     |
| Teradata                                   | SET                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                  |                             |     |              |          |                                                         |      |                                                                                          |                           |                               |      |          |          |     |
| GLOBAL<br>TEMPORARY<br>[TRACE]<br>VOLATILE | <p>whether the table to be created is a global temporary table, global temporary trace table, or a volatile table.</p> <p>GLOBAL TEMPORARY specifies that a temporary table definition be created and stored in the data dictionary for future materialization. You can create global temporary tables by copying a table WITH NO DATA, but not by copying a table WITH DATA.</p> <p>GLOBAL TEMPORARY TRACE specifies that a global temporary trace table definition be created and stored in the data dictionary. See <a href="#">“CREATE GLOBAL TEMPORARY TRACE TABLE” on page 186</a> for further information.</p> <p>VOLATILE specifies that a volatile table be created, with its definition retained in memory only for the course of the session in which it is defined. See the CREATE TABLE (Table Kind Clause) topic “Volatile Tables” in <i>SQL Data Definition Language Detailed Topics</i> for further information.</p> <p>If you do not specify one of these options for the table, then the system defines it to be a persistent user data table. Less formally, such tables are also referred to as base tables, though hash and join index tables are also base tables in the strict sense of the term.</p> <p>Both global temporary and volatile tables can be created as NoPI tables.</p> |                                  |                             |     |              |          |                                                         |      |                                                                                          |                           |                               |      |          |          |     |



| Syntax Element ...                                                                           | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                   |          |           |                                                                                         |               |                                                                                                                                    |
|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------|-----------|-----------------------------------------------------------------------------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Table Name Clause</b>                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                   |          |           |                                                                                         |               |                                                                                                                                    |
| <i>database_name.</i>   <i>user.table_name</i>                                               | <p>the name of the new table and the name of the database or user in which it is to be contained if different from the current database.</p> <p>If the name is not fully qualified, then the system assigns the name of the default database for the current session.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                   |          |           |                                                                                         |               |                                                                                                                                    |
| <b>Table Options Clause</b>                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                   |          |           |                                                                                         |               |                                                                                                                                    |
| [NO] FALLBACK                                                                                | <p>duplicate copy protection (or not) for the table.</p> <p>When FALLBACK is chosen, then duplicate copies of rows in the table are created and stored.</p> <p>The default for this option is established by a CREATE DATABASE, CREATE USER, MODIFY DATABASE, or MODIFY USER statement for the database in which the table is to be created.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                   |          |           |                                                                                         |               |                                                                                                                                    |
| PROTECTION                                                                                   | a dummy word that can be specified after the FALLBACK keyword.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   |          |           |                                                                                         |               |                                                                                                                                    |
| WITH JOURNAL<br>TABLE =<br><i>database_name.</i>  <br><i>user_name.</i><br><i>table_name</i> | <p>the journal table for the data table being created.</p> <table border="1"> <thead> <tr> <th>IF a database or user name is ...</th><th>THEN ...</th></tr> </thead> <tbody> <tr> <td>specified</td><td>it must exist and <i>table_name</i> must have been defined as its default journal name.</td></tr> <tr> <td>not specified</td><td>the default database for the current session is assumed and <i>table_name</i> must have been defined as the default journal table.</td></tr> </tbody> </table> <p><i>table_name</i> can reside in the same database as the table being created or in a different database.</p> <p>You cannot specify journal options for a NoPI table.</p> <p>This clause is required if the CREATE TABLE statement requests some level of journaling, but a default journal table was not defined for the database in which the new table is being created.</p> <p>If you specify journaling for this table, but do not specify a journal table with this clause, then you <i>must</i> define a default journal table for the containing database.</p> <p>If a default journal table was defined for the database, then this clause can be used to override the default.</p> | IF a database or user name is ... | THEN ... | specified | it must exist and <i>table_name</i> must have been defined as its default journal name. | not specified | the default database for the current session is assumed and <i>table_name</i> must have been defined as the default journal table. |
| IF a database or user name is ...                                                            | THEN ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                   |          |           |                                                                                         |               |                                                                                                                                    |
| specified                                                                                    | it must exist and <i>table_name</i> must have been defined as its default journal name.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   |          |           |                                                                                         |               |                                                                                                                                    |
| not specified                                                                                | the default database for the current session is assumed and <i>table_name</i> must have been defined as the default journal table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                   |          |           |                                                                                         |               |                                                                                                                                    |
| [NO] LOG                                                                                     | <p>whether logging occurs.</p> <p>LOG specifies that any updates, inserts, or deletes made to the global temporary or volatile table be logged in the transient journal. This is the default.</p> <p>NO LOG specifies that transient journal logging is not to be performed. Because the Teradata Database does not do any transient journaling, performance is greatly enhanced.</p> <p>If any sort of abort or restart occurs and the table is defined as NO LOG, then any updates, inserts, or deletes made to the global temporary or volatile table cannot be recovered.</p> <p>If the table is defined as NO LOG, contents of any materialized global temporary table or any volatile table are emptied when a transaction aborts.</p> <p>This option pertains to global temporary and volatile tables only.</p>                                                                                                                                                                                                                                                                                                                                                                                 |                                   |          |           |                                                                                         |               |                                                                                                                                    |

| Syntax Element ...                                                                           | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                      |                                              |                        |                                                                                                                                              |                         |                                                                      |         |       |
|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------------------------------------------------------------------|---------|-------|
| [NO] BEFORE JOURNAL<br>DUAL BEFORE JOURNAL                                                   | <p>the number of before change images to be maintained.</p> <p>If the JOURNAL keyword is specified without NO or DUAL, then a single copy of the image is maintained unless FALLBACK is in effect or is also specified.</p> <p>If journaling is requested for a table that uses fallback protection, DUAL images are maintained automatically.</p> <p>Permanent journaling is not supported for global temporary or volatile tables.</p> <p>You cannot specify journal options for a NoPI table.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      |                                              |                        |                                                                                                                                              |                         |                                                                      |         |       |
| [NO] AFTER JOURNAL<br>DUAL AFTER JOURNAL<br>LOCAL AFTER JOURNAL<br>[NOT] LOCAL AFTER JOURNAL | <p>the type of after-image to be maintained for the table; any existing images are not affected until the table is updated.</p> <p>NO, DUAL, LOCAL, or NOT LOCAL: the NO and DUAL options specify the number of after-change images to be maintained for the table.</p> <p>NOT LOCAL and LOCAL specify whether single after-image journal rows for non-fallback data tables are written on the same virtual AMP (LOCAL) as the changed data rows, or on another virtual AMP in the cluster (NOT LOCAL).</p> <p>Permanent journaling is not supported for global temporary or volatile tables.</p> <p>You cannot specify journal options for a NoPI table.</p>                                                                                                                                                                                                                                                                                                                                                                                           |                      |                                              |                        |                                                                                                                                              |                         |                                                                      |         |       |
| [BEFORE] JOURNAL<br>AFTER JOURNAL                                                            | <p>the type of image to be maintained for the table.</p> <p>This option can appear twice in the same statement: once to specify a BEFORE or AFTER image, and again to specify the alternate type.</p> <p>Permanent journaling is not supported for global temporary or volatile tables.</p> <p>The default for this option is established by a CREATE DATABASE, CREATE USER, or MODIFY USER statement for the database in which the table is to be created.</p> <table border="1"> <thead> <tr> <th>FOR this keyword ...</th><th>THIS type of journal image is maintained ...</th></tr> </thead> <tbody> <tr> <td>BEFORE <i>or</i> AFTER</td><td>only the default for that type is overridden.<br/>For example, if AFTER is specified, before-image journaling remains at the default setting.</td></tr> <tr> <td>BEFORE <i>and</i> AFTER</td><td>both, but the two specifications must not conflict with one another.</td></tr> <tr> <td>neither</td><td>both.</td></tr> </tbody> </table> <p>You cannot specify journal options for a NoPI table.</p> | FOR this keyword ... | THIS type of journal image is maintained ... | BEFORE <i>or</i> AFTER | only the default for that type is overridden.<br>For example, if AFTER is specified, before-image journaling remains at the default setting. | BEFORE <i>and</i> AFTER | both, but the two specifications must not conflict with one another. | neither | both. |
| FOR this keyword ...                                                                         | THIS type of journal image is maintained ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |                                              |                        |                                                                                                                                              |                         |                                                                      |         |       |
| BEFORE <i>or</i> AFTER                                                                       | only the default for that type is overridden.<br>For example, if AFTER is specified, before-image journaling remains at the default setting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |                                              |                        |                                                                                                                                              |                         |                                                                      |         |       |
| BEFORE <i>and</i> AFTER                                                                      | both, but the two specifications must not conflict with one another.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                      |                                              |                        |                                                                                                                                              |                         |                                                                      |         |       |
| neither                                                                                      | both.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                      |                                              |                        |                                                                                                                                              |                         |                                                                      |         |       |
| FREESPACE <i>integer</i>                                                                     | <p>the percent of free space that will remain on a cylinder during loading operations.</p> <p>Specifies the value of the percent freespace attribute to the specified value <i>integer</i>.</p> <p>If the specified value does not fall within the allowable range (0 to 75 percent), an error message is generated.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |                                              |                        |                                                                                                                                              |                         |                                                                      |         |       |
| PERCENT                                                                                      | a noise keyword. It has no effect.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |                                              |                        |                                                                                                                                              |                         |                                                                      |         |       |

| Syntax Element ...                                                        | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                   |                                                            |           |             |                                 |                |
|---------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|------------------------------------------------------------|-----------|-------------|---------------------------------|----------------|
| DATABLOCKSIZE<br>= <i>data_block_size</i><br>[BYTES/KBYTES/<br>KILOBYTES] | <p>the maximum data block size for blocks that contain multiple rows as the value <i>data_block_size</i>.</p> <p>The value can be expressed either as a decimal or integer number or using exponential notation. For example, you can write <i>one thousand</i> as either 1000 or 1E3.</p> <p>The maximum data block size value is 127.5 Kbytes.</p> <p>BYTES can be abbreviated as BYTE. KILOBYTES can be abbreviated as KBYTE. This specification is optional.</p> <p>If DATABLOCKSIZE is not specified, then data blocks default to the sizes set in the PermDBSize and JournalDBSize fields of the DBS Control record.</p> <table border="1"> <thead> <tr> <th>The default value for this type of data block ...</th><th>Is specified using this field of the DBSControl record ...</th></tr> </thead> <tbody> <tr> <td>permanent</td><td>PermDBSize.</td></tr> <tr> <td>transient and permanent journal</td><td>JournalDBSize.</td></tr> </tbody> </table> <p>See <i>Utilities</i> for more detailed information about setting default data block sizes.</p> <p>For details about data block size, see the CREATE TABLE (Table Options Clause) topic “DATABLOCKSIZE” in <i>SQL Data Definition Language Detailed Topics</i>.</p> | The default value for this type of data block ... | Is specified using this field of the DBSControl record ... | permanent | PermDBSize. | transient and permanent journal | JournalDBSize. |
| The default value for this type of data block ...                         | Is specified using this field of the DBSControl record ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                   |                                                            |           |             |                                 |                |
| permanent                                                                 | PermDBSize.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                   |                                                            |           |             |                                 |                |
| transient and permanent journal                                           | JournalDBSize.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                   |                                                            |           |             |                                 |                |
| MINIMUM<br>DATABLOCKSIZE                                                  | <p>the smallest possible DATABLOCKSIZE setting for the table.</p> <p>The value can be expressed either as a decimal or integer number or using exponential notation. For example, you can write <i>one thousand</i> as either 1000 or 1E3.</p> <p>MINIMUM DATABLOCKSIZE sets the maximum data block size for blocks that contain multiple rows to the minimum legal value of either 6144 or 7168 bytes (12 or 14 sectors), depending on the cylinder size set for your system.</p> <p>See the CREATE TABLE (Table Options Clause) topic “DATABLOCKSIZE” in <i>SQL Data Definition Language Detailed Topics</i>.</p> <p>You can abbreviate MINIMUM as MIN.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                   |                                                            |           |             |                                 |                |
| MAXIMUM<br>DATABLOCKSIZE                                                  | <p>the largest possible DATABLOCKSIZE setting for the table: 130,560 bytes (255 sectors).</p> <p>The value can be expressed either as a decimal or integer number or using exponential notation. For example, you can write <i>one thousand</i> as either 1000 or 1E3.</p> <p>You can abbreviate MAXIMUM as MAX.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                   |                                                            |           |             |                                 |                |

| Syntax Element ...                                 | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                  |     |     |         |                                                                                                                                                             |      |    |        |    |     |   |      |                                             |
|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------------|-----|-----|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----|--------|----|-----|---|------|---------------------------------------------|
| <i>integrity_checking_level</i>                    | <p>a table-specific disk I/O integrity checksum.</p> <p>The checksum setting applies to primary data rows, fallback data rows, and all secondary index rows for the table.</p> <p>If you do not specify a value, then the system assumes the system-wide default value for this table type. The result is identical to specifying DEFAULT.</p> <p>If you are changing the checksum for this table to the system-wide default value, then specify DEFAULT.</p> <p>You can change the percentage of sampling for the system-wide default values for LOW, MEDIUM, and HIGH using the Checksum Level Definitions fields in the DBSControl utility (see <i>Utilities</i>). The values provided here for those checksum percentages are the defaults specified by the installation or upgrade.</p> <p>You cannot change the sampling percentage for the following:</p> <ul style="list-style-type: none"><li>• The system-wide default values ALL and NONE.</li><li>• Dictionary tables.</li></ul> <table><tr><th>Level</th><th>Checksum Sample Count Percentage</th></tr><tr><td>ALL</td><td>100</td></tr><tr><td>DEFAULT</td><td>Percentage specified for this table type in the Checksum Levels fields of the Disk I/O Integrity Fields in the DBS Control utility (see <i>Utilities</i>).</td></tr><tr><td>HIGH</td><td>67</td></tr><tr><td>MEDIUM</td><td>33</td></tr><tr><td>LOW</td><td>2</td></tr><tr><td>NONE</td><td>Disable checksum disk I/O integrity checks.</td></tr></table> | Level | Checksum Sample Count Percentage | ALL | 100 | DEFAULT | Percentage specified for this table type in the Checksum Levels fields of the Disk I/O Integrity Fields in the DBS Control utility (see <i>Utilities</i> ). | HIGH | 67 | MEDIUM | 33 | LOW | 2 | NONE | Disable checksum disk I/O integrity checks. |
| Level                                              | Checksum Sample Count Percentage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                  |     |     |         |                                                                                                                                                             |      |    |        |    |     |   |      |                                             |
| ALL                                                | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                  |     |     |         |                                                                                                                                                             |      |    |        |    |     |   |      |                                             |
| DEFAULT                                            | Percentage specified for this table type in the Checksum Levels fields of the Disk I/O Integrity Fields in the DBS Control utility (see <i>Utilities</i> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                  |     |     |         |                                                                                                                                                             |      |    |        |    |     |   |      |                                             |
| HIGH                                               | 67                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                  |     |     |         |                                                                                                                                                             |      |    |        |    |     |   |      |                                             |
| MEDIUM                                             | 33                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                  |     |     |         |                                                                                                                                                             |      |    |        |    |     |   |      |                                             |
| LOW                                                | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                  |     |     |         |                                                                                                                                                             |      |    |        |    |     |   |      |                                             |
| NONE                                               | Disable checksum disk I/O integrity checks.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                  |     |     |         |                                                                                                                                                             |      |    |        |    |     |   |      |                                             |
| REPLICATION GROUP<br><i>replication_group_name</i> | <p>the name of the replication group to which this table is to be added if it matches a rule set up by a CREATE REPLICATION RULESET request (see <a href="#">“CREATE REPLICATION RULESET/ REPLACE REPLICATION RULESET” on page 374</a> and “CREATE TABLE” in <i>SQL Data Definition Language Detailed Topics</i>).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                  |     |     |         |                                                                                                                                                             |      |    |        |    |     |   |      |                                             |

| Syntax Element ...                                                                     | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Column Definition Clause</b>                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>column_name</i>                                                                     | specifies the name of one or more columns, in the order in which they and their attributes are to be defined for the table. Up to 2,048 columns can be defined for a table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <i>data_type</i><br>[ <i>data_type_</i><br><i>attributes</i> ]                         | <p>one or more data definition phrases that define data for the column.</p> <p>You must specify a single data type for each <i>column_name</i> except for those defined in a CREATE TABLE ... AS statement. It is <i>not</i> valid to specify data types for such columns.</p> <p>Column data attribute specifications are optional. If you specify attributes for a column, you must define its data type before you define its attributes.</p> <p>The default specification for the [NOT] NULL attribute is NULL with the exception of the case when you copy a table definition using the CREATE TABLE ... AS syntax, in which case the system carries the specification made for the source table over to the target table definition. You must specify NOT NULL explicitly if you do not want nulls to be valid for the column.</p> <p>If you do not specify explicit formatting, a column assumes the default format for the data type, which can be specified by a custom data formatting specification (SDF) defined by the tdlocaledef utility (see <i>Utilities</i>). Explicit formatting applies both to the parsing and to the retrieval of character strings.</p> <p>Data types and data type attributes are the subject of <i>SQL Data Types and Literals</i>.</p> <p>For information about converting data between data types, see <i>SQL Functions, Operators, Expressions, and Predicates</i>.</p> |
| <b>Column Storage Attributes Clause</b>                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Column storage attributes are a Teradata extension to the ANSI SQL:2008 specification. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| COMPRESS                                                                               | <p>a specified set of distinct values in a column that is to be compressed to zero space.</p> <p>See <i>Database Design</i> for a detailed description of value compression.</p> <p>See <i>SQL Data Types and Literals</i> for more information about the COMPRESS attribute.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| NULL                                                                                   | <p>that nulls are compressed.</p> <p>The following rules apply:</p> <ul style="list-style-type: none"> <li>• You cannot specify NULL if the column is defined as NOT NULL.</li> <li>• UDTs and variable length data types such as VARCHAR, VARBYTE, and VARGRAPHIC cannot be compressed.</li> <li>• You can only specify NULL once per column.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <i>constant</i>                                                                        | <p>that the specified value set is compressed.</p> <p>You cannot compress nulls and constants if the column is defined as NOT NULL.</p> <p>Using COMPRESS on fixed-length character data can save space depending on the percentage of rows for which the compressed value is assigned.</p> <p>See <i>SQL Data Types and Literals</i> for information about limits for this value.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

| Syntax Element ...                                                                                                                                                               | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                        |          |        |                                                |         |                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|----------|--------|------------------------------------------------|---------|----------------------------------------------------------------|
| <b>Identity Column Specification</b><br>The identity column is ANSI SQL:2008-compliant.                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |          |        |                                                |         |                                                                |
| ALWAYS                                                                                                                                                                           | that identity column values are always system-generated.<br>You cannot insert values into, nor can you update, an identity column defined as GENERATED ALWAYS AS IDENTITY.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                        |          |        |                                                |         |                                                                |
| BY DEFAULT                                                                                                                                                                       | that identity column values can be system-generated or user-inserted, depending on the circumstance. <table> <tr> <th>IF this is specified for insertion into the column ...</th><th>THEN ...</th></tr> <tr> <td>a null</td><td>the system generates an identity column value.</td></tr> <tr> <td>a value</td><td>the user-specified value is inserted into the identity column.</td></tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | IF this is specified for insertion into the column ... | THEN ... | a null | the system generates an identity column value. | a value | the user-specified value is inserted into the identity column. |
| IF this is specified for insertion into the column ...                                                                                                                           | THEN ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                        |          |        |                                                |         |                                                                |
| a null                                                                                                                                                                           | the system generates an identity column value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                        |          |        |                                                |         |                                                                |
| a value                                                                                                                                                                          | the user-specified value is inserted into the identity column.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                        |          |        |                                                |         |                                                                |
| <b>Identity Column Parameters</b><br>The five identity column parameters are optional and can be specified in any order.<br>You cannot specify identity columns for NoPI tables. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |          |        |                                                |         |                                                                |
| START WITH                                                                                                                                                                       | the lowest number in the system-generated numeric series for an identity column. The default is 1.<br>The value can be any exact negative or positive whole number within the range of the data type for the column as long as it is less than MAXVALUE for an incremental series or greater than MINVALUE for a decremental series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                        |          |        |                                                |         |                                                                |
| INCREMENT BY                                                                                                                                                                     | the (possibly negative) interval on which to increment system-generated numbers. The default is 1.<br>The value can be any whole number less than or equal to the value of DBSControl field IdCol Batch Size except 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                        |          |        |                                                |         |                                                                |
| [NO] MINVALUE                                                                                                                                                                    | the minimum value to which a system-generated numeric series can decrement. MINVALUE applies <i>only</i> to system-generated numbers.<br>The value can be any whole number with an absolute value less than the value specified for START WITH.<br>The default is the minimum number for the data type defined for the column.<br>When cycling is not enabled, the sum of the specified values for START WITH and INCREMENT BY must be greater than MINVALUE. If they are not, then the system generates only one number before the minimum limit is exceeded.<br>Specifying NO MINVALUE causes numbering to restart its cycle from the minimum value that can be expressed for the data type of the column when the MAXVALUE limit is reached.<br>You can only specify NO MINVALUE when the INCREMENT BY interval is a negative number. The default is the minimum value for the data type specified for the identity column. |                                                        |          |        |                                                |         |                                                                |

| Syntax Element ...           | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                      |
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| [NO] MINVALUE<br>(continued) | IF ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | THEN ...                                                                                                                                                                                                             |
|                              | INCREMENT BY is positive and CYCLE is specified                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | renumbering begins from MINVALUE when MAXVALUE is reached.                                                                                                                                                           |
|                              | INCREMENT BY is negative                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | MINVALUE, if specified, must be a whole number such that $\text{MINVALUE} \leq \text{START WITH}$ .<br><br>MINVALUE also cannot be smaller than the minimum value for the data type assigned to the identity column. |
|                              | NO CYCLE is specified                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | MINVALUE is not applicable for positive increments.<br><br>No warning or error is returned if you specify a MINVALUE with NO CYCLE.                                                                                  |
| [NO] MAXVALUE                | <p>the maximum value to which a system-generated numeric series can increment. MAXVALUE applies <i>only</i> to system-generated numbers</p> <p>Can be any whole number with a value greater than the value specified for START WITH.</p> <p>The default is the maximum number for the data type defined for the column.</p> <p>When cycling is not enabled, the sum of the specified values for START WITH and INCREMENT BY must be less than MAXVALUE. If they are not, then the system generates only one number before the maximum limit is exceeded.</p> |                                                                                                                                                                                                                      |
|                              | IF ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | THEN ...                                                                                                                                                                                                             |
|                              | INCREMENT BY is positive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | MAXVALUE, if specified, must be a whole number such that $\text{MAXVALUE} \geq \text{START WITH}$ .<br><br>MAXVALUE also cannot be larger than the maximum value for the data type assigned to the identity column.  |
|                              | INCREMENT BY is negative and CYCLE is specified                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | renumbering begins with MAXVALUE when MINVALUE is reached.                                                                                                                                                           |
|                              | NO CYCLE is specified                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | MAXVALUE is not applicable for negative increments.<br><br>No warning or error is returned if you specify a MAXVALUE with NO CYCLE.                                                                                  |
|                              | <p>Specifying NO MAXVALUE causes numbering to restart its cycle from the minimum value that can be expressed for the data type of the column when the maximum value for the type is reached.</p> <p>You can only specify NO MAXVALUE when the INCREMENT BY interval is a positive number. The default is the maximum value for the data type specified for the identity column.</p>                                                                                                                                                                          |                                                                                                                                                                                                                      |
| [NO] CYCLE                   | <p>whether system-generated values can be recycled when their minimum or maximum is reached.</p> <p>The default is NO CYCLE.</p>                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                      |

| Syntax Element ...                                                                                                                                                                                                                                  | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        |                                                   |                                                                                                                                                                                                                                                     |                |                                                            |                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------------------------------------------------|------------------|
| <b>Column Constraint Attributes Clause</b><br>A column listed as UNIQUE or PRIMARY KEY must be declared NOT NULL.                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |                                                   |                                                                                                                                                                                                                                                     |                |                                                            |                  |
| CONSTRAINT<br><i>name</i>                                                                                                                                                                                                                           | the optional name for a constraint.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |                                                   |                                                                                                                                                                                                                                                     |                |                                                            |                  |
| UNIQUE                                                                                                                                                                                                                                              | <p>that no two rows in the table can have the same value in the field. The system uses a unique primary or secondary index to enforce this constraint.</p> <p>This constraint can only be specified on a single column. To specify UNIQUE on multiple columns, use the UNIQUE definition clause.</p> <p>The system implicitly implements any column specified as UNIQUE as a unique secondary index.</p> <p>Note that for any table defined with NO PRIMARY INDEX, Teradata Database not only implements the constraint as a USI, but also changes the SQL create text for the table to specify a USI, removing the UNIQUE constraint from the defining SQL text.</p> <table> <tr> <th>IF ...</th><th>THEN the implicitly defined index is a unique ...</th></tr> <tr> <td>           all of the following conditions are true:           <ul style="list-style-type: none"> <li>No explicit primary index is specified</li> <li>No explicit primary key is specified</li> <li>This is the first unique constraint defined for the table</li> </ul> </td><td>primary index.</td></tr> <tr> <td>none of the conditions listed in the previous cell is true</td><td>secondary index.</td></tr> </table> | IF ... | THEN the implicitly defined index is a unique ... | all of the following conditions are true: <ul style="list-style-type: none"> <li>No explicit primary index is specified</li> <li>No explicit primary key is specified</li> <li>This is the first unique constraint defined for the table</li> </ul> | primary index. | none of the conditions listed in the previous cell is true | secondary index. |
| IF ...                                                                                                                                                                                                                                              | THEN the implicitly defined index is a unique ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |                                                   |                                                                                                                                                                                                                                                     |                |                                                            |                  |
| all of the following conditions are true: <ul style="list-style-type: none"> <li>No explicit primary index is specified</li> <li>No explicit primary key is specified</li> <li>This is the first unique constraint defined for the table</li> </ul> | primary index.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |                                                   |                                                                                                                                                                                                                                                     |                |                                                            |                  |
| none of the conditions listed in the previous cell is true                                                                                                                                                                                          | secondary index.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |                                                   |                                                                                                                                                                                                                                                     |                |                                                            |                  |
| PRIMARY KEY                                                                                                                                                                                                                                         | <p>that no two rows in the table can have the same value for the defined column set. The system uses a unique primary or secondary index to enforce this constraint.</p> <p>Only one primary key can be specified per table. To specify candidate primary keys for referential integrity relationships with other tables, use the UNIQUE definition clause.</p> <p>The system implicitly implements any column set specified as a PRIMARY KEY as a unique secondary index.</p> <p>Note that for any table defined with NO PRIMARY INDEX, Teradata Database not only implements the constraint as a USI, but also changes the SQL create text for the table to specify a USI, removing the PRIMARY KEY constraint from the defining SQL text.</p> <table> <tr> <th>IF ...</th><th>THEN the implicitly defined index is a unique ...</th></tr> <tr> <td>no primary index is specified explicitly</td><td>primary index.</td></tr> <tr> <td>a primary index is specified explicitly</td><td>secondary index.</td></tr> </table>                                                                                                                                                                          | IF ... | THEN the implicitly defined index is a unique ... | no primary index is specified explicitly                                                                                                                                                                                                            | primary index. | a primary index is specified explicitly                    | secondary index. |
| IF ...                                                                                                                                                                                                                                              | THEN the implicitly defined index is a unique ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |                                                   |                                                                                                                                                                                                                                                     |                |                                                            |                  |
| no primary index is specified explicitly                                                                                                                                                                                                            | primary index.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |                                                   |                                                                                                                                                                                                                                                     |                |                                                            |                  |
| a primary index is specified explicitly                                                                                                                                                                                                             | secondary index.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |                                                   |                                                                                                                                                                                                                                                     |                |                                                            |                  |



| Syntax Element ...                                         | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CHECK ( <i>boolean condition</i> )                         | <p>a Boolean conditional expression, including scalar comparison conditions using, for example, any of the following:</p> <ul style="list-style-type: none"> <li>• =</li> <li>• &lt;&gt;</li> <li>• &gt;</li> <li>• &gt;=</li> </ul> <p>Also see <i>SQL Functions, Operators, Expressions, and Predicates</i>.</p> <p>When a CHECK constraint is part of the column definition, then a search condition cannot reference any columns other than the one being defined.</p> <p>You cannot specify aggregate or ordered analytic functions in a CHECK constraint.</p> |
| REFERENCES<br><i>table_name</i><br><i>column_name</i> list | <p>that each column referenced in the REFERENCES clause identifies a <i>column_name</i> of the referenced table <i>table_name</i>.</p> <p><i>table_name</i> must be a base table; it <i>cannot</i> be a view.</p> <p>Referential integrity constraints are not supported for global temporary or volatile tables.</p> <p>You cannot copy referential constraints to a new table using the copy table syntax.</p>                                                                                                                                                    |
| WITH CHECK<br>OPTION                                       | <p>that referential integrity is checked only when the entire transaction of which it is a component completes.</p> <p>If any of the rows in the transaction are found to violate the Referential Integrity rule, then the entire transaction is rolled back.</p> <p>This clause is a Teradata extension to the ANSI SQL:2008 standard.</p>                                                                                                                                                                                                                         |
| WITH NO CHECK<br>OPTION                                    | that referential integrity is not to be enforced for the specified primary key-foreign key relationship.                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| UNIQUE Definition Clause                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| CONSTRAINT<br><i>name</i>                                  | <p>the optional name for a constraint.</p> <p>UNIQUE constraints are not permitted for volatile tables.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| UNIQUE                                                     | that no two rows in the table can have the same field values. A unique primary or secondary index is used to enforce this constraint.                                                                                                                                                                                                                                                                                                                                                                                                                               |
| PRIMARY KEY                                                | a column set that ensures that no two rows in the table can be duplicates. Only one primary key can be specified per table. Internally, the system uses a unique primary or secondary index to enforce this constraint.                                                                                                                                                                                                                                                                                                                                             |
| <i>column_name</i>                                         | <p>a column in the column set to be used as the primary key or as unique.</p> <p>If more than one <i>column_name</i> is specified, the PRIMARY KEY or UNIQUE column set is based on the combined values of the column named.</p> <p>A maximum of 64 columns can be specified for a primary key.</p> <p>Columns listed in a UNIQUE or PRIMARY KEY table constraint must all be defined as NOT NULL.</p>                                                                                                                                                              |

| Syntax Element ...                    | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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| <b>REFERENCES Definition Clause</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| CONSTRAINT<br><i>name</i>             | the optional name for a constraint.<br>REFERENCES constraints are not permitted for global temporary or volatile tables.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| FOREIGN KEY                           | a foreign key for the table.<br>Foreign keys and their use are described in <i>Database Design</i> .<br>FOREIGN KEY is a table-level constraint.<br>You cannot copy foreign key constraints to a new table using the copy table syntax.<br>A maximum of 64 foreign keys can be defined for a single table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>column_name</i>                    | a name for a column defined as part of the foreign key.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| REFERENCES                            | an integrity reference to the parent table named in <i>table_name</i> .<br>Referential integrity constraints are not supported for global temporary and volatile tables.<br>You cannot copy referential constraints to a new table using the copy table syntax.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <i>table_name</i>                     | the name of the referenced parent table used in the referential integrity constraint definition.<br>If not in the same database as the child table, <i>table_name</i> must be qualified.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <i>column_name</i>                    | a column in the column set that makes up the Parent table PRIMARY KEY or UNIQUE candidate key columns.<br>Optional column name in <i>table_name</i> , used in the referential integrity constraint definition.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>CHECK Definition Clause</b>        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| CONSTRAINT<br><i>name</i>             | the optional name for a constraint.<br>Constraints are not permitted for volatile tables.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| CHECK<br>( <i>boolean_condition</i> ) | a conditional expression, including scalar comparison conditions using, for example, any of the following comparison operators: <ul style="list-style-type: none"> <li>=</li> <li>&lt;&gt;</li> <li>&gt;</li> <li>&gt;=</li> </ul> For more information about these operators, see <i>SQL Functions, Operators, Expressions, and Predicates</i> .<br>When a CHECK constraint is part of the column definition, then its defined search condition cannot reference any other columns in its table, nor are set specifications allowed. Valid column-level CHECK constraints that reference candidate keys of other tables <i>are</i> permitted. See <i>Database Design</i> .<br>A table-level CHECK constraint can compare any columns defined for its table, both against each other and against constant values. |

| Syntax Element ...                                                                                                                                                                                                                                     | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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| <b>AS Clause (Copy Table Syntax)</b>                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <i>source_table_name</i>                                                                                                                                                                                                                               | the name of the source table whose column- and table-level definitions (with some restrictions) and, optionally, data are to be copied to <i>table_name</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>query_expression</i>                                                                                                                                                                                                                                | an optional clause used to select a subset of the column definitions and, only when a WITH DATA clause is specified, data from <i>query_expression</i> for copying to <i>table_name</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| WITH NO DATA                                                                                                                                                                                                                                           | <p>that none of the data from the source table or query expression are to be copied to a new table based on its definition.</p> <p>All (or a user-defined subset) of the definitions for the source table, but none of its data, are to be copied to a new table.</p> <p>Indicate column subsets using a subquery; otherwise the operation copies all column definitions to the target table.</p> <p>If you specify WITH NO DATA with the AND STATISTICS option, the system sets up the appropriate statistical histograms in the target table, but does not populate them with the available statistical information. This state is referred to as <i>zeroed statistics</i>.</p> |
| WITH DATA                                                                                                                                                                                                                                              | <p>that the data for the source table or query expression are to be copied to a new table. You cannot create global temporary tables using the WITH DATA option.</p> <p>Indicate column subsets using a subquery; otherwise the operation copies all column definitions and data to the target table.</p>                                                                                                                                                                                                                                                                                                                                                                         |
| AND STATISTICS                                                                                                                                                                                                                                         | <p>that the statistics for the source table be copied to a new table based on its definition.</p> <p>The system also sets up the appropriate statistical histograms in the dictionary for the target table and copies the statistics from the source table into them (see <i>SQL Request and Transaction Processing</i>).</p> <p>If you specify WITH NO DATA with the AND STATISTICS option, the system sets up the appropriate statistical histograms for the target table, but does not populate them with the available statistical information. This state is referred to as <i>zeroed statistics</i>.</p>                                                                    |
| <b>INDEX Definition Clause</b>                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>If you neither specify PRIMARY INDEX (<i>column_list</i>) nor NO PRIMARY INDEX explicitly, then whether Teradata Database creates the table with or without a primary index depends on the setting of the DBS Control flag PrimaryIndexDefault.</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| UNIQUE                                                                                                                                                                                                                                                 | <p>that the named primary index is defined to be unique.</p> <p>Any secondary indexes and the primary index can be defined to be unique with the exception of a PPI whose definition does not include all of its partitioning columns.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| PRIMARY INDEX                                                                                                                                                                                                                                          | <p>the primary index definition.</p> <p>The primary index is used by the hashing algorithm to partition table rows across the AMPs.</p> <p>If neither a primary index nor the NO PRIMARY INDEX option is specified, the result depends on the setting of the DBS Control flag PrimaryIndexDefault.</p>                                                                                                                                                                                                                                                                                                                                                                            |

| Syntax Element ...                                       | Specifies ...                                                             |                                                                                                                            |                                                                                                                |                                                                                                                                      |
|----------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| PRIMARY INDEX<br>(continued)                             | <b>IF PrimaryIndex Default is set to ...</b>                              | <b>AND you specify ...</b>                                                                                                 | <b>THEN Teradata Database creates the table with ...</b>                                                       |                                                                                                                                      |
|                                                          | N                                                                         | an explicit PRIMARY INDEX                                                                                                  | a primary index on the specified column set, which can be either a UPI or NUPI depending on the specification. |                                                                                                                                      |
|                                                          |                                                                           | an explicit NO PRIMARY INDEX                                                                                               | no primary index.                                                                                              |                                                                                                                                      |
|                                                          |                                                                           | neither an explicit PRIMARY INDEX nor an explicit NO PRIMARY INDEX                                                         | either a default primary index or no primary index according to the following process.                         |                                                                                                                                      |
|                                                          |                                                                           |                                                                                                                            | <b>IF the CREATE TABLE request specifies ...</b>                                                               | <b>THEN Teradata Database creates the table with ...</b>                                                                             |
|                                                          |                                                                           |                                                                                                                            | a PRIMARY KEY constraint                                                                                       | a UPI on the specified primary key column set.                                                                                       |
|                                                          |                                                                           |                                                                                                                            | a PRIMARY KEY constraint and one or more UNIQUE constraints                                                    | a UPI on the specified primary key column set.<br>The columns defined with UNIQUE constraints are then explicitly redefined as USIs. |
|                                                          | no PRIMARY KEY constraint, but one or more UNIQUE constraints             | a UPI on the first UNIQUE column defined for the table.<br>All other UNIQUE columns are then explicitly redefined as USIs. |                                                                                                                |                                                                                                                                      |
| neither a PRIMARY KEY constraint nor a UNIQUE constraint | no primary index.<br>The default Table Kind for NoPI tables is MULTISSET. |                                                                                                                            |                                                                                                                |                                                                                                                                      |

| Syntax Element ...           | Specifies ...                         |                                                                    |                                                                                                                  |  |
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| PRIMARY INDEX<br>(continued) | IF PrimaryIndex Default is set to ... | AND you specify ...                                                | THEN Teradata Database creates the table with ...                                                                |  |
|                              | D or P                                | an explicit PRIMARY INDEX                                          | a primary index on the specified column set, which can be either a UPI or a NUPI depending on the specification. |  |
|                              |                                       | an explicit NO PRIMARY INDEX                                       | no primary index.                                                                                                |  |
|                              |                                       | neither an explicit PRIMARY INDEX nor an explicit NO PRIMARY INDEX | either a default primary index or no primary index according to the following rules.                             |  |
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| Syntax Element ...          | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NO PRIMARY INDEX            | <p>that the table is defined with no primary index.</p> <p>You cannot specify a column name list following a NO PRIMARY INDEX specification.</p> <p>The default Table Kind for such tables is MULTISSET.</p> <p>See <i>Database Design</i> for the complete set of rules that control primary index defaults.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| INDEX                       | <p>a keyword used to define any secondary indexes for the table.</p> <p>The INDEX list is an extension to ANSI SQL.</p> <p>Unlike the indexes created by the UNIQUE and PRIMARY KEY constraint definitions, indexes defined by the index list can have nullable columns.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <i>index_name</i>           | an optional name for a secondary index.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| ALL                         | <p>that the system should ignore the assigned case specificity for a column. This property enables a NUSI defined with the ALL option to do the following:</p> <ul style="list-style-type: none"> <li>• Include case-specific values.</li> <li>• Cover a table on a NOT CASESPECIFIC column set.</li> </ul> <p>ALL enables a NUSI to cover a query, enhancing performance by eliminating the need to access the base table itself when all columns needed by a query are contained in the NUSI.</p> <p>Be aware that specifying the ALL option might also require additional index storage space.</p> <p>You cannot specify multiple NUSIs that differ only by the presence or absence of the ALL option.</p> <p>You cannot specify the ALL option for primary or unique secondary indexes.</p> |
| <i>primary_index_column</i> | <p>a column in the column set that defines a partitioned primary index.</p> <p>If you specify more than one column name, the index is created on the combined values of each column named. A maximum of 64 columns can be specified for an index, and a maximum of 32 secondary indexes can be created for one table.<sup>a</sup></p> <p>No primary index column can have a UDT or LOB data type.</p> <p>If you specify more than one column name, the index is created on the combined values of each column named. A maximum of 64 columns can be specified for an index, and a maximum of 32 secondary indexes can be created for one table.<sup>a</sup></p>                                                                                                                                 |
| PARTITION BY                | <p>that the primary index is partitioned by the partitioning expression that follows.</p> <p>You can define a partitioned primary index for global temporary tables, volatile tables, and standard base tables.</p> <p>Note that you <i>cannot</i> partition secondary indexes or NoPI tables.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

| Syntax Element ...             | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |                         |        |                                        |         |                                                         |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------------|--------|----------------------------------------|---------|---------------------------------------------------------|
| <i>partitioning_expression</i> | <p>one or more SQL expressions used to define the partition set to which a partitioned primary index row is assigned when it is hashed to its AMP.</p> <p>If you specify multiple partitioning expressions, each member of the set must be separated by a COMMA character, and the entire set must be delimited on the left by a LEFT PARENTHESIS character and on the right by a RIGHT PARENTHESIS character.</p> <p>The result of a partitioning expression is always implicitly cast to a 4-byte INTEGER type, if it is not already an INTEGER, because its value must fall within the range 1 - 65,535, inclusive.</p> <table> <tr> <th>Use this function ...</th><th>To define a mapping ...</th></tr> <tr> <td>CASE_N</td><td>between conditions to INTEGER numbers.</td></tr> <tr> <td>RANGE_N</td><td>of ranges of INTEGER or DATE values to INTEGER numbers.</td></tr> </table> <p>See <i>SQL Functions, Operators, Expressions, and Predicates</i> for documentation of the CASE_N and RANGE_N functions.</p> | Use this function ... | To define a mapping ... | CASE_N | between conditions to INTEGER numbers. | RANGE_N | of ranges of INTEGER or DATE values to INTEGER numbers. |
| Use this function ...          | To define a mapping ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |                         |        |                                        |         |                                                         |
| CASE_N                         | between conditions to INTEGER numbers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |                         |        |                                        |         |                                                         |
| RANGE_N                        | of ranges of INTEGER or DATE values to INTEGER numbers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |                         |        |                                        |         |                                                         |
| INDEX                          | <p>a keyword to introduce a secondary index definition. The INDEX list is an extension to ANSI SQL.</p> <p>Unlike the indexes created by the UNIQUE and PRIMARY KEY constraint definitions, indexes defined by the index list can include nullable fields.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |                         |        |                                        |         |                                                         |
| <i>index_name</i>              | an optional name for the index.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |                         |        |                                        |         |                                                         |
| ALL                            | <p>that the system should ignore the assigned case specificity for a column. This property enables a NUSI defined with the ALL option to do the following:</p> <ul style="list-style-type: none"> <li>• Include case-specific values.</li> <li>• Cover a table or join index on a NOT CASESPECIFIC column set.</li> </ul> <p>ALL enables a NUSI to cover a query, enhancing performance by eliminating the need to access the base table itself when all columns needed by a query are contained in the NUSI.</p> <p>Be aware that specifying the ALL option might also require additional index storage space.</p> <p>You cannot specify multiple NUSIs that differ only by the presence or absence of the ALL option.</p> <p>You cannot specify the ALL option for primary or unique secondary indexes.</p>                                                                                                                                                                                                           |                       |                         |        |                                        |         |                                                         |
| <i>index_column_name</i>       | <p>a column set whose values are to be used as the basis for a secondary index.</p> <p>No column in the list can have a UDT or LOB data type.</p> <p>If you specify more than one column name, the index is created on the combined values of each column named. A maximum of 64 columns can be specified for an index, and a maximum of 32 secondary indexes can be created for one table.<sup>a</sup></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |                         |        |                                        |         |                                                         |
| ORDER BY                       | <p>row ordering on each AMP by a single NUSI column: either value-ordered or hash-ordered.</p> <p>If you specify HASH, then the rows are hash-ordered on the AMP; otherwise, the rows are value-ordered.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |                         |        |                                        |         |                                                         |
| VALUES                         | <p>value-ordering for the ORDER BY column.</p> <p>Select VALUES to optimize queries that return a contiguous range of values, especially for a covering index or a nested join.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |                         |        |                                        |         |                                                         |

| Syntax Element ...                           | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HASH                                         | <p>hash-ordering for the ORDER BY column.</p> <p>Select HASH to limit hash-ordering to one column, rather than all columns. This is the default if you do not specify an ORDER BY clause.</p> <p>Hash-ordering a multicolumn NUSI on one of its columns allows the NUSI to participate in a nested join where join conditions involve only that ordering column.<sup>a</sup></p>                                                                                                                                                                       |
| <i>order_column_name</i>                     | <p>a column in the INDEX column list that specifies the sort order used to store index rows.</p> <p>If you do not specify an <i>order_column_name</i>, then the system uses the first column in the index definition by default.</p> <p>The supported data types for a value-ordered <i>order_column_name</i> are the following:</p> <ul style="list-style-type: none"> <li>• BYTEINT</li> <li>• DATE</li> <li>• DECIMAL</li> <li>• INTEGER</li> <li>• SMALLINT</li> </ul> <p>Values for <i>order_column_name</i> are limited to 4 or fewer bytes.</p> |
| Temporary/Volatile Table Preservation Clause |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| ON COMMIT<br>DELETE/<br>PRESERVE ROWS        | <p>to delete or preserve the contents of a global temporary or volatile table when a transaction completes.</p> <p>DELETE is the default.</p> <p>This parameter is valid for global temporary and volatile tables only.</p>                                                                                                                                                                                                                                                                                                                            |

a. A multicolumn NUSI defined with an ORDER BY clause counts as two consecutive indexes in this calculation.

## ANSI Compliance

CREATE TABLE is ANSI SQL:2008-compliant with extensions.

Global temporary tables are ANSI SQL:2008-compliant.

Volatile tables are a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

No privileges are required to create, access, modify, or drop volatile tables. For all other table types, you must have the CREATE TABLE privilege on the database or user in which the table is created.

If you specify the JOURNAL option, then you must also have INSERT privilege on the journal table.



To access a table that contains UDT columns, you must have at least one of the following privileges:

- UDTUSAGE on the specified UDT
- UDTUSAGE on the *SYSUDTLIB* database
- UDTTYPE on the *SYSUDTLIB* database
- UDTMETHOD on the *SYSUDTLIB* database

## Privileges Granted Automatically

No privileges are granted on newly created volatile tables.

For other table types, the creator receives all the following privileges WITH GRANT OPTION on the newly created table:

- CREATE TRIGGER
- DELETE
- DROP TABLE
- DROP TRIGGER
- DUMP
- INDEX
- INSERT
- REFERENCES
- RESTORE
- SELECT
- UPDATE

## Example 1

The following CREATE TABLE statement defines the *employee* table:

```
CREATE TABLE employee
(empno SMALLINT FORMAT '9(5)'
 CHECK (empno >= 10001 AND empno <= 32001) NOT NULL,
 name VARCHAR(12) NOT NULL,
 deptno SMALLINT FORMAT '999'
 CHECK (deptno >= 100 AND deptno <= 900),
 jobtitle VARCHAR(12),
 salary DECIMAL(8,2) FORMAT 'ZZZ,ZZ9.99'
 CHECK (salary >= 1.00 AND salary <= 999000.00),
 yrsexp BYTEINT FORMAT 'Z9'
 CHECK (yrsexp >= -99 AND yrsexp <= 99),
 dob DATE FORMAT 'MMbDDbYYYY' NOT NULL,
 sex CHAR UPPERCASE NOT NULL
 CHECK (sex IN ('M', 'F')),
 race CHAR UPPERCASE,
 mstat CHAR UPPERCASE
 CHECK (MStat IN ('S', 'M', 'D', 'U')),
 edlev BYTEINT FORMAT 'Z9'
 CHECK (EdLev >= 0 AND EdLev <= 22) NOT NULL,
 hcap BYTEINT FORMAT 'Z9'
 CHECK (HCap >= -99 AND HCap <= 99)
 UNIQUE PRIMARY INDEX (EmpNo),
 INDEX (Name);
```

In this example, a unique primary index is defined on the *empno* column, and a unique secondary index is defined on the *name* column. Because the *empno* and *name* columns must always contain a value, they are assigned the NOT NULL attribute.

For display purposes, the values for *sex*, *race*, and *mstat* are defined as UPPERCASE. The *name* column is not defined as a unique index because it is possible for two or more employees to have the same name.

## Example 2: Use of DATABLOCKSIZE, CHECKSUM, and FREESPACE

The following example creates the same *employee* table as in “[Example 1](#)” on page 409 but includes options to specify a maximum data block size of 16 384 bytes (32 sectors), a disk I/O checksum of LOW, and 10 percent freespace:

```
CREATE TABLE Employee,
  DATABLOCKSIZE = 16384 BYTES,
  CHECKSUM = LOW,
  FREESPACE = 10 PERCENT,
  (EmpNo SMALLINT FORMAT '9(5)'
    CHECK (EmpNo >= 10001 AND EmpNo <= 32001) NOT NULL,
  Name VARCHAR(12) NOT NULL,
  DeptNo SMALLINT FORMAT '999'
    CHECK (DeptNo >= 100 AND DeptNo <= 900),
  JobTitle VARCHAR(12),
  Salary DECIMAL(8,2) FORMAT 'ZZZ,ZZ9.99'
    CHECK (Salary >= 1.00 AND Salary <= 999000.00),
  YrsExp BYTEINT FORMAT 'Z9'
    CHECK (YrsExp >= -99 AND YrsExp <= 99),
  dob DATE FORMAT 'MMbDDbYYYY' NOT NULL,
  Sex CHAR UPPERCASE NOT NULL,
  Race CHAR UPPERCASE,
  MStat CHAR UPPERCASE,
  EdLev BYTEINT FORMAT 'Z9'
    CHECK (EdLev >= 0 AND EdLev <= 22) NOT NULL,
  HCap BYTEINT FORMAT 'Z9'
    CHECK (HCap >= -99 AND HCap <= 99)
  UNIQUE PRIMARY INDEX (EmpNo),
  INDEX (Name);
```

## Example 3: Multivalued Compression

The following example compresses all *empname* values of Smith, Wong, and Rodriguez and all DOB values of 1972-02-29, 1976-02-29, and null:

```
CREATE TABLE Employee
  (EmpNo INT NOT NULL,
  EmpName CHAR(30) NOT NULL COMPRESS ('Smith',
    'Wong', 'Rodriguez')
  ...
  DOB DATE COMPRESS (NULL, DATE '1972-02-29',
    DATE '1976-02-29')
  ...);
```

## Example 4: Discrepancy Between Explicit Column Data Type and Implicit Data Type of Compression List Value

The following examples demonstrate the problem with specifying compressed numeric data values in an implicit data type that differs from the explicit type specified for the column containing the value to be compressed. The problem is restricted to bidirectional conversions between the DECIMAL/NUMERIC data type and the REAL/FLOAT/DOUBLE PRECISION data type.

The first example shows the case for a column defined with an explicit FLOAT data type, but a compression value specified with an implicit DECIMAL data type:

```
CREATE TABLE comptest, NO FALLBACK (
  col_1 INTEGER NOT NULL,
  col_2 FLOAT COMPRESS 0.58)
PRIMARY INDEX (col_1);

*** Failure 3632 Compressed value incompatible with type of column COL_2.
      Statement# 1, Info =0
*** Total elapsed time was 1 second.
```

The second example shows the case for a column defined with an explicit DECIMAL data type, but a compression value specified with an implicit FLOAT data type:

```
CREATE TABLE comptest3, NO FALLBACK (
  col_1 INTEGER NOT NULL,
  col_2 DECIMAL(3,2) COMPRESS 0.07E0 )
PRIMARY INDEX (col_1);

*** Failure 3632 Compressed value incompatible with type of column COL_2.
      Statement# 1, Info =0
*** Total elapsed time was 1 second.
```

## Example 5: Identity Column

This example creates an identity column that is used as the primary index for the table. Values for idnum are generated starting with 1,000 and incrementing by 10 until the specified MAXVALUE of 300,000 is reached.

The numbers generated for rows inserted into the table are the following: 1,000, 1,010, 1,020, ..., 300,000 and then an error is returned when the maximum value is reached.

```
CREATE TABLE t (
  idnum INTEGER GENERATED ALWAYS AS IDENTITY
        (START WITH 1000
         INCREMENT BY 10
         MINVALUE 0
         MAXVALUE 300000),
  phone INTEGER)
UNIQUE PRIMARY INDEX(idnum);
```

No CYCLE parameter is specified for this example.

| IF you ...           | THEN the ...                                                                                      |
|----------------------|---------------------------------------------------------------------------------------------------|
| do not specify CYCLE | specification defaults to NO CYCLE.                                                               |
| specify CYCLE        | numbering sequence generated is as follows: 1,000, 1,010, 1,020 ...<br>300,000, 0, 10, 20, 30 ... |

No warning message is returned when numbers are cycled. However, if an *idnum* value is still in existence when an attempt is made to recycle it, the request aborts because *idnum* is the UPI for the table, so all its values must be unique.

If there is a system restart, the numbering sequence might not be in strict increments of 10 from the last generated number. The next available number stored in *DBC.IdCol.AvailValue* for that particular table is retrieved and numbering begins from there. Unassigned numbers last reserved and stored in the cache are lost.

## Example 6: Identity Column

This example creates an identity column that is used as the primary index for the table. Values for *idnum* are generated starting with 1,000 and decrementing by 10 until the specified MINVALUE of 1 is reached. Because CYCLE is specified, no error is returned and numbering proceeds as follows: 1,000, 990, 980 ... 10, 100,000, 99,990, 99,980 ...

However, if an *idnum* value is still in existence when an attempt is made to recycle it, the request aborts because *idnum* is the UPI for the table, so all its values must be unique.

```
CREATE TABLE t (  
    idnum INTEGER GENERATED ALWAYS AS IDENTITY  
        (START WITH 1000  
         INCREMENT BY -10  
         MINVALUE 1  
         MAXVALUE 100000 CYCLE),  
    phone INTEGER)  
UNIQUE PRIMARY INDEX(idnum);
```

## Example 7: Referential Integrity Constraints

In this example, *table\_1* is created with referential integrity constraints that specify the table-level and column-level referential integrity constraints described in the table.

| This specific reference in the example ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Is this level constraint ... |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <p>explicit foreign key columns (<i>field_1</i>, <i>field_2</i>) in <i>table_1</i> defining a foreign key to <i>table_2</i>.</p> <p>For this to work, there must be columns identically typed to the (<i>field_1</i>,<i>field_2</i>) columns in <i>table_1</i> (call them <i>upi_field_1</i> and <i>upi_field_2</i>) that constitute the unique primary index columns for <i>table_2</i>.</p> <p>In other words, columns <i>upi_field_1</i> and <i>upi_field_2</i> in <i>table_2</i> must both be defined as type INTEGER and must constitute the unique primary index for <i>table_2</i>.</p> <p>Otherwise, an error is returned.</p> | Table                        |
| <p>implicit foreign key column <i>field_1</i> in <i>table_1</i> explicitly referencing column <i>field_1</i> in <i>table_3</i>.</p> <p><i>table_1(field_1)</i> and <i>table_3(field_1)</i> must both be typed INTEGER, but <i>table_3(field_1)</i> need not be the unique primary index for <i>table_3</i>.</p>                                                                                                                                                                                                                                                                                                                        | Column                       |

```

CREATE TABLE table_1
  (field_1 INTEGER NOT NULL REFERENCES table_3(field_1),
   field_2 INTEGER,
  FOREIGN KEY (field_1, field_2) REFERENCES table_2)
PRIMARY INDEX (field_1);

```

## Example 8: Batch Referential Integrity Constraint

This example creates a table-level batch referential integrity constraint on column *d1* of child table *drs.t2*, which refers to column *c1* in parent table *drs.t1*. Referential integrity is enforced for this constraint.

```

CREATE SET TABLE drs.t1, NO FALLBACK,
  NO BEFORE JOURNAL,
  NO AFTER JOURNAL
  (
    c1 INTEGER NOT NULL,
    c2 INTEGER NOT NULL,
    c3 INTEGER NOT NULL)
UNIQUE PRIMARY INDEX (c1);

CREATE SET TABLE drs.t2, NO FALLBACK,
  NO BEFORE JOURNAL,
  NO AFTER JOURNAL
  (
    d1 INTEGER,
    d2 INTEGER,
    d3 INTEGER,
  FOREIGN KEY (d1) REFERENCES WITH CHECK OPTION drs.t1 (c1));

```

## Example 9: Column-Level Referential Constraint

The first statement creates a column-level referential integrity constraint on column *a1* with column *b1* in table *b*. Referential integrity is enforced for this relationship.

The second statement specifies a column-level Referential Constraint relationship on column *a1* with column *b1* in table *b*. Referential integrity is not enforced for this relationship.

```
CREATE TABLE a (  
  a1 INTEGER REFERENCES b(b1),  
  a2 CHARACTER(10))  
PRIMARY INDEX (a1);  
  
CREATE TABLE a (  
  a1 INTEGER REFERENCES WITH NO CHECK OPTION b(b1),  
  a2 CHARACTER(10))  
PRIMARY INDEX (a1);
```

## Example 10: Table-Level Referential Constraint

The first statement creates a table-level standard referential integrity constraint on foreign key column *a2* with column *d1* in table *d*. Referential integrity is enforced for this relationship.

The second statement creates a table-level Referential Constraint relationship on column *a2* with column *d1* in table *d*. Referential integrity is not enforced for this relationship.

```
CREATE TABLE a (  
  a1 INTEGER,  
  a2 CHARACTER(10),  
  a3 INTEGER,  
  FOREIGN KEY (a2) REFERENCES d(d1))  
PRIMARY INDEX (a1);  
  
CREATE TABLE a (  
  a1 INTEGER,  
  a2 CHARACTER(10),  
  a3 INTEGER,  
  FOREIGN KEY (a2) REFERENCES WITH NO CHECK OPTION d(d1))  
PRIMARY INDEX (a1);
```

## Example 11: Column-Level Named Constraints

The statement in this example names constraints at the column level.

```
CREATE TABLE good_1 (  
  field_1 INTEGER NOT NULL  
    CONSTRAINT primary_1 PRIMARY KEY,  
  field_2 INTEGER NOT NULL  
    CONSTRAINT unique_1 UNIQUE,  
  field_3 INTEGER  
    CONSTRAINT check_1  
    CHECK (field_3 > 0),  
  field_4 INTEGER  
    CONSTRAINT reference_1  
    REFERENCES parent_1);
```

## Example 12: Table-Level Named Constraints

The statement in this example names constraints at the table level.

```

CREATE TABLE good_2 (
    field_1 INTEGER NOT NULL
    field_2 INTEGER NOT NULL,
    field_3 INTEGER NOT NULL,
    field_4 INTEGER NOT NULL,
    field_5 INTEGER,
    field_6 INTEGER,
    CONSTRAINT primary_1
PRIMARY KEY (field_1, field_2),
    CONSTRAINT unique_1
    UNIQUE (field_3, field_4),
    CONSTRAINT check_1
    CHECK (field_3 > 0 OR field_4 IS NOT NULL),
    CONSTRAINT reference_1
FOREIGN KEY (field_5, field_6)
REFERENCES parent_1 (field_2, field_3));

```

## Example 13: Table- and Column-Level Named and Unnamed Constraints

The statement in this example defines named and unnamed constraints at both the column and table levels.

```

CREATE TABLE good_3 (
    field_1 INTEGER NOT NULL
    CONSTRAINT primary_1
PRIMARY KEY,
    field_2 INTEGER NOT NULL
    CONSTRAINT unique_1
    UNIQUE
    CONSTRAINT check_1
    CHECK (field_2 <> 3)
    CONSTRAINT reference_1
    REFERENCES parent_1
    CHECK (field_2 > 0)
    REFERENCES parent_1 (field_4),
    field_3 INTEGER NOT NULL
    field_4 INTEGER NOT NULL
    field_5 INTEGER,
    CONSTRAINT unique_2
    UNIQUE (field_3),
    CONSTRAINT check_2
    CHECK (field_3 > 0 AND field_3 < 100),
    CONSTRAINT reference_2
FOREIGN KEY (field_3)
REFERENCES parent_1 (field_5),
    UNIQUE (field_4),
    CHECK (field_4 > field_5),
FOREIGN KEY (field_4, field_5)
REFERENCES parent_1 (field_6, field_7));

```

## Example 14: Named and Unnamed CHECK Constraints at Both Levels

The statement in this example combines the three unnamed CHECKs for *field\_1*. Constraint *check\_0* and each of the named CHECKs for *field\_2* are treated as table constraints.

```
CREATE TABLE good_4 (  
    field_1 INTEGER  
        CHECK (field_1 > 0)  
        CHECK (field_1 < 999)  
        CHECK (field_1 NOT IN (100,200,300))  
    CONSTRAINT check_0  
        CHECK (field_1 IS NOT NULL),  
    field_2 INTEGER  
        CONSTRAINT check_1  
        CHECK (field_2 > 0)  
        CHECK (field_2 < 999));
```

## Example 15: Primary Index and Primary Key Specification

The statement in this example specifies both a primary index and primary key.

The Primary Key (*field\_1*) is mapped to a unique secondary index. The UNIQUE constraint on *field\_3* also is mapped to a USI. These two unique secondary indexes cannot be null. The Unique Primary Index (*field\_2*) is the hashing index and *can* be null; however, no more than one row in the table can have a null UPI.

```
CREATE TABLE good_5 (  
    field_1 INTEGER NOT NULL PRIMARY KEY,  
    field_2 INTEGER,  
    field_3 INTEGER NOT NULL UNIQUE,  
    field_4 INTEGER)  
UNIQUE PRIMARY INDEX (field_2);
```

## Example 16: Partitioned NUPI Specification With a USI On the Same Column Set and Partitioned By a RANGE\_N Expression

The following example creates a unique PPI on *o\_orderkey* and a USI on the same column set. The statement bases its partitioning expression on the RANGE\_N function on *o\_orderdate*.

The PPI cannot be defined as unique because its partitioning expression is based on *o\_orderdate* and that column is not included in the primary index column set.

```
CREATE TABLE orders (  
    o_orderkey      INTEGER NOT NULL,  
    o_custkey       INTEGER,  
    o_orderstatus   CHARACTER(1) CASESPECIFIC,  
    o_totalprice    DECIMAL(13,2) NOT NULL,  
    o_orderdate     DATE FORMAT 'yyyy-mm-dd' NOT NULL,  
    o_orderpriority CHARACTER(21),  
    o_clerk         CHARACTER(16),  
    o_shippriority  INTEGER,  
    o_comment       VARCHAR(79))  
PRIMARY INDEX (o_orderkey)  
PARTITION BY RANGE_N(o_orderdate BETWEEN DATE '1992-01-01'  
                                AND     DATE '1998-12-31'  
                                EACH INTERVAL '1' MONTH)  
  
UNIQUE INDEX (o_orderkey);
```



**Example 17: Partitioned NUPI Specification Without a USI and Partitioned By a RANGE\_N Expression**

The following example creates a nonunique PPI on *l\_orderkey* and bases its partitioning expression on the RANGE\_N function on *l\_shipdate*. No secondary indexes are defined.

```
CREATE TABLE lineitem (
  l_orderkey      INTEGER NOT NULL,
  l_partkey       INTEGER NOT NULL,
  l_suppkey       INTEGER,
  l_linenumbers   INTEGER,
  l_quantity      INTEGER NOT NULL,
  l_extendedprice DECIMAL(13,2) NOT NULL,
  l_discount      DECIMAL(13,2),
  l_tax          DECIMAL(13,2),
  l_returnflag    CHARACTER(1),
  l_linestatus    CHARACTER(1),
  l_shipdate      DATE FORMAT 'yyyy-mm-dd',
  l_commitdate    DATE FORMAT 'yyyy-mm-dd',
  l_receiptdate   DATE FORMAT 'yyyy-mm-dd',
  l_shipinstruct  VARCHAR(25),
  l_shipmode      VARCHAR(10),
  l_comment       VARCHAR(44))
PRIMARY INDEX (l_orderkey)
PARTITION BY RANGE_N(l_shipdate BETWEEN DATE '1992-01-01'
                     AND         DATE '1998-12-31'
                     EACH INTERVAL '1' MONTH);
```

**Example 18: Partitioned UPI Specification Over a Narrow Range Using a RANGE\_N Expression**

The following example creates a UPPI on *storeid*, *productid*, and *salesdate* and bases its partitioning expression on the RANGE\_N function on *salesdate*. No secondary indexes are defined.

The example provides partitions that are one day wide over a 5 month interval.

The PPI can be defined as unique because its partitioning expression is based on *salesdate* and that column is included in the primary index column set.

```
CREATE TABLE sales (
  storeid      INTEGER NOT NULL,
  productid    INTEGER NOT NULL,
  salesdate    DATE FORMAT 'yyyy-mm-dd' NOT NULL,
  totalrevenue DECIMAL(13,2),
  totalsold    INTEGER,
  note         VARCHAR(256))
UNIQUE PRIMARY INDEX (storeid, productid, salesdate)
PARTITION BY RANGE_N(salesdate BETWEEN DATE '2001-01-01'
                     AND         DATE '2001-05-31'
                     EACH INTERVAL '1' DAY);
```

## Example 19: Partitioned UPI Specification Over a Broad Range Using a RANGE\_N Expression

The following example is similar to [“Example 18: Partitioned UPI Specification Over a Narrow Range Using a RANGE\\_N Expression” on page 417](#) except that it provides partitions that are one week wide over a 4 year interval:

```
CREATE TABLE SalesHistory (  
  storeid      INTEGER NOT NULL,  
  productid    INTEGER NOT NULL,  
  salesdate    DATE FORMAT 'yyyy-mm-dd' NOT NULL,  
  totalrevenue DECIMAL(13,2),  
  totalsold    INTEGER,  
  note         VARCHAR(256))  
UNIQUE PRIMARY INDEX (storeid, productid, salesdate)  
PARTITION BY RANGE_N(salesdate BETWEEN DATE '1997-01-01'  
                      AND      DATE '2000-12-31'  
                      EACH INTERVAL '7' DAY);
```

## Example 20: Partitioned UPI Specification Using an EXTRACT Expression

The following example creates a UPPI on *storeid*, *productid*, and *salesdate* and bases its partitioning expression on a simple EXTRACT function on *salesdate*. No secondary indexes are defined.

```
CREATE TABLE SalesByMonth (  
  storeid      INTEGER NOT NULL,  
  productid    INTEGER NOT NULL,  
  salesdate    DATE FORMAT 'yyyy-mm-dd' NOT NULL,  
  totalrevenue DECIMAL(13,2),  
  totalsold    INTEGER,  
  note         VARCHAR(256))  
UNIQUE PRIMARY INDEX (storeid, productid, salesdate)  
PARTITION BY EXTRACT(MONTH FROM salesdate);
```

## Example 21: PPI Specification Using a Simple Column Expression

The following example creates a PPI on *storeid*, *productid*, and *salesdate* and bases its CASE\_N partitioning expression on *totalrevenue*. Because *totalrevenue* is not defined in the primary index column set, the primary index on this table cannot be defined as unique.

```
CREATE TABLE StoreRevenue (  
  storeid      INTEGER NOT NULL,  
  productid    INTEGER NOT NULL,  
  salesdate    DATE FORMAT 'yyyy-mm-dd' NOT NULL,  
  totalrevenue DECIMAL(13,2),  
  totalsold    INTEGER,  
  note         VARCHAR(256))  
PRIMARY INDEX (storeid, productid, salesdate)  
PARTITION BY CASE_N(totalrevenue < 10000,  
                    totalrevenue < 100000,  
                    totalrevenue < 1000000,  
                    NO CASE, UNKNOWN);
```

If you need to ensure the uniqueness of the column set (*storeid*, *productid*, *salesdate*), you can define a USI on that set.

**Example 22: Illegal Specification of UPI Without All Partitioning Columns Included in Primary Index Definition**

The following example attempts to create a UPPI on *storeid*, *productid*, and *salesdate*, but fails because *totalrevenue*, on which the table is partitioned, is not included in the UPPI definition. A PPI cannot be unique unless all its partitioning columns are included in the index definition.

```
CREATE TABLE StoreRevenue (
  storeid      INTEGER NOT NULL,
  product id   INTEGER NOT NULL,
  salesdate    DATE FORMAT 'yyyy-mm-dd' NOT NULL,
  totalrevenue DECIMAL(13,2)
  totalsold    INTEGER
  note         VARCHAR(256))
UNIQUE PRIMARY INDEX (storeid, productid, salesdate)
PARTITION BY CASE_N(totalrevenue < 10000,
                    totalrevenue < 100000,
                    totalrevenue < 1000000,
                    NO CASE, UNKNOWN);
```

**Example 23: Partitioned UPI Specification Using a Simple Arithmetic Expression**

The following example creates a UPPI on *storeid*, *productid*, and *salesdate* and bases its partitioning expression on a simple arithmetic expression on *storeid* and *productid*. No secondary indexes are defined.

```
CREATE TABLE StoreProduct (
  storeid      INTEGER NOT NULL BETWEEN 0 AND 64,
  productid    INTEGER NOT NULL BETWEEN 0 and 999,
  salesdate    DATE FORMAT 'yyyy-mm-dd' NOT NULL,
  totalrevenue DECIMAL(13,2),
  totalsold    INTEGER,
  note         VARCHAR(256))
UNIQUE PRIMARY INDEX (storeid, productid, salesdate)
PARTITION BY storeid*1000 + productid + 1;
```

## Example 24: Partitioned MLPPI NUPI With a USI on the Primary Index to Enforce Uniqueness

The following example creates a two-level MLPPI using the RANGE\_N function as the basis for both partitioning expressions. Because neither partitioning column is a component of the primary index, that index must be defined as a NUPI. Note that a USI is defined on *o\_orderkey* to maintain its uniqueness.

```
CREATE TABLE orders (
  o_orderkey      INTEGER NOT NULL,
  o_custkey       INTEGER,
  o_orderstatus   CHARACTER(1) CASESPECIFIC,
  o_totalprice    DECIMAL(13,2) NOT NULL,
  o_orderdate     DATE FORMAT 'yyyy-mm-dd' NOT NULL,
  o_orderpriority CHARACTER(21),
  o_clerk         CHARACTER(16),
  o_shippriority  INTEGER,
  o_comment       VARCHAR(79))
PRIMARY INDEX (o_orderkey)
PARTITION BY (RANGE_N(o_custkey    BETWEEN 0
                        AND 49999
                        EACH 100),
              RANGE_N(o_orderdate BETWEEN DATE '2000-01-01'
                        AND      DATE '2006-12-31'
                        EACH INTERVAL '1' MONTH))
UNIQUE INDEX (o_orderkey);
```

## Example 25: Partitioned MLPPI NUPI With No USI on the Primary Index

The following example creates a two-level MLPPI using the RANGE\_N function as the basis for both partitioning expressions.

Because neither partitioning column is a component of the primary index, that index must be defined as a NUPI, and because no USI is defined on *o\_orderkey*, it is not unique.

```
CREATE TABLE lineitem (
  l_orderkey      INTEGER NOT NULL,
  l_partkey       INTEGER NOT NULL,
  l_suppkey       INTEGER,
  l_linenumbers   INTEGER,
  l_quantity      INTEGER NOT NULL,
  l_extendedprice DECIMAL(13,2) NOT NULL,
  l_discount      DECIMAL(13,2),
  l_tax           DECIMAL(13,2),
  l_returnflag    CHARACTER(1),
  l_linestatus    CHARACTER(1),
  l_shipdate      DATE FORMAT 'yyyy-mm-dd',
  l_commitdate    DATE FORMAT 'yyyy-mm-dd',
  l_receiptdate   DATE FORMAT 'yyyy-mm-dd',
  l_shipinstruct  VARCHAR(25),
  l_shipmode      VARCHAR(10),
  l_comment       VARCHAR(44))
```

```

PRIMARY INDEX (l_orderkey)
PARTITION BY (RANGE_N(l_suppkey  BETWEEN 0
                                AND 4999
                                EACH 10),
              RANGE_N(l_shipdate BETWEEN DATE '2000-01-01'
                                AND    DATE '2006-12-31'
                                EACH INTERVAL '1' MONTH));

```

### Example 26: Partitioned MLPPI NUPI With No USI on the Primary Index

The following example creates a two-level MLPPI using the RANGE\_N function as the basis for both partitioning expressions. Because both partitioning columns are components of the primary index, the index can be defined as a UPI.

```

CREATE TABLE sales (
  storeid      INTEGER NOT NULL,
  productid    INTEGER NOT NULL,
  salesdate    DATE FORMAT 'yyyy-mm-dd' NOT NULL,
  totalrevenue DECIMAL(13,2),
  totalsold    INTEGER,
  note         VARCHAR(256))
UNIQUE PRIMARY INDEX (storeid, productid, salesdate)
PARTITION BY (RANGE_N(storeid  BETWEEN 1
                        AND    300
                        EACH    1),
              RANGE_N(salesdate BETWEEN DATE '2006-01-01'
                        AND    DATE '2006-05-31'
                        EACH INTERVAL '1' DAY));

```

### Example 27: Partitioned MLPPI UPI

The following example creates a two-level MLPPI using the RANGE\_N function as the basis for both partitioning expressions. Because both partitioning columns are components of the primary index, the index can be defined as a UPI.

```

CREATE TABLE saleshistory (
  storeid      INTEGER NOT NULL,
  productid    INTEGER NOT NULL,
  salesdate    DATE FORMAT 'yyyy-mm-dd' NOT NULL,
  totalrevenue DECIMAL(13,2),
  totalsold    INTEGER,
  note         VARCHAR(256))
UNIQUE PRIMARY INDEX (storeid, productid, salesdate)
PARTITION BY (RANGE_N(storeid  BETWEEN 1
                        AND    300
                        EACH    1),
              RANGE_N(salesdate BETWEEN DATE '2004-01-01'
                        AND    DATE '2006-12-31'
                        EACH INTERVAL '1' MONTH));

```

## Example 28: Partitioned MLPPI NUPI With Maximum Number of Partitions

The following example specifies the maximum of 65,535 ( $3 \times 5 \times 17 \times 257$ ) partitions allowed for a combined partitioning expression. Because none of the partitioning columns is a component of the primary index, that index cannot be defined as a UPI.

```
CREATE TABLE markets (  
    productid      INTEGER NOT NULL,  
    region         BYTEINT NOT NULL,  
    activity_date  DATE FORMAT 'yyyy-mm-dd' NOT NULL,  
    revenue_code   BYTEINT NOT NULL,  
    business_sector BYTEINT NOT NULL,  
    note          VARCHAR(256))  
PRIMARY INDEX (productid, region) PARTITION BY (  
    RANGE_N(region      BETWEEN 1  
                AND      9  
                EACH     3),  
    RANGE_N(business_sector BETWEEN 0  
                AND      49  
                EACH     10),  
    RANGE_N(revenue_code BETWEEN 1  
                AND      34  
                EACH     2),  
    RANGE_N(activity_date BETWEEN DATE '1986-01-01'  
                AND      DATE '2007-05-31'  
                EACH INTERVAL '1' MONTH));
```

## Example 29: Illegal MLPPI Because of Too Many Partitions

The following example is illegal because the product of 1500 (the number of store ID partitions specified) and 51 (the number of sales date partitions specified), which is 76,500, exceeds the maximum of 65,535 partitions that can be defined for a PPI.

```
CREATE TABLE storerevenue (  
    storeid      INTEGER NOT NULL,  
    productid    INTEGER NOT NULL,  
    salesdate    DATE FORMAT 'yyyy-mm-dd' NOT NULL,  
    totalrevenue DECIMAL(13,2),  
    totalsold    INTEGER,  
    note        VARCHAR(256))  
UNIQUE PRIMARY INDEX (storeid, productid, salesdate)  
PARTITION BY (RANGE_N(storeid  BETWEEN 1  
                AND      1500  
                EACH     1),  
    RANGE_N(salesdate BETWEEN DATE '2006-01-01'  
                AND      DATE '2006-02-20'  
                EACH INTERVAL '1' DAY));
```

### Example 30: Illegal MLPPI Because a Unique Primary Index Must Be Defined Using All Partitioning Columns

The following example fails because the primary index is defined as a UPI, but one of the partitioning columns, *totalrevenue*, is not a component of the primary index definition.

You could make this example work as intended if you were to remove the word *unique* from the primary index definition, then add a composite USI on the (*storeid*, *productid*, *salesdate*) column set.

```
CREATE TABLE sales2 (
  storeid      INTEGER NOT NULL,
  productid    INTEGER NOT NULL,
  salesdate    DATE FORMAT 'yyyy-mm-dd' NOT NULL,
  totalrevenue DECIMAL(13,2),
  totalsold    INTEGER,
  note         VARCHAR(256))
UNIQUE PRIMARY INDEX (storeid, productid, salesdate)
PARTITION BY (RANGE_N(salesdate BETWEEN DATE '2006-01-01'
                      AND      DATE '2006-05-31'
                      EACH INTERVAL '1' DAY),
              CASE_N(totalrevenue < 1000,
                    totalrevenue < 10000,
                    NO CASE));
```

### Example 31: MLPPI Partitioning Expression With the Maximum of 15 Levels

The following example specifies the maximum 15 levels of partitioning. In order to not exceed 65,535 partitions for the combined partitioning expression, each level must define at most two partitions except for one level that can define a maximum of three partitions.

In this example, the last partitioning expression defines three partitions and the other partitioning expressions each define two partitions. Therefore, a total of 49,152 partitions are defined for the combined partitioning expression, which is fewer than the maximum of 65,535.

Note that while the partitioning expressions are defined using a mix of RANGE\_N and CASE\_N function-based expressions, each level is defined atomically using either one or the other function, but never both. You cannot mix RANGE\_N and CASE\_N functions within any of the partitioning expressions, nor can you partition on anything but a RANGE\_N or CASE\_N function, or both, when you define a MLPPI. See the CREATE TABLE (Index Definition Clause) “Restrictions for Multilevel Partitioned Primary Indexes” topic in *SQL Data Definition Language Detailed Topics*.

```

CREATE TABLE Product (
    productid    INTEGER NOT NULL,
    pcolor       INTEGER NOT NULL,
    psize        INTEGER NOT NULL,
    pwidth       SMALLINT NOT NULL,
    pdepth       SMALLINT NOT NULL,
    pheight      SMALLINT NOT NULL,
    pweight      SMALLINT NOT NULL,
    pcatalog     INTEGER NOT NULL,
    pcode        BYTEINT NOT NULL,
    psubcode     SMALLINT NOT NULL,
    rating       BYTEINT NOT NULL,
    discontinued BYTEINT NOT NULL,
    instock      INTEGER NOT NULL,
    backorder    INTEGER NOT NULL,
    totalsold    INTEGER NOT NULL,
    product_date DATE FORMAT 'yyyy-mm-dd' NOT NULL,
    note         CHARACTER(255))
PRIMARY INDEX (productid)
PARTITION BY (RANGE_N(pcolor          BETWEEN 1
                        AND 1000
                        EACH 500),
              RANGE_N(psize           BETWEEN 1
                        AND 1000, 1001
                        AND 48000000),
              RANGE_N(pwidth          BETWEEN 1
                        AND 400
                        EACH 200),
              RANGE_N(pdepth          BETWEEN 1
                        AND 400
                        EACH 200),
              RANGE_N(pheight         BETWEEN 1
                        AND 400
                        EACH 200),
              RANGE_N(pweight         BETWEEN 1
                        AND 2000
                        EACH 1000),
              CASE_N(pcatalog <= 1, NO CASE),
              RANGE_N(pcode           BETWEEN 1
                        AND 100
                        EACH 50),
              RANGE_N(psubcode        BETWEEN 1
                        AND 10000
                        EACH 5000),
              RANGE_N(rating           BETWEEN 1
                        AND 10
                        EACH 5),
              CASE_N(discontinued = 0,
                      discontinued = 1),
              CASE_N(instock < 50,    NO CASE),
              CASE_N(backorder = 0,   NO CASE),
              CASE_N(totalsold < 1000, NO CASE),
              RANGE_N(product_date BETWEEN DATE '2004-01-01'
                        AND DATE '2006-12-31'
                        EACH INTERVAL '1' YEAR));

```



### Example 32: Global Temporary Table With SLPPI

The following example demonstrates a valid CREATE GLOBAL TEMPORARY TABLE statement with a single-level partitioned primary index:

```

CREATE GLOBAL TEMPORARY TABLE G_orders (
  o_orderkey      INTEGER NOT NULL,
  o_custkey       INTEGER,
  o_orderstatus   CHARACTER(1) CASESPECIFIC,
  o_totalprice    DECIMAL(13,2) NOT NULL,
  o_orderdate     DATE FORMAT 'yyyy-mm-dd' NOT NULL,
  o_orderpriority CHARACTER(21),
  o_clerk         CHARACTER(16),
  o_shippriority  INTEGER,
  o_comment       VARCHAR(79))
PRIMARY INDEX (o_orderkey)
PARTITION BY RANGE_N(o_orderdate BETWEEN DATE '1992-01-01'
                        AND         DATE '1998-12-31'
                        EACH INTERVAL '1' MONTH)

UNIQUE INDEX (o_orderkey);

```

### Example 33: Volatile Table With SLPPI

The following example demonstrates a valid CREATE VOLATILE TABLE statement with a single-level partitioned primary index:

```

CREATE VOLATILE TABLE V_lineitem (
  l_orderkey INTEGER NOT NULL,
  l_partkey  INTEGER NOT NULL,
  l_suppkey  INTEGER,
  l_linenum  INTEGER,
  l_quantity INTEGER NOT NULL,
  l_extendedprice DECIMAL(13,2) NOT NULL,
  l_discount DECIMAL(13,2),
  l_tax DECIMAL(13,2),
  l_returnflag CHARACTER(1),
  l_linestatus CHARACTER(1),
  l_shipdate DATE FORMAT 'yyyy-mm-dd',
  l_commitdate DATE FORMAT 'yyyy-mm-dd',
  l_receiptdate DATE FORMAT 'yyyy-mm-dd',
  l_shipinstruct VARCHAR(25),
  l_shipmode VARCHAR(10),
  l_comment VARCHAR(44))
PRIMARY INDEX (l_orderkey)
PARTITION BY RANGE_N(l_shipdate BETWEEN DATE '1992-01-01'
                        AND         DATE '1998-12-31'
                        EACH INTERVAL '1' MONTH);

```

### Example 34: Primary Key Specification

The statement in this example specifies a primary key only, so *field\_2* is mapped to a UPI. In this case the PRIMARY index cannot be null.

```

CREATE TABLE good_6 (
  field_1 INTEGER,
  field_2 INTEGER NOT NULL PRIMARY KEY);

```

### Example 35: Neither Primary Index Nor Primary Key Is Specified

The request in this example specifies neither a primary index nor a primary key. Assuming that the DBS Control flag `PrimaryIndexDefault` is set to D or P, Teradata Database maps the first unique column, *field\_2*, to a UPI, which cannot be null.

```
CREATE TABLE good_7 (  
    field_1 INTEGER,  
    field_2 INTEGER NOT NULL UNIQUE,  
    field_3 INTEGER NOT NULL UNIQUE);
```

### Example 36: Non-Valid Use of CHECK Constraint

The statement in this example is not valid because it contains duplicate constraint names (*dup\_name*).

```
CREATE TABLE bad_1 (  
    field_1 INTEGER CONSTRAINT dup_name CHECK (field_1 > 0),  
    field_2 INTEGER NOT NULL  
    CONSTRAINT dup_name UNIQUE);
```

The system returns the following error message:

```
*** Failure 3706 Syntax error: Constraint, primary index, or  
secondary index with the same name 'dup_name' already specified for  
the table.  
Statement# 1, Info =101  
*** Total elapsed time was 1 second.
```

### Example 37: Non-Valid Use of Primary Key Constraint

The statement in this example is not valid because it defines more than one primary key constraint for the table.

```
CREATE TABLE bad_2 (  
    field_1 INTEGER NOT NULL CONSTRAINT primary_1 PRIMARY KEY,  
    field_2 INTEGER NOT NULL PRIMARY KEY);
```

The system returns the error message:

```
More than one primary index or primary key specified.
```

### Example 38: Non-Valid Use of Constraint Name

The statement in this example is not valid because the constraint name exceeds the limit of 30 characters.

```
CREATE TABLE bad_3 (  
    field_1 INTEGER NOT NULL  
    CONSTRAINT ThisIsAVeryLongNamedUniqueConstraint UNIQUE);
```

The system returns the following error message:

```
Name is longer than 30 characters.
```

### Example 39: Local Journaling

As an example, given the following CREATE TABLE statements:

```
CREATE TABLE cyk.test_1, NO FALLBACK, AFTER JOURNAL (
  x INTEGER,
  y INTEGER)
PRIMARY INDEX(x);

CREATE TABLE cyk.test_2, NO FALLBACK, NOT LOCAL AFTER JOURNAL (
  x INTEGER,
  y INTEGER)
PRIMARY INDEX(x);

CREATE TABLE cyk.test_3, NO FALLBACK, LOCAL AFTER JOURNAL (
  x INTEGER,
  y INTEGER)
PRIMARY INDEX(x);
```

SHOW TABLE produces the following output:

```
CREATE TABLE cyk.test_1, NO FALLBACK,
NO BEFORE JOURNAL,
NOT LOCAL AFTER JOURNAL
(x INTEGER, y INTEGER) PRIMARY INDEX(x);

CREATE TABLE cyk.test_2, NO FALLBACK,
NO BEFORE JOURNAL,
NOT LOCAL AFTER JOURNAL
(x INTEGER, y INTEGER) PRIMARY INDEX(x);

CREATE TABLE cyk.test_3, NO FALLBACK,
NO BEFORE JOURNAL,
LOCAL AFTER JOURNAL
(x INTEGER, y INTEGER) PRIMARY INDEX(x);
```

### Example 40: Equivalence of CREATE TABLE ... AS and CT ... AS With Respect To The Table Kind

If you use the abbreviated CT ... AS syntax rather than the full CREATE TABLE ... AS syntax when creating a copied target table definition, you cannot specify a table kind. Because of this limitation, the system automatically defaults the definition of the target table kind to the table kind of the source table in the operation, as the following example illustrates.

Assume you are running in Teradata mode, where the default table kind is SET.

First you create the source table whose definition and data are to be copied to a new table under a different name:

```
CREATE MULTISET TABLE test_m (
  i INTEGER)
PRIMARY INDEX(i);
```

Run SHOW TABLE on *test\_m* to report its definition as stored by the system:

```
SHOW TABLE test_m;
```

The result is as follows:

```
CREATE MULTISET TABLE ARUN.test_m ,NO FALLBACK ,
    NO BEFORE JOURNAL,
    NO AFTER JOURNAL,
    CHECKSUM = DEFAULT
    (
        i INTEGER)
PRIMARY INDEX ( i );
```

Now copy the definition for *test\_m* and its data to a new table, *test\_m2*:

```
CT test_m2 AS test_m
WITH DATA;
```

Because you used the CREATE TABLE ... AS syntax, you were unable to specify the MULTISET table kind.

Now run SHOW TABLE on *test\_m2* to report its definition as stored by the system:

```
SHOW TABLE test_m2;
```

The result is as follows:

```
CREATE MULTISET TABLE ARUN.test_m2 ,NO FALLBACK ,
    NO BEFORE JOURNAL,
    NO AFTER JOURNAL,
    CHECKSUM = DEFAULT
    (
        i INTEGER)
PRIMARY INDEX ( i );
```

Because the SHOW TABLE reports on both tables indicate their table kind is MULTISET, you can see that the default table kind was copied from the definition of *test\_m* to the definition of *test\_m2*.

## Example 41: AS ... WITH DATA With Default Column Names

The following CREATE TABLE ... AS ... WITH DATA statement selects all columns from the subquery for inclusion in *target\_table* and retains their names. The statement also copies the data from the selected columns into *target\_table*.

Because the statement specifies a subquery and no explicit table kind is specified, the table kind of *target\_table* defaults to the session mode default, not to the table kind of *subquery\_table*.

```
CREATE TABLE target_table AS (
    SELECT *
    FROM subquery_table )
WITH DATA;
```

### Example 42: AS ... WITH NO DATA With Default Column Names

The following CREATE TABLE ... AS ... WITH NO DATA statement selects a subset of the columns from *subquery\_table* for inclusion in *target\_table* and retains their names.

Because the statement specifies a subquery and no explicit table kind is specified, the table kind of *target\_table* defaults to the session mode default, not to the table kind of *subquery\_table* (see the CREATE TABLE (AS Clause) topic “Target Table Kind Defaults” in *SQL Data Definition Language Detailed Topics*).

```
CREATE TABLE target_table AS (  
    SELECT column_1, column_2  
    FROM subquery_table )  
WITH NO DATA;
```

### Example 43: AS ... WITH DATA With Column Constraints

The following CREATE TABLE ... AS ... WITH DATA request specifies column constraints. Note the absence of referential integrity constraints, which are not valid for AS clauses (see the CREATE TABLE (AS Clause) topic “Exclusive AS ... WITH DATA Clause Rules” in *SQL Data Definition Language Detailed Topics*).

The request also copies the data from the selected columns into *target\_table*.

Because the request specifies a subquery and no explicit table kind is specified, the table kind of *target\_table* defaults to the session mode default, not to the table kind of *subquery\_table* (see the CREATE TABLE (AS Clause) topic “Target Table Kind Defaults” in *SQL Data Definition Language Detailed Topics*).

```
CREATE TABLE target_table (  
    column_1 NOT NULL DEFAULT 0,  
    column_2)  
AS (  
    SELECT column_x, column_y  
    FROM subquery_table )  
WITH DATA;
```

### Example 44: AS ... WITH DATA With Explicit Column Names

The following CREATE TABLE ... AS ... WITH DATA statement specifies column names in *target\_table* that differ from their names in *source\_table*. The statement also copies the data from the selected columns into *target\_table*.

Because the statement specifies a subquery and no explicit table kind is specified, the table kind of *target\_table* defaults to the session mode default, not to the table kind of *subquery\_table* (see the CREATE TABLE (AS Clause) topic “Target Table Kind Defaults” in *SQL Data Definition Language Detailed Topics*).

```
CREATE TABLE target_table (  
    column_x,  
    column_y)  
AS (  
    SELECT column_1, column_2  
    FROM subquery_table )  
WITH DATA;
```

### Example 45: AS ... WITH NO DATA With Explicit Column Names

The following CREATE TABLE ... AS ... WITH NO DATA statement specifies column names for *target\_table* as column alias names in the subquery.

Because the statement specifies a subquery and no explicit table kind is specified, the table kind of *target\_table* defaults to the session mode default, not to the table kind of *subquery\_table* (see the CREATE TABLE (AS Clause) topic “Target Table Kind Defaults” in *SQL Data Definition Language Detailed Topics*).

```
CREATE TABLE target_table AS (  
    SELECT column_x AS column_1, column_y AS column_2  
    FROM subquery_table )  
WITH NO DATA;
```

### Example 46: AS ... WITH NO DATA With Data Type Attributes

The following CREATE TABLE ... AS ... WITH NO DATA statement specifies data type attributes and uses an expression to define a column in *target\_table*.

Because the statement specifies a subquery and no explicit table kind is specified, the table kind of *target\_table* defaults to the session mode default, not to the table kind of *subquery\_table* (see the CREATE TABLE (AS Clause) topic “Target Table Kind Defaults” in *SQL Data Definition Language Detailed Topics*).

```
CREATE TABLE target_table (  
    column_1 TITLE 'max_x',  
    column_2)  
AS (  
    SELECT MAX(column_x), column_y  
    FROM subquery_table  
    GROUP BY 2 )  
WITH NO DATA;
```

### Example 47: AS ... WITH NO DATA With Data Type Attributes

The following CREATE TABLE ... AS ... WITH NO DATA statement creates the same *target\_table* as [“Example 46: AS ... WITH NO DATA With Data Type Attributes” on page 430](#), but codes it differently.

Because the statement specifies a subquery and no explicit table kind is specified, the table kind of *target\_table* defaults to the session mode default, not to the table kind of *subquery\_table* (see the CREATE TABLE (AS Clause) topic “Target Table Kind Defaults” in *SQL Data Definition Language Detailed Topics*).

```
CREATE TABLE target_table AS (  
    SELECT MAX(column_x) (TITLE 'max_x' NAMED column_1),  
           column_y AS column_2  
    FROM subquery_table  
    GROUP BY 2 )  
WITH NO DATA;
```

### Example 48: AS ... WITH DATA With Unnamed Expressions

The following CREATE TABLE ... AS ... WITH DATA statement creates *target\_table* from a subquery having unnamed expressions that define both columns for *target\_table*. Note that the affected columns are named explicitly in the *target\_table* definition to compensate. The statement also copies the data from the selected columns into *target\_table*.

Because the statement specifies a subquery and no explicit table kind is specified, the table kind of *target\_table* defaults to the session mode default, not to the table kind of *subquery\_table* (see the CREATE TABLE (AS Clause) topic “Target Table Kind Defaults” in *SQL Data Definition Language Detailed Topics*).

```
CREATE TABLE target_table (
    column_x,
    column_y)
AS (
    SELECT column_x + 1, column_y + 1
    FROM subquery_table )
WITH DATA;
```

### Example 49: AS ... WITH DATA With an Unnamed Expression

The following CREATE TABLE ... AS ... WITH DATA statement creates *target\_table* from a subquery having an unnamed aggregate expression. Note that the affected column is named explicitly in the *target\_table* definition to compensate. The statement also copies the data from the selected columns into *target\_table*.

Because the statement specifies a subquery and no explicit table kind is specified, the table kind of *target\_table* defaults to the session mode default, not to the table kind of *subquery\_table* (see the CREATE TABLE (AS Clause) topic “Target Table Kind Defaults” in *SQL Data Definition Language Detailed Topics*).

```
CREATE TABLE target_table (
    column_x,
    column_y)
AS (
    SELECT MAX(column_x), column_y
    FROM subquery_table
    GROUP BY 2 )
WITH DATA;
```

### Example 50: AS ... WITH DATA and Different Explicit Attributes Specified in Target Table Definition Than in Source Table Definition

The purpose of this example is to show that when you specify explicit column descriptors that are different from those defined in the source table, the system does not copy the old column descriptors, but instead defines the new table with the descriptors specified in the target table definition.

Suppose you have defined the following simple table:

```
CREATE TABLE source (
    x INTEGER NOT NULL,
    y INTEGER DEFAULT 0);
```

You then decide to create a new table with data based on the definition of *source*, so you submit a CREATE TABLE ... AS ... WITH DATA request like the following:

```
CREATE TABLE target (  
    a,  
    b NOT NULL) AS (SELECT *  
                    FROM source)  
WITH DATA;
```

You then submit a SHOW TABLE request on *target* to see what its column descriptors are:

```
SHOW TABLE target;  
  
*** Text of DDL statement returned.  
*** Total elapsed time was 1 second.  
-----  
CREATE SET TABLE DF2.target ,NO FALLBACK ,  
    NO BEFORE JOURNAL,  
    NO AFTER JOURNAL,  
    CHECKSUM = DEFAULT  
    (  
        a INTEGER,  
        b INTEGER NOT NULL)  
PRIMARY INDEX ( a );
```

Notice that the NOT NULL attribute is not copied from column *source.x* to column *target.a*, nor is the DEFAULT 0 attribute copied from column *source.y* to column *target.b*. Instead, *target.a* has no column descriptor because none is specified for it in its table definition, and *target.b* has the column descriptor NOT NULL, as specified in the table definition for *target.b*, rather than the attribute DEFAULT 0 as is specified for *source.y*.

## Example 51: AS ... WITH NO DATA With Named Expressions

The following CREATE TABLE ... AS ... WITH NO DATA statement creates *target\_table* from a subquery where all column expressions are named explicitly. No column names are defined for *target\_table* because it is unnecessary.

Because the statement specifies a subquery and no explicit table kind is specified, the table kind of *target\_table* defaults to the session mode default, not to the table kind of *subquery\_table* (see the CREATE TABLE (AS Clause) topic “Target Table Kind Defaults” in *SQL Data Definition Language Detailed Topics*).

```
CREATE TABLE target_table AS (  
    SELECT column_x + 1 AS column_x, column_y + 1 AS column_y  
    FROM subquery_table )  
WITH NO DATA;
```



### Example 52: AS ... WITH DATA With Index

The following CREATE TABLE ... AS ... WITH DATA statement creates a new NUSI index on *column\_2* of *target\_table*. The statement also copies the data from the selected columns into *target\_table*.

Because the statement specifies a subquery and no explicit table kind is specified, the table kind of *target\_table* defaults to the session mode default, not to the table kind of *subquery\_table* (see the CREATE TABLE (AS Clause) topic “Target Table Kind Defaults” in *SQL Data Definition Language Detailed Topics*).

```
CREATE TABLE target_table (  
    column_1,  
    column_2)  
AS (  
    SELECT *  
    FROM subquery_table )  
WITH DATA  
INDEX (column_2);
```

### Example 53: AS ... WITH NO DATA With Index

The following CREATE TABLE ... AS ... WITH NO DATA statement creates a NUSI on *column\_y* of *target\_table*. The primary index defaults to *column\_x* (see the CREATE TABLE (Index Definition Clause) topic “Primary Index Default Definitions” in *SQL Data Definition Language Detailed Topics*) and no indexes are copied from *subquery\_table*.

Because the statement specifies a subquery and no explicit table kind is specified, the table kind of *target\_table* defaults to the session mode default, not to the table kind of *subquery\_table* (see the CREATE TABLE (AS Clause) topic “Target Table Kind Defaults” in *SQL Data Definition Language Detailed Topics*). *target\_table* also takes the default definitions for all table options clause attributes (see the CREATE TABLE (AS Clause) topic “Using Subqueries To Customize An AS Clause” in *SQL Data Definition Language Detailed Topics*).

```
CREATE TABLE target_table AS (  
    SELECT column_x, column_y  
    FROM subquery_table )  
WITH NO DATA  
INDEX (column_y);
```

### Example 54: GLOBAL TEMPORARY TABLE ... AS ... WITH NO DATA

The following CREATE TABLE ... AS ... WITH NO DATA statement creates a new global temporary table using all the selected column definitions with default definitions for all table options clause attributes (see the CREATE TABLE (AS Clause) topic “Using Subqueries To Customize An AS Clause” in *SQL Data Definition Language Detailed Topics*).

Because the statement specifies a subquery and no explicit table kind is specified, the table kind of *target\_table* defaults to the session mode default, not to the table kind of *subquery\_table* (see the CREATE TABLE (AS Clause) topic “Target Table Kind Defaults” in *SQL Data Definition Language Detailed Topics*).

```
CREATE GLOBAL TEMPORARY TABLE target_table AS (  
    SELECT *  
    FROM subquery_table )  
WITH NO DATA;
```

**Example 55: CREATE VOLATILE TABLE ... AS ... WITH DATA**

The following CREATE TABLE ... AS ... WITH DATA statement creates a new volatile table using all the column definitions and data from *source\_table*.

The table kind of target\_table defaults to the table kind of *source\_table* (see the CREATE TABLE (AS Clause) topic “Target Table Kind Defaults” in *SQL Data Definition Language Detailed Topics*).

```
CREATE VOLATILE TABLE target_table AS  
    source_table  
WITH DATA;
```

**Example Set 56a - 56d: Copying Zeroed Statistics**

Consider the following table definitions:

```
CREATE SET TABLE test, NO FALLBACK,  
    NO BEFORE JOURNAL,  
    NO AFTER JOURNAL,  
    CHECKSUM = DEFAULT (  
        x INTEGER,  
        y INTEGER,  
        z CHARACTER(30) ,  
        a INTEGER,  
        b DATE,  
        e INTEGER)  
PRIMARY INDEX (a) ,  
INDEX (x, y) ;
```

Assume the following statistics have been collected on *test*:

| Statistics            | Test Table Column Set                                                        |
|-----------------------|------------------------------------------------------------------------------|
| single column         | <ul style="list-style-type: none"><li>• x</li><li>• y</li></ul>              |
| single-column NUPI    | a                                                                            |
| composite pseudoindex | <ul style="list-style-type: none"><li>• (x, y, z)</li><li>• (a, b)</li></ul> |
| composite NUSI        | (x, y)                                                                       |

```
CREATE SET TABLE test1, NO FALLBACK,  
NO BEFORE JOURNAL,  
NO AFTER JOURNAL,  
CHECKSUM = DEFAULT (  
  x1 INTEGER,  
  y1 INTEGER,  
  z1 CHARACTER(30),  
  a1 INTEGER,  
  k1 DECIMAL,  
  b1 DATE)  
PRIMARY INDEX (x1, y1),  
INDEX (z1);
```

Assume the following statistics have been collected on *test1*:

| Statistics         | Test1 Table Column Set                                                         |
|--------------------|--------------------------------------------------------------------------------|
| single column      | <ul style="list-style-type: none"><li>• x1</li><li>• y1</li><li>• k1</li></ul> |
| single-column NUSI | z1                                                                             |
| composite NUPI     | (x1, y1)                                                                       |

Example 56a

In the following example, the system copies zeroed statistics for the following column and index sets:

```
CREATE GLOBAL TEMPORARY TABLE t2 AS (  
  SELECT *  
  FROM test1)  
WITH NO DATA AND STATISTICS;
```

| The system copies these zeroed statistics ... | From this source table column set ... | To this target table column set ... | Because ...                                                                                                                 |
|-----------------------------------------------|---------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| single column                                 | x1                                    | x1                                  | all the columns defined for target table <i>t2</i> are exact analogs of all columns defined for source table <i>test1</i> . |
|                                               | y1                                    | y1                                  |                                                                                                                             |
|                                               | k1                                    | k1                                  |                                                                                                                             |
|                                               | none                                  | <b>z1</b>                           |                                                                                                                             |
| single-column NUSI                            | <b>z1</b>                             | none                                |                                                                                                                             |
| composite NUPI                                | (x1, y1)                              | (x1, y1)                            |                                                                                                                             |

## Example 56b

In the following example, the system copies zeroed statistics for the following column and index sets:

```
CREATE GLOBAL TEMPORARY TABLE t2 AS (
  SELECT *
  FROM test)
WITH NO DATA AND STATISTICS;
```

| The system copies these zeroed statistics ... | From this source table column set ... | To this target table column set ... | Because ...                                                                                                                                                                                                                                                               |
|-----------------------------------------------|---------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| single column                                 | x                                     | x                                   | all the columns defined for target table <i>t2</i> are analogs of all columns defined for source table <i>test</i> except that the NUSI on $(x,y)$ is not defined as an index on <i>t2</i> , so its index statistics are copied as multicolumn statistics for <i>t2</i> . |
|                                               | y                                     | y                                   |                                                                                                                                                                                                                                                                           |
| single-column NUPI                            | a                                     | a                                   |                                                                                                                                                                                                                                                                           |
| composite pseudoindex                         | (x, y, z)                             | (x, y, z)                           |                                                                                                                                                                                                                                                                           |
|                                               | (a, b)                                | (a, b)                              |                                                                                                                                                                                                                                                                           |
|                                               | none                                  | (x, y)                              |                                                                                                                                                                                                                                                                           |
| composite NUSI                                | (x, y)                                | none                                |                                                                                                                                                                                                                                                                           |

## Example 56c

In the following example, the system copies zeroed statistics for the following:

```
CREATE TABLE t1 AS
test
WITH NO DATA AND STATISTICS;
```

| The system copies these zeroed statistics ... | From this source table column set ...                                       | To this target table column set ...                                         | Because ...                                                                                                                |
|-----------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| single column                                 | x                                                                           | x                                                                           | all the columns defined for target table <i>t1</i> are exact analogs of all columns defined for source table <i>test</i> . |
|                                               | y                                                                           | y                                                                           |                                                                                                                            |
| single-column NUPI                            | a                                                                           | a                                                                           |                                                                                                                            |
| composite pseudoindex                         | <ul style="list-style-type: none"> <li>(a, b)</li> <li>(x, y, z)</li> </ul> | <ul style="list-style-type: none"> <li>(a, b)</li> <li>(x, y, z)</li> </ul> |                                                                                                                            |
| composite NUSI                                | (x, y)                                                                      | (x, y)                                                                      |                                                                                                                            |

## Example 56d

In the following example, the system copies *no* statistics because of the join condition on *test* and *test1* specified in the subquery:

```
CREATE TABLE t1 AS (
  SELECT *
  FROM test, test1)
WITH NO DATA AND STATISTICS;
```

## Example Set 57a - 57b: Copying Zeroed Multicolumn and Composite Index Statistics

The system copies multicolumn zeroed statistics and zeroed composite index statistics even if the relative order of the index columns specified in the select list of the subquery is not the same as their order in the source table.

## Example 57a

In the following example, the system copies the single-column statistics on columns *x* and *a* in *test* as zeroed single-column statistics for columns *a* and *c* in *t2*. The multicolumn statistics on (*a,b*) are not copied as zeroed multicolumn statistics on columns (*b,c*) in *t2* because the order of columns *b* and *c* in *t2* is different than the order of columns *b* and *a* in *test*.

```
CREATE TABLE t2 (a, b, c) AS (
  SELECT x AS colA, b, a (NAMED colC)
  FROM test)
WITH NO DATA AND STATISTICS;
```

| The system copies these zeroed statistics ... | From this source table column set ... | To this target table column set ... | Because ...                                                                                                                                                                                         |
|-----------------------------------------------|---------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| single column                                 | x                                     | a                                   | column <i>a</i> in target table <i>t2</i> is the exact analog of column <i>x</i> in source table <i>test</i> .                                                                                      |
|                                               | y                                     | none                                | there is no analog of source table column <i>y</i> in target table <i>t2</i> .                                                                                                                      |
| single-column NUPI                            | a                                     | c                                   | column <i>c</i> in target table <i>t2</i> is the exact analog of column <i>a</i> in source table <i>test</i> .                                                                                      |
| composite pseudoindex                         | (a,b)                                 | none                                | the order of columns <i>b</i> and <i>c</i> in the definition of target table <i>t2</i> is different than the order of columns <i>b</i> and <i>a</i> in the definition of source table <i>test</i> . |
|                                               | (x,y,z)                               | none                                | there is no multicolumn index set defined for source table <i>t2</i> on an analogous column set to ( <i>x,y,z</i> ) and ( <i>x,y</i> ) in source table <i>test</i> .                                |
| composite NUSI                                | (x,y)                                 |                                     |                                                                                                                                                                                                     |

Example 57b

In the following example, the system copies the single-column statistics from *test1* as zeroed single-column statistics on columns *a*, *b*, and *c* in *t2*. The index statistics on (*x1*,*y1*) are not copied as zeroed index statistics on columns (*a*,*b*) in *t2* because the order of columns *a* and *b* in *t2* is different than the order of columns *x1* and *y1* in *test1*.

```
CREATE TABLE t2 (a, b, c) AS (  
  SELECT k1 AS colA, y1 AS colB, z1 NAMED colC)  
  FROM test1)  
WITH NO DATA AND STATISTICS  
INDEX(a, b);
```

| The system copies these zeroed statistics ... | From this source table column set ...                                          | To this target table column set ... | Because ...                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| single column                                 | k1                                                                             | a                                   | the new columns in target table <i>t2</i> are exact analogs of the existing columns in source table <i>test1</i> .                                                                                                                                                                                                                                                                                                                                |
|                                               | y1                                                                             | b                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                               | z1                                                                             | c                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                               | <ul style="list-style-type: none"><li>• x1</li><li>• a1</li><li>• b1</li></ul> | none                                | there are no analogs of these source table columns defined in target table <i>t2</i> .                                                                                                                                                                                                                                                                                                                                                            |
| single-column NUSI                            | z1                                                                             | none                                | there is no single-column NUSI defined on the analog to source table column z1, column c, in the source table; instead, there is a multicolumn NUSI defined on the column set ( <i>a</i> , <i>b</i> ).<br><br>The NUSI on ( <i>a</i> , <i>b</i> ) in target table <i>t2</i> is defined without statistics being copied because no statistics were collected on their analog column set, ( <i>k1</i> , <i>y1</i> ), in source table <i>test1</i> . |
| composite NUPI                                | (x1,y1)                                                                        | none                                | the order of the index columns specified in the subquery select list is different than the column order of the <i>test1</i> index.                                                                                                                                                                                                                                                                                                                |

## Example Set 58a - 58b

The system copies multicolumn or index statistics even if the relative order of the columns specified in the select list of the subquery is not the same as is defined for the source table.

### Example 58a

In the following example, the system copies single-column statistics on columns *x* and *a* as single-column statistics for columns *a* and *c*, respectively. Multicolumn statistics on (*a*, *b*) are *not* copied as multicolumn statistics for (*b*, *c*) because the order of columns *b* and *c* in the target table is different from the order of columns *b* and *a* in the source table.

```
CREATE TABLE t2 (a, b, c) AS (
  SELECT x AS colA, b, a (NAMED colC)
  FROM test)
WITH DATA AND STATISTICS;
```

| The system copies these statistics ... | From this source table column set ... | To this target table column set ... | Because ...                                                                                                                                                                                               |
|----------------------------------------|---------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| single column                          | x                                     | a                                   | column <i>x</i> in source table <i>test</i> maps directly to column <i>a</i> in target table <i>t2</i> .                                                                                                  |
|                                        | y                                     | none                                | there is no analog of source table <i>test</i> column <i>y</i> in target table <i>t2</i> .                                                                                                                |
| single-column NUPI                     | a                                     | c                                   | column <i>a</i> in source table <i>test</i> maps directly to column <i>c</i> in target table <i>t2</i> .                                                                                                  |
| composite pseudoindex                  | (x,y,z)                               | none                                | there is no analog of source table <i>test</i> column <i>y</i> in target table <i>t2</i> .                                                                                                                |
|                                        | (a,b)                                 |                                     | the order of columns ( <i>b</i> , <i>c</i> ) in target table <i>t2</i> is different than the order of columns ( <i>a</i> , <i>b</i> ) in source table <i>test</i> .                                       |
| composite NUSI                         | (x,y)                                 | none                                | <ul style="list-style-type: none"> <li>there is no analog of source table <i>test</i> column <i>y</i> in target table <i>t2</i>.</li> <li>there is no NUSI defined for target table <i>t2</i>.</li> </ul> |

### Example 58b

In the following example, the system copies single-column statistics on *k1*, *y1*, and *z1* as single-column statistics for *a*, *b*, and *c*, respectively. The system does *not* copy index statistics on (*x1*, *y1*) as index statistics for (*a*, *b*) because the order of *a* and *b* in the target table *t2* is not the same as the order of *x1* and *y1* in the source table *test1*.

```
CREATE TABLE t2 (a, b, c) AS (
  SELECT y1 AS colA, x1 AS colB, z1 NAMED colC)
  FROM test1)
WITH DATA AND STATISTICS
INDEX (a, b);
```

| The system copies these statistics ... | From this source table column set ... | To this target table column set ... | Because ...                                                                                                                                       |
|----------------------------------------|---------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| single column                          | x1                                    | b                                   | columns <i>x1</i> and <i>y1</i> in source table <i>test1</i> map directly to target table <i>t2</i> columns <i>b</i> and <i>a</i> , respectively. |
|                                        | y1                                    | a                                   |                                                                                                                                                   |
|                                        | k1                                    | none                                | there is no analog of source table <i>test1</i> column <i>k1</i> in target table <i>t2</i> .                                                      |
| single-column NUSI                     | z1                                    | c                                   | source table <i>test1</i> column <i>z1</i> maps directly to target table <i>t2</i> column <i>c</i> .                                              |
| composite NUSI                         | none                                  | (a,b)                               | the order of columns (a,b) in target table <i>t2</i> <sup>a</sup> is different than the order of columns (x1,y1) in source table <i>test1</i> .   |
| composite NUPI                         | (x1,y1)                               | none                                |                                                                                                                                                   |

a. Their ordering in *t2*, if they had retained the same column names, would be (*y1*, *x1*).

### Example Set 59a - 59d: Statistics Are Not Copied For Conditions In The Subquery

The system does not copy statistics if any single table conditions or join conditions are specified in the WHERE clause of the subquery. A warning message is returned to the requestor that says statistics cannot be copied.

#### Example 59a

In the following example, the system does not copy statistics because only partial data is copied based on the WHERE condition that limits copied rows to those having a value for column *x* greater than 10:

```
CREATE TABLE t2 AS (  
  SELECT *  
  FROM test  
  WHERE x > 10)  
WITH DATA AND STATISTICS;
```

#### Example 59b

In the following example, the system does not copy statistics because only partial data is copied based on the WHERE clause in the subquery that limits copied rows to those having a value for column *x1* greater than 10 AND a value for column *y1* equal to 20:

```
CREATE TABLE t2 AS (  
  SELECT *  
  FROM test1  
  WHERE x1 > 10  
  AND y1 = 20)  
WITH DATA AND STATISTICS;
```



### Example 59c

In the following example, the system does not copy statistics because tables are left outer joined in the subquery:

```
CREATE TABLE t2 AS (  
  SELECT *  
  FROM test LEFT OUTER JOIN test1 ON test.x=test1.x1)  
WITH DATA AND STATISTICS;
```

### Example 59d

In the following example, the system does not copy statistics because tables are right outer joined in the subquery.

```
CREATE TABLE t2 (a, b) AS (  
  SELECT x1, y1  
  FROM test RIGHT JOIN test1 ON test. a=test1.a1)  
WITH DATA AND STATISTICS;
```

### Example Set 60a - 60c: Statistics Are Not Copied When Set Or Aggregation Operators Are Specified In The Query

The system does not copy statistics if set operators or aggregation operations are specified in the query.

### Example 60a

In the following example, the system does not copy statistics because of the aggregating GROUP BY clause in the subquery:

```
CREATE TABLE t3 (c1, c2) AS (  
  SELECT MAX(x), y  
  FROM test  
  GROUP BY 2)  
WITH DATA AND STATISTICS;
```

### Example 60b

In the following example, the system does not copy statistics because of the aggregating GROUP BY clause in the subquery:

```
CREATE TABLE t3 (c1, c2) AS (  
  SELECT COUNT(x), y  
  FROM test  
  GROUP BY 2)  
WITH DATA AND STATISTICS;
```

## Example 60c

In the following example, the system does not copy statistics because of the aggregating GROUP BY and HAVING clauses in the subquery:

```
CREATE TABLE t3(a, b, c) AS (  
  SELECT x1, MIN(y1), AVG(a1)  
  FROM test1  
  GROUP BY x1  
  HAVING AVG(y1) > 40)  
WITH DATA AND STATISTICS;
```

## Example Set 61a - 61b: Statistics Are Not Copied If An OLAP Operation Is Specified In The Subquery

The system does not copy statistics if an OLAP function is specified in the subquery.

### Example 61a

In the following example, the system does not copy statistics because of the OLAP RANK function in the subquery:

```
CREATE TABLE t3 (c1, c2, c3) AS (  
  SELECT x, RANK(y), z  
  FROM test  
  QUALIFY RANK(X) > 1)  
WITH DATA AND STATISTICS;
```

### Example 61b

In the following example, the system does not copy statistics because of the partial data returned by the SAMPLE operator:

```
CREATE TABLE t3 (c1, c2, c3) AS (  
  SELECT x, y, z  
  FROM test SAMPLE 4)  
WITH DATA AND STATISTICS;
```

## Example Set 62a - 62d: Statistics Are Not Copied If A Join Operation Is Specified In The Subquery

The system does not copy statistics if a join operation is specified in the subquery.

Consider the following view definitions for the examples in this set:

```
CREATE VIEW v2 (i, j) AS (  
  SELECT SUM(x), y  
  FROM test  
  GROUP BY 2);  
  
CREATE VIEW v3 (i, j) AS (  
  SELECT CASE  
    WHEN z1='abc'  
    THEN 1  
    ELSE 0, a1+1  
  FROM test1);
```

### Example 62a

In the following example, the system does not copy statistics because of the join specification in the subquery:

```
CREATE TABLE t4 AS (  
  SELECT *  
  FROM test, test1)  
WITH DATA AND STATISTICS  
PRIMARY INDEX (z, z1)  
INDEX (b, b1);
```

### Example 62b

In the following example, the system does not copy statistics because of the join specification in the subquery:

```
CREATE TABLE t6 (c1, c2, c3, c4) AS (  
  SELECT x1, y1, x-1, y*2  
  FROM test1, test)  
WITH DATA AND STATISTICS;
```

### Example 62c

In the following example, the system does not copy statistics because of the join specification in the subquery.

```
CREATE TABLE t5 AS (  
  SELECT *  
  FROM v2, v3)  
WITH DATA AND STATISTICS;
```

### Example 62d

In the following example, the system does not copy statistics because of the join specification in the subquery:

```
CREATE TABLE t5 AS (  
  SELECT *  
  FROM v3, test)  
WITH DATA AND STATISTICS;
```

## Example Set 63a - 63f: Statistics Are Not Copied If Functions Or Expressions Are Specified In The Subquery

Consider the following view definitions for the examples in this set:

```
CREATE VIEW v1 (i, j) AS (  
    SELECT x+1, b+1  
    FROM test);  
  
CREATE VIEW v3 (i, j) AS (  
    SELECT CASE  
        WHEN z1='abc'  
        THEN 1  
        ELSE 0, a1+1  
    FROM test1);
```

The system also does not copy statistics for specific column sets or indexes if the subquery specifies functions or expressions of any kind because such data manipulations cause the resulting column set or index value set to be transformed into something different from that of the source relation.

### Example 63a

In the following example, the system does not copy statistics because the view *v1* selects column expressions from its underlying table *test*, so the resulting columns in the target table *t1* are different from the columns in *test*.

```
CREATE TABLE t1 AS (  
    SELECT *  
    FROM v1)  
WITH NO DATA AND STATISTICS;
```

### Example 63b

In the following example, the system does not copy statistics because the view *v1* selects column expressions from its underlying table *test*, so the resulting column data in the target table would be different from the columns in *test*. Also note that you cannot copy zeroed statistics.

```
CREATE TABLE t5 AS (  
    SELECT *  
    FROM v1)  
WITH DATA AND STATISTICS;
```

### Example 63c

In the following example, the system does not copy statistics because the view *v3* is defined using a CASE expression, so the resulting column data in the target table would be different from the columns in *test1*.

```
CREATE TABLE t5 AS (  
    SELECT *  
    FROM v3)  
WITH DATA AND STATISTICS;
```

### Example 63d

In the following example, the system does not copy statistics because the subquery specifies simple arithmetic expressions that would cause the data in the target table to be different from the columns in *test*.

```
CREATE TABLE t5 (c1, c2) AS (  
  SELECT x+1, y+1  
  FROM test)  
WITH DATA AND STATISTICS;
```

### Example 63e

In the following example, the system does not copy statistics because the subquery specifies simple arithmetic expressions that would cause the data in the target table to be different from the columns in *test1*.

```
CREATE TABLE t5 (c1, c2) AS (  
  SELECT (k1/(y1+2)), b1+7  
  FROM test1)  
WITH DATA AND STATISTICS;
```

### Example 63f

In the following example, the system does not copy statistics because the subquery specifies simple arithmetic expressions that would cause the data in the target table to be different from the columns in *test*.

```
CREATE TABLE t5 (a, b) AS (  
  SELECT x+1 AS x, y+1 AS y  
  FROM test)  
WITH DATA AND STATISTICS;
```

### Example Set 64a - 64j

The system copies statistics for all of the following scenarios because the underlying index and column data is not modified when it is copied.

### Example 64a

In the following example, the system copies the statistics for columns for *x1* and *y1* from source table *test1* to columns *a* and *b* in target table *t6*. The system copies the statistics on the composite index on the source table column set (*x1*, *y1*) as multicolumn statistics for the pseudoindex (*a*, *b*) in the target table *t6* because no index is explicitly defined on that column set in *t6*.

```
CREATE TABLE t6 (a, b, c) AS (  
  SELECT x1, y1, z1 (NAMED colC)  
  FROM test1)  
WITH DATA AND STATISTICS;
```

| The system copies these statistics ... | From this source table column set ... | To this target table column set ... | Because ...                                                                                                                                                                                                                                                                                                               |
|----------------------------------------|---------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| single column                          | x1                                    | a                                   | columns <i>x1</i> and <i>y1</i> in source table <i>test1</i> map directly to columns <i>a</i> and <i>b</i> in target table <i>t6</i> .                                                                                                                                                                                    |
|                                        | y1                                    | b                                   |                                                                                                                                                                                                                                                                                                                           |
| single-column NUSI                     | z1                                    | c                                   | column <i>z1</i> in source table <i>test1</i> maps directly to column <i>c</i> in target table <i>t6</i> .                                                                                                                                                                                                                |
| composite pseudoindex                  | none                                  | (a, b)                              | columns <i>x1</i> and <i>y1</i> in source table <i>test1</i> map directly, and in the same order, to columns <i>a</i> and <i>b</i> in target table <i>t6</i> , so the multicolumn statistics on ( <i>x1</i> , <i>y1</i> ) in <i>test1</i> can be used as multicolumn statistics on ( <i>a</i> , <i>b</i> ) in <i>t6</i> . |
| composite NUPI                         | (x1, y1)                              | none                                |                                                                                                                                                                                                                                                                                                                           |

## Example 64b

In the following example, the system copies the following column and index statistics:

```
CREATE TABLE t6 (a, b, c) AS (
  SELECT x AS colA, b, a (NAMED colC)
  FROM test)
WITH DATA AND STATISTICS;
```

| The system copies these statistics ... | From this source table column set ... | To this target table column set ... | Because ...                                                                                                                                                                                                                |
|----------------------------------------|---------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| single column                          | y                                     | none                                | there is no analog of column <i>y</i> in table <i>t6</i> .                                                                                                                                                                 |
|                                        | x                                     | a                                   | column <i>a</i> in table <i>t6</i> is a direct analog of column <i>x</i> in table <i>test</i> .                                                                                                                            |
|                                        | a                                     | c                                   | the index statistics collected on NUPI column <i>a</i> in table <i>test</i> can be used as column statistics for column <i>c</i> in table <i>t6</i> .                                                                      |
| single-column NUPI                     | a                                     | none. <sup>a</sup>                  | no NUPI is defined for target table <i>t6</i> .<br>However, the statistics collected for the NUPI on column <i>a</i> in source table <i>test</i> can be used as column statistics for column <i>c</i> in table <i>t6</i> . |
| composite pseudoindex                  | (a, b)                                | none.                               | the analogs of columns <i>a</i> and <i>b</i> from source table <i>test</i> are defined in a different order in target table <i>t6</i> ; therefore, their multicolumn statistics cannot be used for the new column set.     |
| composite NUSI                         | (x,y)                                 | none.                               | there is no analog of column <i>y</i> in table <i>t6</i> .                                                                                                                                                                 |

a. Statistics for index column *a* in *test* are copied to non-index column *c* in *t6*.

### Example 64c

In the following example, the system copies the following statistics:

```

CREATE TABLE t6 (a, b, c) AS (
  SELECT k1 AS colA, y1 AS colB, z1 NAMED colC)
FROM test1)
WITH DATA AND STATISTICS;

```

| The system copies these statistics ... | From this source table column set ... | To this target table column set ... | Because ...                                                                                                                                                                                                        |
|----------------------------------------|---------------------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| single column <sup>a</sup>             | k1                                    | a                                   | columns <i>a</i> and <i>b</i> in target table <i>t6</i> are direct analogs of columns <i>k1</i> and <i>y1</i> in source table <i>test1</i> .                                                                       |
|                                        | y1                                    | b                                   |                                                                                                                                                                                                                    |
| single-column NUSI                     | z1                                    | c                                   | no NUSI is defined for target table <i>t6</i> .<br>However, the statistics collected for the index on column <i>z1</i> in source table <i>test1</i> map directly to column <i>c</i> in target table <i>test1</i> . |
| composite NUPI                         | (x1,y1)                               | none                                | there is no analog of column <i>x1</i> in source table <i>test1</i> in target table <i>t6</i> .                                                                                                                    |

- a. The single-column statistics for columns *k1*, *y1*, and *z1*, respectively, in *test1* are copied to *t6* for the single columns *a*, *b*, and *c*, respectively.

### Example 64d

In the following example, the system copies single column statistics on *x1* and *y1* for *a* and *b*, and it copies index statistics for the column set (*a*, *b*).

```

CREATE TABLE t6 (a, b) AS (
  SELECT x1 AS colB, y1 (NAMED colC)
  FROM test1)
WITH DATA AND STATISTICS
PRIMARY INDEX (a, b);

```

| The system copies these statistics ... | From this source table column set ... | To this target table column set ... | Because ...                                                                                                                                                                                                            |
|----------------------------------------|---------------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| single column                          | x1                                    | a                                   | columns <i>a</i> and <i>b</i> in target table <i>t6</i> are analogs of columns <i>x1</i> and <i>y1</i> in source table <i>test1</i> .                                                                                  |
|                                        | y1                                    | b                                   |                                                                                                                                                                                                                        |
| single-column NUSI                     | z1                                    | none                                | there is no analog of source table <i>test1</i> column <i>z1</i> in target table <i>t6</i> .                                                                                                                           |
| composite NUPI                         | (x1, y1)                              | (a, b)                              | columns <i>a</i> and <i>b</i> in target table <i>t6</i> are analogs of columns <i>x1</i> and <i>y1</i> in source table <i>test1</i> and are also defined in the same order in <i>t6</i> as they were in <i>test1</i> . |

## Example 64e

In the following example, the system copies statistics from source table *test* to target table *t6* only for column *x*.

```
CREATE TABLE t6 AS (
  SELECT *
  FROM (
    SELECT x
    FROM test) AS d1)
WITH DATA AND STATISTICS;
```

| The system copies these statistics ... | From this source table column set ...                                    | To this target table column set ... | Because ...                                                                                                  |
|----------------------------------------|--------------------------------------------------------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------|
| single column                          | x                                                                        | d1                                  | column <i>x</i> from source table <i>test</i> is the only column that is qualified by the nested subqueries. |
| single-column NUPI                     | a                                                                        | none                                | there is no analog of source table column <i>a</i> in target table <i>t6</i> .                               |
| composite pseudoindex                  | <ul style="list-style-type: none"> <li>(a,b)</li> <li>(x,y,z)</li> </ul> | none                                | the only column in target table <i>t6</i> is an analog of column <i>x</i> in source table <i>test</i> .      |
| composite NUSI                         | (x, y)                                                                   | none                                | the only column in target table <i>t6</i> is an analog of column <i>x</i> in source table <i>test</i> .      |

## Example 64f

In the following example, the system copies all the available single column statistics, multicolumn statistics, and index statistics from table *test1* to table *t6*:

```
CREATE TABLE t6 AS
test1
WITH DATA AND STATISTICS;
```

| The system copies these statistics ... | From this source table column set ... | To this target table column set ... | Because ...                                                                                                                                      |
|----------------------------------------|---------------------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| single column                          | x1                                    | x1                                  | All columns from source table <i>test1</i> and their statistics are copied to the same columns (with the same names) in target table <i>t6</i> . |
|                                        | y1                                    | y1                                  |                                                                                                                                                  |
|                                        | k1                                    | k1                                  |                                                                                                                                                  |
| single-column NUSI                     | z1                                    | z1                                  |                                                                                                                                                  |
| composite NUPI                         | (x1, y1)                              | (x1, y1)                            |                                                                                                                                                  |



## Example 64g

In the following example, the system copies all the available single column statistics, multicolumn statistics, and index statistics from table *test* to table *t6*.

Note that the statistics that had been collected for the composite pseudoindex  $(x, y, z)$  in *test* are now used for the new composite NUPI defined on the same column set in table *t6*.

The composite pseudoindex  $(a, b)$  from *test* is retained for table *t6*, but the composite NUSI defined on  $(x, y)$  and the single-column NUPI on *a* that were defined for *test* are not defined as either indexes or columns on which statistics are to be copied for the new table *t6*.

The statistics for the composite pseudoindex defined on  $(x, y, z)$  for *test* are copied to *t6* for the same column set, which is defined as the composite NUPI for that table.

```
CREATE TABLE t6 AS
test
WITH DATA AND STATISTICS
PRIMARY INDEX (x, y, z);
```

The colors and shading in the following table are used to help you see where the system copies statistics when they do not correspond directly to a column set in the source table.

| The system copies these statistics ... | From this source table column set ... | To this target table column set ... | Because ...                                                                                                                                                                                                                                                                    |
|----------------------------------------|---------------------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| single column                          | x                                     | x                                   | columns <i>x</i> and <i>y</i> from source table <i>test</i> are analogous, having the same column names in target table <i>t6</i> .                                                                                                                                            |
|                                        | y                                     | y                                   |                                                                                                                                                                                                                                                                                |
|                                        | none                                  | a                                   |                                                                                                                                                                                                                                                                                |
| single-column NUPI                     | a                                     | none                                | the system copies NUPI column <i>a</i> from source table <i>test</i> as non-index column <i>a</i> to target table <i>t6</i> .<br>Its single-column index statistics from source table <i>test</i> are copied as single-column non-index statistics to target table <i>t6</i> . |
| composite pseudoindex                  | (a, b)                                | (a, b)                              | the source and target table columns are analogous and defined in the same order in both tables.                                                                                                                                                                                |
|                                        |                                       | (x,y)                               | the source and target table columns are analogous and defined in the same order in both tables.                                                                                                                                                                                |
| composite NUSI                         | (x, y)                                |                                     | The system copies the multicolumn index statistics from source table <i>test</i> as multicolumn pseudoindex statistics to target table <i>t6</i> .                                                                                                                             |
| composite pseudoindex                  | (x,y,z)                               |                                     | the source and target table columns are analogous and defined in the same order in both tables.                                                                                                                                                                                |
| composite NUPI                         |                                       | (x, y, z)                           | The system copies the multicolumn pseudoindex statistics from source table <i>test</i> as multicolumn index statistics to target table <i>t6</i> .                                                                                                                             |

Example 64h

In the following example, the system copies all the available single-column statistics, multicolumn statistics, and index statistics for table *test*:

```
CREATE TABLE t6 AS
test
WITH DATA AND STATISTICS
PRIMARY INDEX (x, y, z)
INDEX (a, b);
```

The colors and shading in the following table are used to help you see where the system copies statistics when they do not correspond directly to a column set in the source table.

| The system copies these statistics ... | From this source table column set ... | To this target table column set ... | Because ...                                                                                                                                                                                              |
|----------------------------------------|---------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| single column                          | x                                     | x                                   | columns <i>x</i> and <i>y</i> from source table <i>test</i> are analogs and have the same column names in target table <i>t6</i> .                                                                       |
|                                        | y                                     | y                                   |                                                                                                                                                                                                          |
|                                        |                                       | a                                   | the system copies NUPI column <i>a</i> from source table <i>test</i> as non-index column <i>a</i> to target table <i>t6</i> .                                                                            |
| single-column NUPI                     | a                                     |                                     | Its single-column index statistics from source table <i>test</i> are copied as single-column non-index statistics to target table <i>t6</i> .                                                            |
| composite pseudoindex                  | (x, y, z)                             |                                     | the composite statistics on column set ( <i>x,y,z</i> ) in source table <i>test</i> are copied as multicolumn index statistics for the composite NUPI on the same column set in target table <i>t6</i> . |
|                                        | (a,b)                                 |                                     |                                                                                                                                                                                                          |
|                                        |                                       | (x,y)                               | The composite statistics on column set ( <i>a,b</i> ) in source table <i>test</i> are copied as multicolumn index statistics for the composite NUSI on the same column set in target table <i>t6</i> .   |
| composite NUPI                         |                                       | (x, y, z)                           |                                                                                                                                                                                                          |
| composite NUSI                         | (x, y)                                | (a, b)                              | The composite NUSI statistics on column set ( <i>x,y</i> ) in source table <i>test</i> are copied as multicolumn non-index statistics on the same column set in target table <i>t6</i> .                 |

Note that the statistics that had been collected for the composite pseudoindex in *test* are now used for the new composite NUPI defined on the same column set in *t6*, while the statistics that had been collected for the composite pseudoindex on (*a, b*) in *test* are now used for the new composite NUSI defined on the same column set in *t6*.

The composite pseudoindexes and the single-column NUPI that were defined for *test* are not defined as pseudoindexes, but rather as true indexes for the new table *t6*.

**Example 64i**

In the following example, the system copies all the single-column statistics, multicolumn statistics, and the index statistics for the composite NUSI ( $x, y$ ).

```
CREATE TABLE t6 AS (
  SELECT *
  FROM test)
WITH DATA AND STATISTICS
PRIMARY INDEX(x, y);
```

The colors and shading in the following table are used to help you see where the system copies statistics when they do not correspond directly to a column set in the source table.

| The system copies these statistics ... | From this source table column set ... | To this target table column set ... | Because ...                                                                                                                                                                                                               |
|----------------------------------------|---------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| single column                          | x                                     | x                                   | columns $x$ and $y$ from source table <i>test</i> are analogs and have the same column names in target table <i>t6</i> .                                                                                                  |
|                                        | y                                     | y                                   |                                                                                                                                                                                                                           |
|                                        |                                       | a                                   | the system copies NUPI column <i>a</i> from source table <i>test</i> as non-index column <i>a</i> to target table <i>t6</i> .                                                                                             |
| single-column NUPI                     | a                                     |                                     | The system copies its single-column index statistics from source table <i>test</i> as single-column non-index statistics to target table <i>t6</i> .                                                                      |
| composite pseudoindex                  | (x, y, z)                             | (x, y, z)                           | the system copies the multicolumn statistics on both column sets directly from source table <i>test</i> to target table <i>t6</i> because the columns are defined identically for both.                                   |
|                                        | (a,b)                                 | (a,b)                               |                                                                                                                                                                                                                           |
| composite NUPI                         |                                       | (x, y)                              | the system copies multicolumn index statistics on the composite NUSI column set ( $x,y$ ) of source table <i>test</i> as composite index statistics on the composite NUPI on the same columns in target table <i>t6</i> . |
| composite NUSI                         | (x, y)                                |                                     |                                                                                                                                                                                                                           |

Note that the statistics that had been collected for the single columns  $x$  and  $y$  and for the composite pseudoindexes ( $x, y, z$ ) and ( $a, b$ ) in *test* are copied straight across into the same columns sets for *t6*, while the statistics that had been collected for the composite NUSI on ( $x, y$ ) in *test* are now used for the new composite NUPI defined on the same column set in *t6*.

The composite NUSI that was defined for *test* is not defined for the new table *t6*, but the system does copy its statistics for use with the new composite NUPI defined on the same column set in *t6*.

Example 64j

In the following example, the system copies all the single-column statistics, multicolumn statistics, and index statistics from *test* to *t6*.

```
CREATE TABLE t6 AS
test
WITH DATA AND STATISTICS;
```

| The system copies these statistics ... | From this source table column set ... | To this target table column set ... | Because ...                                                |
|----------------------------------------|---------------------------------------|-------------------------------------|------------------------------------------------------------|
| single column                          | x                                     | x                                   | the source and target tables are identical to one another. |
|                                        | y                                     | y                                   |                                                            |
| single-column NUPI                     | a                                     | a                                   |                                                            |
| composite pseudoindex                  | (x, y, z)                             | (x, y, z)                           |                                                            |
|                                        | (a,b)                                 | (a,b)                               |                                                            |
| composite NUSI                         | (x, y)                                | (x, y)                              |                                                            |

Example Set 65a - 65c: Copying PARTITION Statistics

The system copies PARTITION statistics in the following scenarios.

Consider the following DDL definitions for the examples in this set:

```
CREATE SET TABLE test3,
NO FALLBACK, NO BEFORE JOURNAL, NO AFTER JOURNAL,
CHECKSUM = DEFAULT (
  a INTEGER,
  b DATE,
  c INTEGER,
  e INTEGER)
PRIMARY INDEX (c)
PARTITION BY RANGE_N (e BETWEEN 1 AND 1000000 EACH 50000);
```

For the purpose of the examples that follow, assume the following statistics have been collected on *test3*:

| Statistics                      | Test3 Table Column Set                                      |
|---------------------------------|-------------------------------------------------------------|
| single column                   | <ul style="list-style-type: none"><li>a</li><li>b</li></ul> |
| single-column index on PPI NUPI | c                                                           |
| single-column PARTITION         | PARTITION                                                   |
| composite NUPI                  | (a, c)                                                      |
| composite PARTITION             | (PARTITION, a)                                              |

Example 65a

In the following example, the system copies all the single column, multicolumn, and index statistics as well as the single-column PARTITION statistics and the multicolumn PARTITION statistics for the column set (*PARTITION,a*).

```
CREATE TABLE t8 AS
test3
WITH DATA AND STATISTICS;
```

| The system copies these statistics ... | From this source table column set ... | To this target table column set ... | Because ...                                                                                                                                                    |
|----------------------------------------|---------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| single column                          | a                                     | a                                   | the system copies all columns from source table <i>test3</i> to target table <i>t8</i> with the same column names and properties and without using a subquery. |
|                                        | b                                     | b                                   |                                                                                                                                                                |
| single-column index on PPI NUPI        | c                                     | c                                   |                                                                                                                                                                |
| single-column PARTITION                | PARTITION                             | PARTITION                           |                                                                                                                                                                |
| composite NUPI                         | (a, c)                                | (a, c)                              |                                                                                                                                                                |
| composite PARTITION                    | (PARTITION, a)                        | (PARTITION, a)                      |                                                                                                                                                                |

Example 65b

In the following example, the system does *not* copy PARTITION statistics because the target table columns are specified in a subquery; however, the system *does* copy the single-column and multicolumn statistics from *test3* to *t8*.

```
CREATE TABLE t8 AS (
SELECT *
FROM test3)
WITH DATA AND STATISTICS;
```

| The system copies these statistics ... | From this source table column set ... | To this target table column set ... | Because ...                                                                                                                                             |
|----------------------------------------|---------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| single column                          | a                                     | a                                   | the columns in source table <i>test3</i> and target table <i>t8</i> are identical, so the system copies their single-column statistics.                 |
|                                        | b                                     | b                                   |                                                                                                                                                         |
| single-column index on PPI NUPI        | c                                     | c                                   |                                                                                                                                                         |
| composite NUPI                         | (a, c)                                | (a, c)                              | the columns in source table <i>test3</i> and target table <i>t8</i> are identical, so the system copies their multicolumn statistics.                   |
| single-column PARTITION                | PARTITION                             | none                                | the system does not copy PARTITION statistics, either single-column or as part of a composite, if the target table columns are specified in a subquery. |
| composite PARTITION                    | (PARTITION, a)                        | none                                |                                                                                                                                                         |

### Example 65c

In the following example, the system does not copy PARTITION statistics because the PPI is not copied to the target table when any index definition for the target table is specified explicitly. However, the system *does* copy all single-column and multicolumn statistics from *test3* to *t8*.

```
CREATE TABLE t8 AS
test3
WITH DATA AND STATISTICS
INDEX (a, c) ;
```

| The system copies these statistics ... | From this source table column set ... | To this target table column set ... | Because ...                                                                                                                             |
|----------------------------------------|---------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| single column                          | a                                     | a                                   | the columns in source table <i>test3</i> and target table <i>t8</i> are identical, so the system copies their single-column statistics. |
|                                        | b                                     | b                                   |                                                                                                                                         |
| single-column index on PPI NUPI        | c                                     | c                                   |                                                                                                                                         |
| composite NUPI                         | (a, c)                                | (a, c)                              | the columns in source table <i>test3</i> and target table <i>t8</i> are identical, so the system copies their multicolumn statistics.   |
| single-column PARTITION                | PARTITION                             | none                                | the system does not copy indexes or PARTITION statistics if any index is defined explicitly for the target table.                       |
| composite PARTITION                    | (PARTITION, a)                        | none                                |                                                                                                                                         |

## Example Set 66a - 66c

The system does not copy statistics under the following scenarios.

Consider the following DDL definition:

```
CREATE SET TABLE t1, NO FALLBACK,
  NO BEFORE JOURNAL,
  NO AFTER JOURNAL,
  CHECKSUM = DEFAULT (
    x INTEGER,
    y CHAR(10) CHARACTER SET LATIN CASESPECIFIC,
    z INTEGER)
  UNIQUE PRIMARY INDEX (x);
```

Assume that single-column statistics have been collected on columns *x*, *y*, and *z*.

### Example 66a

In the following example, the system does *not* copy statistics because only partial data is copied. This occurs because neither *y* nor *z* is uniquely constrained, and as a result, the system eliminates all duplicate rows, which might cause a difference in cardinality between the two tables.

```
CREATE SET TABLE t9(x, y) AS (
  SELECT y, z
  FROM t1)
  WITH DATA AND STATISTICS
  PRIMARY INDEX(x, y);
```

### Example 66b

In the following example, the system copies partial statistics. The single-column statistics from source table columns *x* and *z* are copied as single-column statistics for target table columns *a* and *c*, respectively.

Single-column statistics on *y* in the source table are not eligible to be copied to target table column *b* in the target table because the NOT CASESPECIFIC column attribute of *b* is not the same as the column default attribute of source table column *y*.

```
CREATE TABLE t9(a, b NOT CASESPECIFIC, c) AS (
  SELECT x, y, z
  FROM t1)
  WITH DATA AND STATISTICS;
```

| The system copies these statistics ... | From this source table column set ... | To this target table column set ... | Because ...                                                                                                                                                                                 |
|----------------------------------------|---------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| single-table                           | x                                     | a                                   | the columns <i>x</i> and <i>z</i> in source table <i>t1</i> and columns <i>a</i> and <i>c</i> in target table <i>t9</i> are identical, so the system copies their single-column statistics. |
|                                        | z                                     | c                                   |                                                                                                                                                                                             |
|                                        | y                                     | none                                | the definition of column <i>b</i> in the target table is changed from the definition of its analog column <i>y</i> in the source table because it adds a NOT CASESPECIFIC attribute.        |

Example 66c

In the following example, single-column statistics on source table column *y* are not eligible to be copied for target table column *x* because data for this column is modified in the target table with the UPPERCASE attribute.

```
CREATE TABLE t9(x UPPERCASE, y) AS (  
    SELECT y, z  
    FROM t1)  
WITH DATA AND STATISTICS;
```

| The system copies these statistics ... | From this source table column set ... | To this target table column set ... | Because ...                                                                                                                                                                    |
|----------------------------------------|---------------------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| single-table                           | z                                     | y                                   | column <i>z</i> in source table <i>t1</i> and column <i>y</i> in target table <i>t9</i> are identical, so the system copies their single-column statistics.                    |
|                                        | y                                     | none                                | the definition of column <i>x</i> in the target table is changed from the definition of its analog column <i>y</i> in the source table because it adds an UPPERCASE attribute. |

Example 67: CREATE ... AS Requests That Produce a Table With a Primary Index

Assume that you have defined the following primary-indexed table:

```
CREATE TABLE source (  
    column_1 INTEGER  
    column_2 INTEGER)  
UNIQUE PRIMARY INDEX (column_1);
```

The following CREATE TABLE ... AS requests both produce primary-indexed tables:

```
CREATE TABLE target  
AS source  
WITH NO DATA;  
  
CREATE TABLE target AS (  
    SELECT column_1, column_2  
    FROM source)  
WITH DATA  
PRIMARY INDEX (column_1);
```



### Example 68: Ambiguous CREATE Request That Produces Either a NoPI Table or a Primary-Indexed Table Depending on the Presence or Absence of a PRIMARY KEY or UNIQUE Constraint and the Setting of the PrimaryIndexDefault Flag

The following example specifies neither an explicit PRIMARY INDEX clause nor an explicit NO PRIMARY INDEX clause, but does specify a UNIQUE constraint on *column\_2*.

```
CREATE TABLE ambiguous_1 AS (  
    column_1 INTEGER NOT NULL,  
    column_2 INTEGER NOT NULL  
    CONSTRAINT UNIQUE (column_2));
```

Regardless of the setting for the PrimaryIndexDefault flag, Teradata Database creates this table with a UPI on *column\_2* because you neither explicitly specified a primary index nor NO PRIMARY INDEX. Because of this, the system follows the rules for creating a default primary index and creates a UPI on the first column with a UNIQUE constraint, which is *column\_2*.

As a result, a SHOW TABLE request on *ambiguous\_1* returns the following SQL text:

```
CREATE SET TABLE ambiguous_1 ,NO FALLBACK ,  
    NO BEFORE JOURNAL,  
    NO AFTER JOURNAL,  
    CHECKSUM = DEFAULT  
    (  
        column_1 INTEGER NOT NULL,  
        column_2 INTEGER NOT NULL)  
    UNIQUE PRIMARY INDEX (column_2);
```

Note that Teradata Database has removed the UNIQUE constraint from *column\_2* and has converted it to a unique primary index. Because no INDEX clause was specified, Teradata Database creates the table with a unique primary index on *column\_2* regardless of the setting of the PrimaryIndexDefault flag in DBS Control.

The following example also fails to specify either an explicit PRIMARY INDEX clause or an explicit NO PRIMARY INDEX clause, but does specify a PRIMARY KEY constraint on *column\_2*.

```
CREATE TABLE ambiguous_2 AS (  
    column_1 INTEGER NOT NULL  
    column_2 INTEGER NOT NULL  
    CONSTRAINT PRIMARY KEY (column_2));
```

Regardless of the setting for the PrimaryIndexDefault flag, Teradata Database creates this table with a UPI on *column\_2* because *column\_2* is defined as the primary key for the table, so a SHOW TABLE request on *ambiguous\_2* returns the following SQL text:

```
CREATE SET TABLE ambiguous_2 ,NO FALLBACK ,  
    NO BEFORE JOURNAL,  
    NO AFTER JOURNAL,  
    CHECKSUM = DEFAULT  
    (  
        column_1 INTEGER NOT NULL,  
        column_2 INTEGER NOT NULL)  
    UNIQUE PRIMARY INDEX (column_2);
```

Note that Teradata Database has removed the PRIMARY KEY constraint from *column\_2* and has converted it to a unique primary index. Because no INDEX clause was specified, Teradata Database creates the table with a unique primary index on *column\_2* regardless of the setting of the PrimaryIndexDefault flag in DBS Control.

The following example fails to specify either an explicit PRIMARY INDEX clause or an explicit NO PRIMARY INDEX clause. The request also specifies a UNIQUE constraint on *column\_1* and a PRIMARY KEY constraint on *column\_2*.

```
CREATE TABLE ambiguous_3 AS (  
    column_1 INTEGER NOT NULL  
    column_2 INTEGER NOT NULL  
    CONSTRAINT UNIQUE (column_1)  
    CONSTRAINT PRIMARY KEY (column_2));
```

In this case, Teradata Database follows the default hierarchy for converting non-primary index columns into a primary index (see *Database Design* for details) and converts the PRIMARY KEY constraint to the unique primary index for the table because it has precedence over UNIQUE constraints in the default primary index rules hierarchy.

Regardless of the setting for the PrimaryIndexDefault flag, Teradata Database creates this table with a UPI on *column\_2* and converts the UNIQUE constraint on *column\_1* to a unique secondary index, so a SHOW TABLE request on *ambiguous\_3* returns the following SQL text:

```
CREATE SET TABLE ambiguous_3 ,NO FALLBACK ,  
    NO BEFORE JOURNAL,  
    NO AFTER JOURNAL,  
    CHECKSUM = DEFAULT  
    (  
        column_1 INTEGER NOT NULL,  
        column_2 INTEGER NOT NULL)  
    UNIQUE INDEX (column_1)  
    UNIQUE PRIMARY INDEX (column_2);
```

## Example 69: NoPI Table CREATE Request That Converts PRIMARY KEY or UNIQUE Constraints to Unique Secondary Indexes

If you create a NoPI table that also specifies a PRIMARY KEY, one or more UNIQUE constraints, or both, Teradata Database converts the SQL text for the constraints to specifications for unique secondary indexes on the same column sets.

Consider the following CREATE TABLE request:

```
CREATE TABLE nopi_constraints (  
    column_1 INTEGER NOT NULL  
    column_2 INTEGER NOT NULL  
    CONSTRAINT UNIQUE (column_1)  
    CONSTRAINT PRIMARY KEY (column_2))  
NO PRIMARY INDEX;
```

The general rule for PRIMARY KEY and UNIQUE constraints is that if one of them exists and you do not specify a primary index for a table, then the primary key column set is converted to the unique primary index for the table and the column defined with a UNIQUE constraint is converted to a unique secondary index.

If no primary key specification exists, but one or more UNIQUE constraints do, the first column set defined with a UNIQUE constraint is converted to the unique primary index for the table and the others are converted to USIs.

This causes problems for the NoPI case, because the explicit intent is that no primary index be defined for the table.

To handle this case, Teradata Database automatically converts the SQL text for any PRIMARY KEY or UNIQUE constraints to SQL text that specifies unique secondary indexes when you submit such a CREATE TABLE request.

For example, Teradata Database converts the SQL text for the earlier request to the following SQL text because you have specified NO PRIMARY INDEX explicitly.

```
CREATE TABLE nopi_constraints (
  column_1 INTEGER NOT NULL
  column_2 INTEGER NOT NULL)
UNIQUE INDEX (column_1)
UNIQUE INDEX (column_2)
NO PRIMARY INDEX;
```

This does not change any of the characteristics for the column sets previously designated as PRIMARY INDEX and UNIQUE, respectively, because both would have been implemented as USIs anyway. All this transformation does is permit the table to be created without a primary index.

## Example 70: CREATE Request That Produces a NoPI Table

This example creates a NoPI table named *sales\_temp1* regardless of the setting for PrimaryIndexDefault because you have specified NO PRIMARY INDEX explicitly:

```
CREATE MULTISET TABLE sales_temp1, Fallback, NO BEFORE JOURNAL,
NO AFTER JOURNAL, CHECKSUM = DEFAULT (
  item_nbr INTEGER NOT NULL,
  sale_date DATE FORMAT 'MM/DD/YYYY' NOT NULL,
  item_count INTEGER)
NO PRIMARY INDEX;
```

## Example 71: CREATE ... AS Requests That Produce a NoPI Table

Assume the following primary-indexed source table definition for the following example set:

```
CREATE TABLE source_pi (
  column_1 INTEGER
  column_2 INTEGER)
UNIQUE PRIMARY INDEX (column_1);
```

Also assume you have created the following NoPI table definition for the example set:

```
CREATE TABLE source_nopi (
  column_1 INTEGER
  column_2 INTEGER)
NO PRIMARY INDEX;
```

The following CREATE TABLE ... AS requests all produce a NoPI table because in each case you have explicitly specified NO PRIMARY INDEX:

```
CREATE TABLE target_nopi AS
  source_pi
WITH DATA
NO PRIMARY INDEX;

CREATE TABLE target_nopi AS
  source_nopi
WITH DATA
NO PRIMARY INDEX;

CREATE TABLE target_nopi AS (
  SELECT column_1, column_2
  FROM source_pi)
WITH DATA
NO PRIMARY INDEX;

CREATE TABLE target_nopi AS (
  SELECT column_1, column_2
  FROM source_nopi)
WITH DATA
NO PRIMARY INDEX;
```

Unlike the preceding examples, the outcome of the following CREATE TABLE request depends on the setting of the DBS Control flag PrimaryIndexDefault.

```
CREATE TABLE target AS (
  SELECT column_1, column_2
  FROM source_nopi)
WITH DATA;
```

| IF the value for PrimaryIndexDefault is ... | THEN the resulting table has ...                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N                                           | <p>no primary index.</p> <p>Even though you have not explicitly specified NO PRIMARY INDEX, you also have not specified any PRIMARY KEY or UNIQUE constraints on the columns of the table, so Teradata Database defines <i>target</i> as a NoPI table by default.</p>                                                                                                                                                                      |
| D or P                                      | <p>a nonunique primary index.</p> <p>The NUPI is defined by default, following the rules for selecting the primary index for a table when none is specified.</p> <p>In this case, the primary index is defined on the first column defined for <i>target</i>, which is <i>column_1</i>.</p> <p>The primary index is defined as a NUPI because no PRIMARY KEY or UNIQUE constraints are defined on any of the columns of <i>target</i>.</p> |

## Example 72: UDT Examples

The following example shows several ways to specify the UDT *circle* for columns *cir1* and *cir2*.

```
CREATE TABLE tab1 (  
  c1    INTEGER,  
  cir1 circle,  
  cir2 circle NOT NULL);
```

The following example specifies the UDT *ellipse* for column *y* and the UDT *circle* for column *z*.

```
CREATE TABLE tab2 (  
  x CHARACTER(10),  
  y SYSUDTLIB.ellipse,  
  z circle FORMAT 'X(15)' );
```

## Related Topics

The following topics are all related to defining tables:

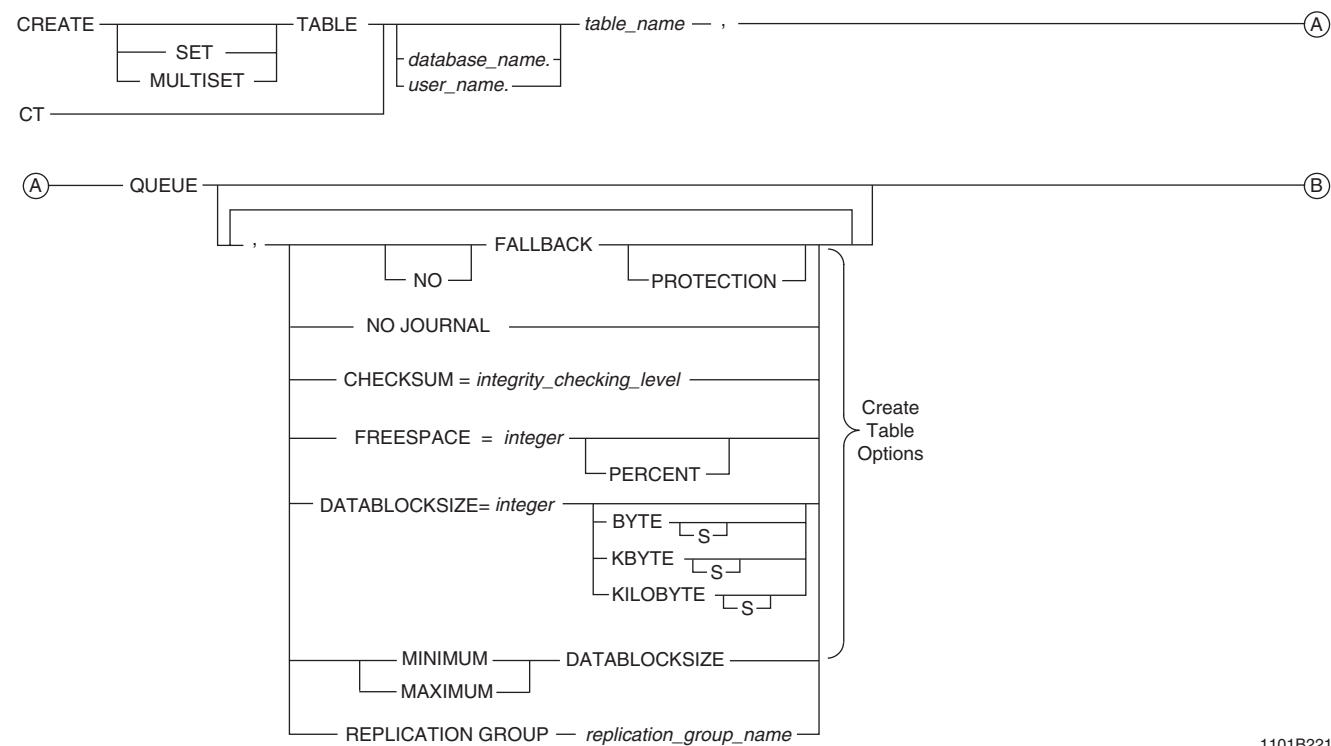
- [“ALTER TABLE” on page 33](#)
- [“CREATE ERROR TABLE” on page 135](#)
- [“CREATE GLOBAL TEMPORARY TRACE TABLE” on page 186](#)
- [“CREATE TABLE \(Table Kind Clause\)” in SQL Data Definition Language Detailed Topics](#)
- [“CREATE TABLE \(Table Options Clause\)” in SQL Data Definition Language Detailed Topics](#)
- [“CREATE TABLE \(Column Definition Clause\)” in SQL Data Definition Language Detailed Topics](#)
- [“CREATE TABLE \(Index Definition Clause\)” in SQL Data Definition Language Detailed Topics](#)
- [“CREATE TABLE \(Temporary/Volatile Table Preservation Clause\)” in SQL Data Definition Language Detailed Topics](#)
- [“CREATE TABLE \(AS Clause\)” in SQL Data Definition Language Detailed Topics](#)
- [“CREATE TABLE \(Queue Table Form\)” on page 462](#)
- [“DROP MACRO/ DROP PROCEDURE/ DROP TABLE/ DROP TRIGGER/ DROP VIEW” on page 574](#)
- [“HELP COLUMN” on page 696](#)
- [“HELP CONSTRAINT” on page 708](#)
- [“HELP INDEX” on page 724](#)
- [“HELP TABLE” on page 769](#)
- [“HELP VOLATILE TABLE” on page 787](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)

# CREATE TABLE (Queue Table Form)

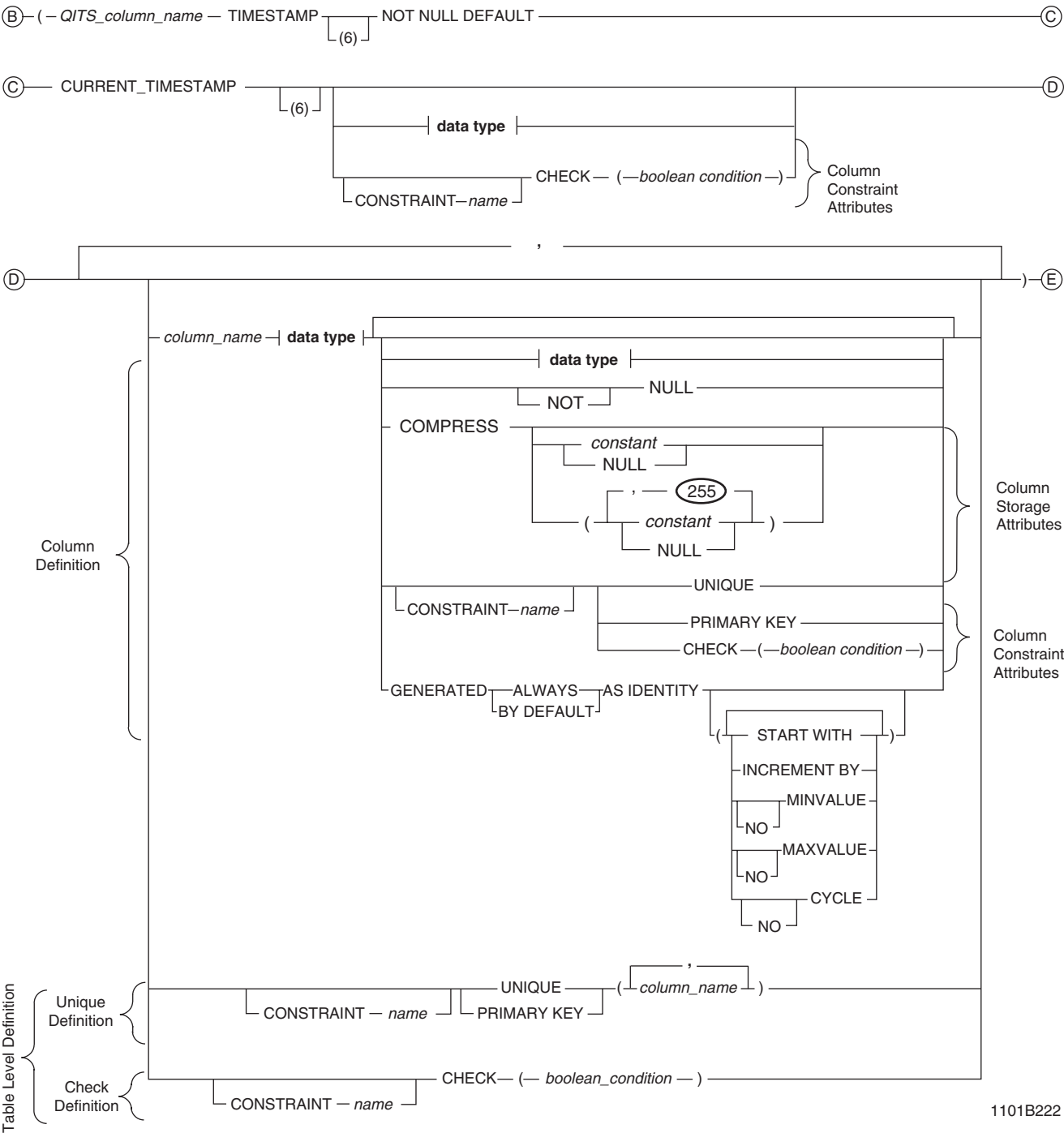
## Purpose

Creates a queue table.  
You cannot create a NoPI queue table.

## Syntax

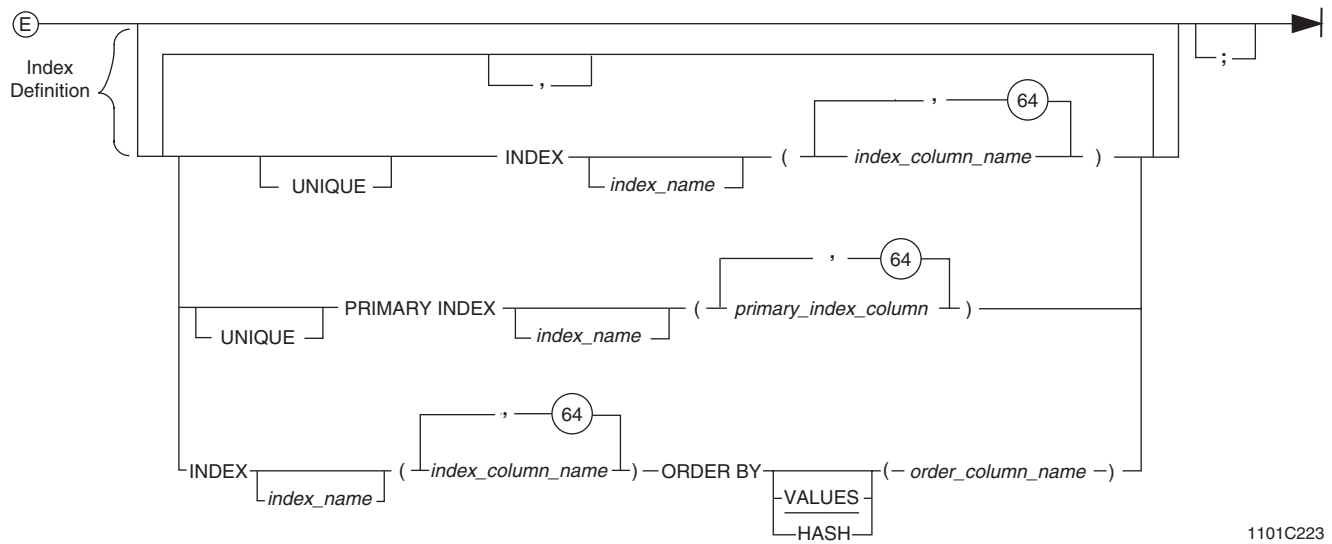


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Chapter 5: CREATE TABLE  
CREATE TABLE (Queue Table Form)



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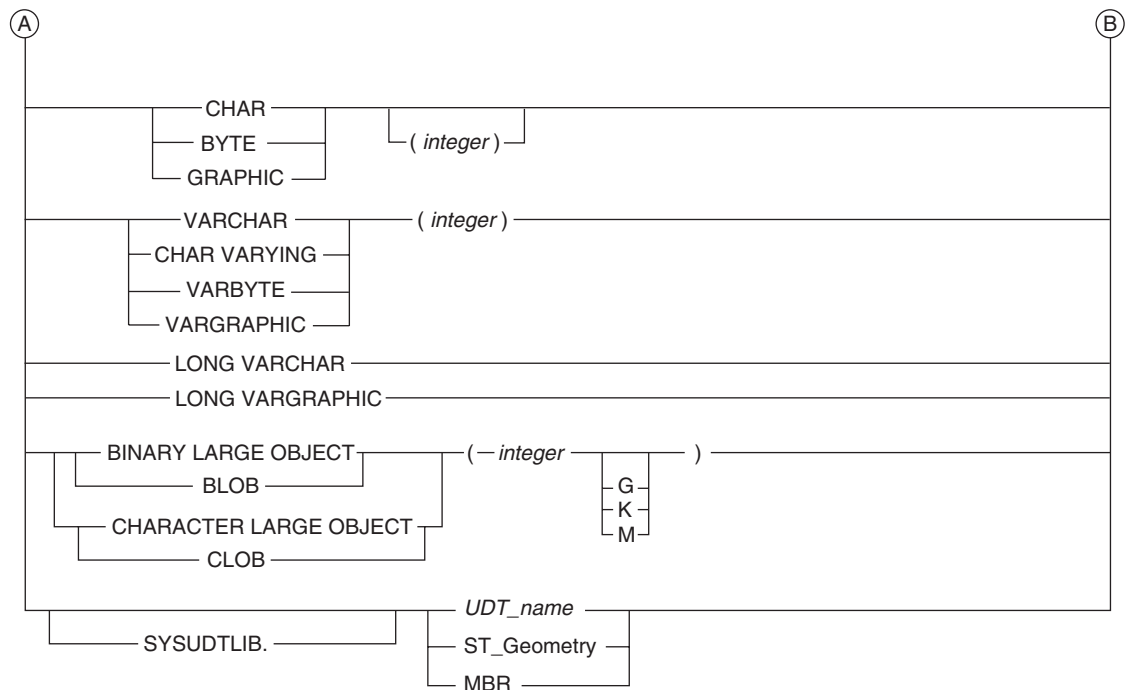


| Data Type        |                                                                                                                   |
|------------------|-------------------------------------------------------------------------------------------------------------------|
| INTEGER          |                                                                                                                   |
| SMALLINT         |                                                                                                                   |
| BIGINT           |                                                                                                                   |
| BYTEINT          |                                                                                                                   |
| DATE             |                                                                                                                   |
| TIME             |                                                                                                                   |
| TIMESTAMP        | (fractional_seconds_precision) WITH TIMEZONE                                                                      |
| INTERVAL YEAR    | (precision) TO MONTH                                                                                              |
| INTERVAL MONTH   | (precision)                                                                                                       |
| INTERVAL DAY     | (precision) TO<br><div> <div>HOUR</div> <div>MINUTE</div> <div>SECOND (fractional_seconds_precision)</div> </div> |
| INTERVAL HOUR    | (precision) TO<br><div> <div>MINUTE</div> <div>SECOND (fractional_seconds_precision)</div> </div>                 |
| INTERVAL MINUTE  | (precision) TO SECOND (fractional_seconds_precision)                                                              |
| INTERVAL SECOND  | (precision, fractional_seconds_precision)                                                                         |
| PERIOD(          | DATE)                                                                                                             |
| PERIOD(          | TIME)                                                                                                             |
| PERIOD(TIMESTAMP | (precision) WITH TIMEZONE)                                                                                        |
| REAL             |                                                                                                                   |
| DOUBLE PRECISION |                                                                                                                   |
| FLOAT            | (integer)                                                                                                         |
| DECIMAL          |                                                                                                                   |
| NUMERIC          | (integer, integer)                                                                                                |

(A)
(B)

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Chapter 5: CREATE TABLE  
CREATE TABLE (Queue Table Form)



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where:

| Syntax Element ...               | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                  |                             |     |              |          |          |      |                                                                                          |                           |                               |      |          |          |     |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-----------------------------|-----|--------------|----------|----------|------|------------------------------------------------------------------------------------------|---------------------------|-------------------------------|------|----------|----------|-----|
| <b>Table Kind Clause</b>         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                  |                             |     |              |          |          |      |                                                                                          |                           |                               |      |          |          |     |
| MULTISET<br>SET                  | <p>duplicate row control.</p> <p>If there are uniqueness constraints on any column or set of columns in the table definition, then the table cannot have duplicate rows even if it is declared as MULTISET.</p> <p>If the only column in the table is its QITS column (see “QITS_column_name” later in this table), then you cannot specify SET. In this case, the table must be defined, either implicitly or explicitly, as MULTISET.</p> <p>Some client utilities have restrictions with respect to MULTISET tables. See the CREATE TABLE (Table Kind Clause) topic “SET and MULTISET” in <i>SQL Data Definition Language Detailed Topics</i>.</p> <table> <tr> <th>IF this keyword is specified ...</th><th>THEN duplicate rows are ...</th></tr> <tr> <td>SET</td><td>not allowed.</td></tr> <tr> <td>MULTISET</td><td>allowed.</td></tr> <tr> <td>none</td><td>allowed or not depending on the current session mode, as defined in the following table:</td></tr> </table> <table> <tr> <th>For this session mode ...</th><th>The default table kind is ...</th></tr> <tr> <td>ANSI</td><td>MULTISET</td></tr> <tr> <td>Teradata</td><td>SET</td></tr> </table> | IF this keyword is specified ... | THEN duplicate rows are ... | SET | not allowed. | MULTISET | allowed. | none | allowed or not depending on the current session mode, as defined in the following table: | For this session mode ... | The default table kind is ... | ANSI | MULTISET | Teradata | SET |
| IF this keyword is specified ... | THEN duplicate rows are ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                  |                             |     |              |          |          |      |                                                                                          |                           |                               |      |          |          |     |
| SET                              | not allowed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                  |                             |     |              |          |          |      |                                                                                          |                           |                               |      |          |          |     |
| MULTISET                         | allowed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                  |                             |     |              |          |          |      |                                                                                          |                           |                               |      |          |          |     |
| none                             | allowed or not depending on the current session mode, as defined in the following table:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                  |                             |     |              |          |          |      |                                                                                          |                           |                               |      |          |          |     |
| For this session mode ...        | The default table kind is ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                  |                             |     |              |          |          |      |                                                                                          |                           |                               |      |          |          |     |
| ANSI                             | MULTISET                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                  |                             |     |              |          |          |      |                                                                                          |                           |                               |      |          |          |     |
| Teradata                         | SET                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                  |                             |     |              |          |          |      |                                                                                          |                           |                               |      |          |          |     |
| <b>Table Name Clause</b>         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                  |                             |     |              |          |          |      |                                                                                          |                           |                               |      |          |          |     |
| <i>database_name.table_name</i>  | <p>the name of the new queue table and the name of its containing database if different from the current database.</p> <p>If the name is not fully qualified, then the system assigns the name of the default database for the current session.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                  |                             |     |              |          |          |      |                                                                                          |                           |                               |      |          |          |     |
| <b>Table Options Clause</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                  |                             |     |              |          |          |      |                                                                                          |                           |                               |      |          |          |     |
| QUEUE                            | the mandatory keyword that indicates that the table being defined is a queue table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                  |                             |     |              |          |          |      |                                                                                          |                           |                               |      |          |          |     |
| [NO] FALLBACK                    | <p>duplicate copy protection (or not) for the table.</p> <p>When FALLBACK is chosen, then duplicate copies of rows in the table are created and stored.</p> <p>The default for this option is established by a CREATE DATABASE, CREATE USER, LOCKING Modifier, or MODIFY USER statement for the database in which the table is to be created.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                  |                             |     |              |          |          |      |                                                                                          |                           |                               |      |          |          |     |
| PROTECTION                       | a dummy word that can be specified after the FALLBACK keyword.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                  |                             |     |              |          |          |      |                                                                                          |                           |                               |      |          |          |     |

| Syntax Element ...                                          | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                   |                                                            |           |             |                                 |                |
|-------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|------------------------------------------------------------|-----------|-------------|---------------------------------|----------------|
| FREESPACE <i>integer</i>                                    | <p>the percent of free space that will remain on a cylinder during loading operations.</p> <p>Specifies the value of the percent freespace attribute to the specified value <i>integer</i>.</p> <p>If the specified value does not fall within the allowable range (0 to 75 percent), an error message is generated.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                   |                                                            |           |             |                                 |                |
| PERCENT                                                     | a noise keyword. It has no effect.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                   |                                                            |           |             |                                 |                |
| DATABLOCKSIZE= <i>numeric</i><br>BYTES/KBYTES/<br>KILOBYTES | <p>the maximum data block size for blocks that contain multiple rows as the value <i>numeric</i>. BYTES can be abbreviated as BYTE. KILOBYTES can be abbreviated as KBYTE.</p> <p>If DATABLOCKSIZE is not specified, then data blocks default to the sizes set in the PermDBSize and JournalDBSize fields of the DBSControl record.</p> <table border="1"> <thead> <tr> <th>The default value for this type of data block ...</th><th>Is specified using this field of the DBSControl record ...</th></tr> </thead> <tbody> <tr> <td>permanent</td><td>PermDBSize.</td></tr> <tr> <td>transient and permanent journal</td><td>JournalDBSize.</td></tr> </tbody> </table> <p>See <i>Utilities</i> for more detailed information about setting default data block sizes.</p> <p>For details about data block size, see the CREATE TABLE (Table Options Clause) topic “DATABLOCKSIZE” in <i>SQL Data Definition Language Detailed Topics</i>.</p> | The default value for this type of data block ... | Is specified using this field of the DBSControl record ... | permanent | PermDBSize. | transient and permanent journal | JournalDBSize. |
| The default value for this type of data block ...           | Is specified using this field of the DBSControl record ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                   |                                                            |           |             |                                 |                |
| permanent                                                   | PermDBSize.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                   |                                                            |           |             |                                 |                |
| transient and permanent journal                             | JournalDBSize.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                   |                                                            |           |             |                                 |                |
| MINIMUM<br>DATABLOCKSIZE                                    | <p>the smallest possible DATABLOCKSIZE setting for the table.</p> <p>MINIMUM DATABLOCKSIZE sets the maximum data block size for blocks that contain multiple rows to the minimum legal value of either 6144 or 7168 bytes (12 or 14 sectors), depending on the cylinder size set for your system.</p> <p>See the CREATE TABLE (Table Options Clause) topic “DATABLOCKSIZE” in <i>SQL Data Definition Language Detailed Topics</i>.</p> <p>You can abbreviate MINIMUM as MIN.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                   |                                                            |           |             |                                 |                |
| MAXIMUM<br>DATABLOCKSIZE                                    | <p>the largest possible DATABLOCKSIZE setting for the table: 130 560 bytes (255 sectors).</p> <p>You can abbreviate MAXIMUM as MAX.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                   |                                                            |           |             |                                 |                |

| Syntax Element ...                                 | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------------|-----|-----|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----|--------|----|-----|---|------|---------------------------------------------|
| <i>integrity_checking_level</i>                    | <p>a table-specific disk I/O integrity checksum.</p> <p>The checksum setting applies to primary data rows, fallback data rows, and all secondary index rows for the table.</p> <p>If you do not specify a value, then the system assumes the system-wide default value for this table type. The result is identical to specifying DEFAULT.</p> <p>If you are changing the checksum for this table to the system-wide default value, then specify DEFAULT.</p> <p>You can change the percentage of sampling for the system-wide default values for LOW, MEDIUM, and HIGH using the Checksum Level Definitions fields in the DBSControl utility (see <i>Utilities</i>). The values provided here for those checksum percentages are the defaults specified by the installation or upgrade.</p> <p>You cannot change the sampling percentage for the following:</p> <ul style="list-style-type: none"> <li>• The system-wide default values ALL and NONE.</li> <li>• Dictionary tables.</li> </ul> <table> <tr> <th>Level</th><th>Checksum Sample Count Percentage</th></tr> <tr> <td>ALL</td><td>100</td></tr> <tr> <td>DEFAULT</td><td>Percentage specified for this table type in the Checksum Levels fields of the Disk I/O Integrity Fields in the DBSControl utility (see <i>Utilities</i>).</td></tr> <tr> <td>HIGH</td><td>67</td></tr> <tr> <td>MEDIUM</td><td>33</td></tr> <tr> <td>LOW</td><td>2</td></tr> <tr> <td>NONE</td><td>Disable checksum disk I/O integrity checks.</td></tr> </table> | Level | Checksum Sample Count Percentage | ALL | 100 | DEFAULT | Percentage specified for this table type in the Checksum Levels fields of the Disk I/O Integrity Fields in the DBSControl utility (see <i>Utilities</i> ). | HIGH | 67 | MEDIUM | 33 | LOW | 2 | NONE | Disable checksum disk I/O integrity checks. |
| Level                                              | Checksum Sample Count Percentage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
| ALL                                                | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
| DEFAULT                                            | Percentage specified for this table type in the Checksum Levels fields of the Disk I/O Integrity Fields in the DBSControl utility (see <i>Utilities</i> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
| HIGH                                               | 67                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
| MEDIUM                                             | 33                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
| LOW                                                | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
| NONE                                               | Disable checksum disk I/O integrity checks.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |
| REPLICATION GROUP<br><i>replication_group_name</i> | <p>the name of the replication group to which this queue table is to be added if it matches a rule set up by a CREATE REPLICATION RULESET request (see <a href="#">“CREATE REPLICATION RULESET/ REPLACE REPLICATION RULESET” on page 374</a> and “CREATE TABLE” in <i>SQL Data Definition Language Detailed Topics</i>).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                  |     |     |         |                                                                                                                                                            |      |    |        |    |     |   |      |                                             |

| Syntax Element ...                                          | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Column Definition Clause                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <i>QITS_column_name</i>                                     | <p>the Query Insertion Timestamp (QITS) column.</p> <p>The first column defined for any queue table must be a query insertion timestamp (QITS) column. The system uses the QITS column to maintain the FIFO ordering of rows in the queue table (see the CREATE TABLE (Queue Table Form) topic “About Queue Tables” in <i>SQL Data Definition Language Detailed Topics</i>). Each queue table has only one QITS column, and it must be defined with the following attributes:</p> <pre>column_name TIMESTAMP (6) NOT NULL       DEFAULT CURRENT_TIMESTAMP (6)</pre> <p>The precision specification is optional for the TIMESTAMP data type specification and its DEFAULT attribute, but you cannot define either with a precision value other than 6.</p> <p>The QITS column <i>cannot</i> be defined as any of the following:</p> <ul style="list-style-type: none"> <li>• UNIQUE PRIMARY INDEX (see the CREATE TABLE (Index Definition Clause) topic “Primary Indexes” in <i>SQL Data Definition Language Detailed Topics</i>)</li> <li>• UNIQUE (see the CREATE TABLE (Column Definition Clause) topic “UNIQUE Constraints” in <i>SQL Data Definition Language Detailed Topics</i>)</li> <li>• PRIMARY KEY (see the CREATE TABLE (Column Definition Clause) topic “PRIMARY KEY” in <i>SQL Data Definition Language Detailed Topics</i>)</li> <li>• Unique secondary index (see “<a href="#">CREATE INDEX</a>” on page 211 and the CREATE TABLE (Index Definition Clause) topic “Secondary Indexes” in <i>SQL Data Definition Language Detailed Topics</i>)</li> <li>• Identity column (see the CREATE TABLE (Column Definition Clause) topic “Identity Columns” in <i>SQL Data Definition Language Detailed Topics</i>)</li> </ul> <p>The QITS column can be the NUPI for a table, but you should avoid following that practice. Be aware that if you do not define an explicit primary index, primary key, or uniquely constrained column in the table, then the QITS column becomes its primary index by default because it is the first column defined for the table.</p> <p>You might find it useful to find additional queue management columns for functions such as message identification or queue sequencing.</p> |
| TIMESTAMP(6)<br>NOT NULL<br>DEFAULT<br>CURRENT_TIMESTAMP(6) | <p>The data type for <i>QITS_column_name</i> must be <code>TIMESTAMP ( 6 ) NOT NULL DEFAULT CURRENT_TIMESTAMP ( 6 )</code>.</p> <p>You need not specify the precision values for the timestamps because they default to 6, but you also cannot specify a precision value <i>other</i> than 6.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <i>column_name</i>                                          | <p>specifies the name of one or more non-QITS columns, in the order in which they are to be defined for the table.</p> <p>You can define up to 2,048 columns, including the mandatory QITS column, for a queue table.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

| Syntax Element ...                                                                                                                                                       | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>data_type</i><br>[ <i>data_type_attributes</i> ]                                                                                                                      | <p>one or more data definition phrases that define data for the column.</p> <p>You must specify a single data type for each <i>column_name</i>.</p> <p>Queue tables cannot contain columns with LOB data types.</p> <p>Column data attribute specifications are optional. If you specify attributes for a column, you should define its data type prior to defining the attributes.</p> <p>If you do not specify explicit formatting, a column assumes the default format for the data type, which can be specified by a custom data formatting specification (SDF) defined by the <i>tdlocaledef</i> utility (see <i>Utilities</i>). Explicit formatting applies both to the parsing and to the retrieval of character strings.</p> <p>Data types and data type attributes are the subject of <i>SQL Data Types and Literals</i>.</p> <p>For information about converting data between data types, see <i>SQL Functions, Operators, Expressions, and Predicates</i>.</p> |
| <p style="text-align: center;"><b>Column Storage Attributes Clause</b></p> <p>Column storage attributes are a Teradata extension to the ANSI SQL:2008 specification.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| COMPRESS                                                                                                                                                                 | <p>a specified set of distinct values in a column that is to be compressed to zero space.</p> <p>See <i>Database Design</i> for a detailed description of value compression.</p> <p>See <i>SQL Data Types and Literals</i> for more information about the COMPRESS attribute.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| NULL                                                                                                                                                                     | <p>that nulls are compressed.</p> <p>You can only specify NULL once per column.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <i>constant</i>                                                                                                                                                          | <p>that nulls and the value are compressed.</p> <p>Compressed constants are typically quoted character strings. For numeric columns, constants have a numeric data type.</p> <p>The most space a numeric value can occupy is eight bytes.</p> <p>Using COMPRESS on fixed-length character data can save space depending on the percentage of rows for which the compressed value is assigned.</p> <p>See <i>SQL Data Types and Literals</i> for information about limits for this value.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

| Syntax Element ...                                                                                                                                                 | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                       |                                                        |          |        |                                                |         |                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|----------|--------|------------------------------------------------|---------|----------------------------------------------------------------|
| <b>Identity Column Specification</b><br>The identity column is ANSI SQL:2008-compliant.<br>The QITS column <i>cannot</i> also be defined to be an identity column. |                                                                                                                                                                                                                                                                                                                                                                                                     |                                                        |          |        |                                                |         |                                                                |
| ALWAYS                                                                                                                                                             | that identity column values are always system-generated.<br>You cannot insert values into, nor can you update, an identity column defined as GENERATED ALWAYS AS IDENTITY.                                                                                                                                                                                                                          |                                                        |          |        |                                                |         |                                                                |
| BY DEFAULT                                                                                                                                                         | that identity column values can be system-generated or user-inserted, depending on the circumstance. <table> <tr> <th>IF this is specified for insertion into the column ...</th><th>THEN ...</th></tr> <tr> <td>a null</td><td>the system generates an identity column value.</td></tr> <tr> <td>a value</td><td>the user-specified value is inserted into the identity column.</td></tr> </table> | IF this is specified for insertion into the column ... | THEN ... | a null | the system generates an identity column value. | a value | the user-specified value is inserted into the identity column. |
| IF this is specified for insertion into the column ...                                                                                                             | THEN ...                                                                                                                                                                                                                                                                                                                                                                                            |                                                        |          |        |                                                |         |                                                                |
| a null                                                                                                                                                             | the system generates an identity column value.                                                                                                                                                                                                                                                                                                                                                      |                                                        |          |        |                                                |         |                                                                |
| a value                                                                                                                                                            | the user-specified value is inserted into the identity column.                                                                                                                                                                                                                                                                                                                                      |                                                        |          |        |                                                |         |                                                                |
| <b>Identity Column Parameters</b><br>The five identity column parameters are optional and can be specified in any order.                                           |                                                                                                                                                                                                                                                                                                                                                                                                     |                                                        |          |        |                                                |         |                                                                |
| START WITH                                                                                                                                                         | the lowest number in the system-generated numeric series for an identity column. The default is 1.<br>The value can be any exact negative or positive whole number within the range of the data type for the column as long as it is less than MAXVALUE for an incremental series or greater than MINVALUE for a decremental series.                                                                |                                                        |          |        |                                                |         |                                                                |
| INCREMENT BY                                                                                                                                                       | the (possibly negative) interval on which to increment system-generated numbers. The default is 1.<br>The value can be any whole number less than or equal to the value of DBSControl field IdCol Batch Size except 0.                                                                                                                                                                              |                                                        |          |        |                                                |         |                                                                |



| Syntax Element ...                              | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |        |          |                                                 |                                                                                                                                                                                                                 |                                                 |                                                                                                                                                                                                                  |                       |                                                                                                                                 |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------|
| [NO] MINVALUE                                   | <p>the minimum value to which a system-generated numeric series can decrement.</p> <p>The value can be any whole number with an absolute value less than the value specified for START WITH.</p> <p>The default is the minimum number for the data type defined for the column.</p> <p>When cycling is not enabled, the sum of the specified values for START WITH and INCREMENT BY must be greater than MINVALUE. If they are not, then the system generates only one number before the minimum limit is exceeded.</p> <table> <tr> <th>IF ...</th><th>THEN ...</th></tr> <tr> <td>INCREMENT BY is positive and CYCLE is specified</td><td>renumbering begins from MINVALUE when MAXVALUE is reached.</td></tr> <tr> <td>INCREMENT BY is negative</td><td>MINVALUE, if specified, must be a whole number such that <math>\text{MINVALUE} \leq \text{START WITH}</math>.<br/>MINVALUE also cannot be smaller than the minimum value for the data type assigned to the identity column.</td></tr> <tr> <td>NO CYCLE is specified</td><td>MINVALUE is not applicable for positive increments.<br/>No warning or error is returned if you specify a MINVALUE with NO CYCLE.</td></tr> </table> | IF ... | THEN ... | INCREMENT BY is positive and CYCLE is specified | renumbering begins from MINVALUE when MAXVALUE is reached.                                                                                                                                                      | INCREMENT BY is negative                        | MINVALUE, if specified, must be a whole number such that $\text{MINVALUE} \leq \text{START WITH}$ .<br>MINVALUE also cannot be smaller than the minimum value for the data type assigned to the identity column. | NO CYCLE is specified | MINVALUE is not applicable for positive increments.<br>No warning or error is returned if you specify a MINVALUE with NO CYCLE. |
| IF ...                                          | THEN ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |          |                                                 |                                                                                                                                                                                                                 |                                                 |                                                                                                                                                                                                                  |                       |                                                                                                                                 |
| INCREMENT BY is positive and CYCLE is specified | renumbering begins from MINVALUE when MAXVALUE is reached.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |          |                                                 |                                                                                                                                                                                                                 |                                                 |                                                                                                                                                                                                                  |                       |                                                                                                                                 |
| INCREMENT BY is negative                        | MINVALUE, if specified, must be a whole number such that $\text{MINVALUE} \leq \text{START WITH}$ .<br>MINVALUE also cannot be smaller than the minimum value for the data type assigned to the identity column.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |          |                                                 |                                                                                                                                                                                                                 |                                                 |                                                                                                                                                                                                                  |                       |                                                                                                                                 |
| NO CYCLE is specified                           | MINVALUE is not applicable for positive increments.<br>No warning or error is returned if you specify a MINVALUE with NO CYCLE.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |          |                                                 |                                                                                                                                                                                                                 |                                                 |                                                                                                                                                                                                                  |                       |                                                                                                                                 |
| [NO] MAXVALUE                                   | <p>the maximum value to which a system-generated numeric series can increment.</p> <p>Can be any whole number with a value greater than the value specified for START WITH.</p> <p>The default is the maximum number for the data type defined for the column.</p> <p>When cycling is not enabled, the sum of the specified values for START WITH and INCREMENT BY must be less than MAXVALUE. If they are not, then the system generates only one number before the maximum limit is exceeded.</p> <table> <tr> <th>IF ...</th><th>THEN ...</th></tr> <tr> <td>INCREMENT BY is positive</td><td>MAXVALUE, if specified, must be a whole number such that <math>\text{MAXVALUE} \geq \text{START WITH}</math>.<br/>MAXVALUE also cannot be larger than the maximum value for the data type assigned to the identity column.</td></tr> <tr> <td>INCREMENT BY is negative and CYCLE is specified</td><td>renumbering begins with MAXVALUE when MINVALUE is reached.</td></tr> <tr> <td>NO CYCLE is specified</td><td>MAXVALUE is not applicable for negative increments.<br/>No warning or error is returned if you specify a MAXVALUE with NO CYCLE.</td></tr> </table>                      | IF ... | THEN ... | INCREMENT BY is positive                        | MAXVALUE, if specified, must be a whole number such that $\text{MAXVALUE} \geq \text{START WITH}$ .<br>MAXVALUE also cannot be larger than the maximum value for the data type assigned to the identity column. | INCREMENT BY is negative and CYCLE is specified | renumbering begins with MAXVALUE when MINVALUE is reached.                                                                                                                                                       | NO CYCLE is specified | MAXVALUE is not applicable for negative increments.<br>No warning or error is returned if you specify a MAXVALUE with NO CYCLE. |
| IF ...                                          | THEN ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |          |                                                 |                                                                                                                                                                                                                 |                                                 |                                                                                                                                                                                                                  |                       |                                                                                                                                 |
| INCREMENT BY is positive                        | MAXVALUE, if specified, must be a whole number such that $\text{MAXVALUE} \geq \text{START WITH}$ .<br>MAXVALUE also cannot be larger than the maximum value for the data type assigned to the identity column.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |          |                                                 |                                                                                                                                                                                                                 |                                                 |                                                                                                                                                                                                                  |                       |                                                                                                                                 |
| INCREMENT BY is negative and CYCLE is specified | renumbering begins with MAXVALUE when MINVALUE is reached.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |          |                                                 |                                                                                                                                                                                                                 |                                                 |                                                                                                                                                                                                                  |                       |                                                                                                                                 |
| NO CYCLE is specified                           | MAXVALUE is not applicable for negative increments.<br>No warning or error is returned if you specify a MAXVALUE with NO CYCLE.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |          |                                                 |                                                                                                                                                                                                                 |                                                 |                                                                                                                                                                                                                  |                       |                                                                                                                                 |
| [NO] CYCLE                                      | <p>whether system-generated values can be recycled when their minimum or maximum is reached.</p> <p>The default is NO CYCLE.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |          |                                                 |                                                                                                                                                                                                                 |                                                 |                                                                                                                                                                                                                  |                       |                                                                                                                                 |

| Syntax Element ...                                                                                                                                                                                                                                        | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |                                                   |                                                                                                                                                                                                                                                           |                |                                                            |                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------------------------------------------------|------------------|
| <b>Column Constraint Attributes Clause</b><br>A column listed as UNIQUE or PRIMARY KEY must be declared NOT NULL.                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |                                                   |                                                                                                                                                                                                                                                           |                |                                                            |                  |
| CONSTRAINT <i>name</i>                                                                                                                                                                                                                                    | the name for a named constraint.<br><br>See the CREATE TABLE (Column Definition Clause) topic “Constraint Names” in <i>SQL Data Definition Language Detailed Topics</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        |                                                   |                                                                                                                                                                                                                                                           |                |                                                            |                  |
| UNIQUE                                                                                                                                                                                                                                                    | <p>that no two rows in the table can have the same value in the field. The system uses a unique primary or secondary index to enforce this constraint.</p> <p>This constraint can only be specified on a single column. To specify UNIQUE on multiple columns, use the UNIQUE definition clause.</p> <p>You cannot specify a UNIQUE constraint for a QITS column (see “QITS_column_name” earlier in this table).</p> <p>The system implicitly creates a unique index on any column specified as UNIQUE.</p> <table> <tr> <th>IF ...</th><th>THEN the implicitly defined index is a unique ...</th></tr> <tr> <td>           all of the following conditions are true:           <ul style="list-style-type: none"> <li>• No explicit primary index is specified</li> <li>• No explicit primary key is specified</li> <li>• This is the first unique constraint defined for the table</li> </ul> </td><td>primary index.</td></tr> <tr> <td>none of the conditions listed in the previous cell is true</td><td>secondary index.</td></tr> </table> | IF ... | THEN the implicitly defined index is a unique ... | all of the following conditions are true: <ul style="list-style-type: none"> <li>• No explicit primary index is specified</li> <li>• No explicit primary key is specified</li> <li>• This is the first unique constraint defined for the table</li> </ul> | primary index. | none of the conditions listed in the previous cell is true | secondary index. |
| IF ...                                                                                                                                                                                                                                                    | THEN the implicitly defined index is a unique ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |                                                   |                                                                                                                                                                                                                                                           |                |                                                            |                  |
| all of the following conditions are true: <ul style="list-style-type: none"> <li>• No explicit primary index is specified</li> <li>• No explicit primary key is specified</li> <li>• This is the first unique constraint defined for the table</li> </ul> | primary index.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |                                                   |                                                                                                                                                                                                                                                           |                |                                                            |                  |
| none of the conditions listed in the previous cell is true                                                                                                                                                                                                | secondary index.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |                                                   |                                                                                                                                                                                                                                                           |                |                                                            |                  |
| PRIMARY KEY                                                                                                                                                                                                                                               | <p>that no two rows in the table can have the same value for the defined column set. The system uses a unique primary or secondary index to enforce this constraint.</p> <p>Only one primary key can be specified per table. To specify candidate primary keys for referential integrity relationships with other tables, use the UNIQUE definition clause.</p> <p>You cannot specify a PRIMARY KEY constraint for a QITS column (see “QITS_column_name” earlier in this table).</p> <p>The system implicitly creates a unique index on any column set specified as PRIMARY KEY if it is not also defined to be the primary index for the table.</p> <table> <tr> <th>IF ...</th><th>THEN the implicitly defined index is a unique ...</th></tr> <tr> <td>no primary index is specified explicitly</td><td>primary index.</td></tr> <tr> <td>a primary index is specified explicitly</td><td>secondary index.</td></tr> </table>                                                                                                                  | IF ... | THEN the implicitly defined index is a unique ... | no primary index is specified explicitly                                                                                                                                                                                                                  | primary index. | a primary index is specified explicitly                    | secondary index. |
| IF ...                                                                                                                                                                                                                                                    | THEN the implicitly defined index is a unique ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |                                                   |                                                                                                                                                                                                                                                           |                |                                                            |                  |
| no primary index is specified explicitly                                                                                                                                                                                                                  | primary index.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |                                                   |                                                                                                                                                                                                                                                           |                |                                                            |                  |
| a primary index is specified explicitly                                                                                                                                                                                                                   | secondary index.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |                                                   |                                                                                                                                                                                                                                                           |                |                                                            |                  |

| Syntax Element ...                 | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CHECK ( <i>boolean condition</i> ) | <p>a Boolean conditional expression, including scalar comparison conditions using, for example, any of the following:</p> <ul style="list-style-type: none"> <li>• =</li> <li>• &lt;&gt;</li> <li>• &gt;</li> <li>• &gt;=</li> </ul> <p>Also see <i>SQL Functions, Operators, Expressions, and Predicates</i>.</p> <p>When a CHECK constraint is part of the column definition, then a search condition cannot reference any columns other than the one being defined, nor are aggregate functions allowed.</p> <p>Also see the CREATE TABLE (Column Definition Clause) topic “BETWEEN ... AND ... Constraints” in <i>SQL Data Definition Language Detailed Topics</i>.</p> |
| <b>UNIQUE Definition Clause</b>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| CONSTRAINT <i>name</i>             | <p>the name for a named constraint.</p> <p>UNIQUE constraints are not permitted for the QITS column (see “QITS_column_name” earlier in this table).</p> <p>UNIQUE constraints are not permitted for volatile tables.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| UNIQUE                             | <p>that no two rows in the table can have the same field values. A unique primary or secondary index is used to enforce this constraint.</p> <p>You cannot specify a UNIQUE constraint for a QITS column (see “QITS_column_name” earlier in this table).</p>                                                                                                                                                                                                                                                                                                                                                                                                                |
| PRIMARY KEY                        | <p>a column set that ensures that no two rows in the table can be duplicates. Only one primary key can be specified per table. Internally, the system uses a unique primary or secondary index to enforce this constraint.</p> <p>You cannot specify a PRIMARY KEY constraint for a QITS column (see “QITS_column_name” earlier in this table).</p>                                                                                                                                                                                                                                                                                                                         |
| <i>column_name</i>                 | <p>a column in the column set to be used as the primary key or as unique.</p> <p>You cannot specify the QITS column (see “QITS_column_name” earlier in this table) to be either UNIQUE or a PRIMARY KEY.</p> <p>If more than one <i>column_name</i> is specified, the PRIMARY KEY or UNIQUE column set is based on the combined values of the column named.</p> <p>A maximum of 64 columns can be specified for a primary key.</p> <p>Columns listed in a UNIQUE or PRIMARY KEY table constraint must all be defined as NOT NULL.</p>                                                                                                                                       |

| Syntax Element ...                    | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CHECK Definition Clause</b>        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| CONSTRAINT <i>name</i>                | <p>the name for a named constraint.</p> <p>Constraints are not permitted for volatile tables.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| CHECK<br>( <i>boolean_condition</i> ) | <p>a conditional expression, including scalar comparison conditions using, for example, any of the following comparison operators:</p> <ul style="list-style-type: none"> <li>• =</li> <li>• &lt;&gt;</li> <li>• &gt;</li> <li>• &gt;=</li> </ul> <p>For more information about these operators, see <i>SQL Functions, Operators, Expressions, and Predicates</i>.</p> <p>When a CHECK constraint is part of the column definition, then its defined search condition cannot reference any other columns in its table, nor are set specifications allowed. Valid column-level CHECK constraints that reference candidate keys of other tables <i>are</i> permitted. See also the CREATE TABLE topic “BETWEEN ... AND ... Constraints” in <i>SQL Data Definition Language Detailed Topics and Database Design</i>.</p> <p>A table-level CHECK constraint can compare any columns defined for its table, both against each other and against constant values.</p> |
| <b>INDEX Definition Clause</b>        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| UNIQUE                                | <p>that the named column must be unique.</p> <p>The primary index and any secondary indexes can be defined to be unique. The only exception is if a queue table has only a QITS column. In this case, the QITS column must also be the primary index, so it cannot be a UPI. This is because timestamp values can repeat and therefore cannot be assumed to be unique (see <i>SQL Data Types and Literals</i>).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

| Syntax Element ...                                            | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |                                                      |                                                               |                            |                                                         |                                                |                                                            |                                                                                                                                                                                                                                                                                |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------------------------------------------|---------------------------------------------------------------|----------------------------|---------------------------------------------------------|------------------------------------------------|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PRIMARY                                                       | <p>the primary index.</p> <p>The primary index is used by the hashing algorithm to partition table rows across the AMPs.</p> <p>Queue tables cannot be NoPI tables nor can they have a partitioned primary index.</p> <p>If no primary index is specified, then Teradata Database assigns one implicitly, using the following guidelines to determine which column set is to be defined as the primary index:</p> <table> <tr> <th>IF ...</th><th>THEN the implicitly defined primary index is the ...</th></tr> <tr> <td>no primary index is specified, but an explicit primary key is</td><td>primary key for the table.</td></tr> <tr> <td>no primary key is specified, but a unique constraint is</td><td>first unique constraint defined for the table.</td></tr> <tr> <td>neither a primary key nor a unique constraint is specified</td><td> <p>QITS column.</p> <p>In this case, the primary index is nonunique by default and <i>cannot</i> be defined with a unique constraint or as a USI.</p> <p>The reason for this restriction is that timestamp values can repeat and therefore cannot be assumed to be unique.</p> </td></tr> </table> | IF ... | THEN the implicitly defined primary index is the ... | no primary index is specified, but an explicit primary key is | primary key for the table. | no primary key is specified, but a unique constraint is | first unique constraint defined for the table. | neither a primary key nor a unique constraint is specified | <p>QITS column.</p> <p>In this case, the primary index is nonunique by default and <i>cannot</i> be defined with a unique constraint or as a USI.</p> <p>The reason for this restriction is that timestamp values can repeat and therefore cannot be assumed to be unique.</p> |
| IF ...                                                        | THEN the implicitly defined primary index is the ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |                                                      |                                                               |                            |                                                         |                                                |                                                            |                                                                                                                                                                                                                                                                                |
| no primary index is specified, but an explicit primary key is | primary key for the table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |                                                      |                                                               |                            |                                                         |                                                |                                                            |                                                                                                                                                                                                                                                                                |
| no primary key is specified, but a unique constraint is       | first unique constraint defined for the table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        |                                                      |                                                               |                            |                                                         |                                                |                                                            |                                                                                                                                                                                                                                                                                |
| neither a primary key nor a unique constraint is specified    | <p>QITS column.</p> <p>In this case, the primary index is nonunique by default and <i>cannot</i> be defined with a unique constraint or as a USI.</p> <p>The reason for this restriction is that timestamp values can repeat and therefore cannot be assumed to be unique.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        |                                                      |                                                               |                            |                                                         |                                                |                                                            |                                                                                                                                                                                                                                                                                |
| INDEX                                                         | <p>a keyword used to define the primary index and secondary indexes for the table. The INDEX list is an extension to ANSI SQL.</p> <p>Unlike the indexes created by the UNIQUE and PRIMARY KEY constraint definitions, indexes defined by the index list can have nullable fields.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |                                                      |                                                               |                            |                                                         |                                                |                                                            |                                                                                                                                                                                                                                                                                |
| <i>index_name</i>                                             | an optional name for the index.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |                                                      |                                                               |                            |                                                         |                                                |                                                            |                                                                                                                                                                                                                                                                                |
| INDEX                                                         | <p>a keyword to introduce a secondary index definition using an ORDER BY clause to order the index on a single column. The INDEX list is an extension to ANSI SQL.</p> <p>Unlike the indexes created by the UNIQUE and PRIMARY KEY constraint definitions, indexes defined by the index list can include nullable fields.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |                                                      |                                                               |                            |                                                         |                                                |                                                            |                                                                                                                                                                                                                                                                                |
| <i>index_column_name</i>                                      | <p>a column in the column set whose values are to be used as the basis for a primary or secondary index.</p> <p>No column in the list can have a UDT or LOB data type.</p> <p>If you specify more than one column name, the index is created on the combined values of each column named. A maximum of 64 columns can be specified for an index, and a maximum of 32 secondary indexes can be created for one table.<sup>a</sup></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |                                                      |                                                               |                            |                                                         |                                                |                                                            |                                                                                                                                                                                                                                                                                |

| Syntax Element ...          | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                             |          |             |                                                                          |                        |                    |                           |                                                                                          |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------|-------------|--------------------------------------------------------------------------|------------------------|--------------------|---------------------------|------------------------------------------------------------------------------------------|
| ORDER BY                    | <p>row ordering on each AMP by a single NUSI column: either value-ordered or hash-ordered. You cannot order rows on a LOB column.</p> <p>Rules for using an ORDER BY clause are shown in the following table:</p> <table> <tr> <th>IF you specify ORDER BY ...</th><th>THEN ...</th></tr> <tr> <td>with VALUES</td><td>the ORDER BY <i>column_name</i> must be numeric with four bytes or less.</td></tr> <tr> <td>without HASH or VALUES</td><td>VALUES is assumed.</td></tr> <tr> <td>with a <i>column_name</i></td><td>the ORDER BY <i>column_name</i> must be one of the columns in the INDEX list of columns.</td></tr> </table> | IF you specify ORDER BY ... | THEN ... | with VALUES | the ORDER BY <i>column_name</i> must be numeric with four bytes or less. | without HASH or VALUES | VALUES is assumed. | with a <i>column_name</i> | the ORDER BY <i>column_name</i> must be one of the columns in the INDEX list of columns. |
| IF you specify ORDER BY ... | THEN ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                             |          |             |                                                                          |                        |                    |                           |                                                                                          |
| with VALUES                 | the ORDER BY <i>column_name</i> must be numeric with four bytes or less.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                             |          |             |                                                                          |                        |                    |                           |                                                                                          |
| without HASH or VALUES      | VALUES is assumed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                             |          |             |                                                                          |                        |                    |                           |                                                                                          |
| with a <i>column_name</i>   | the ORDER BY <i>column_name</i> must be one of the columns in the INDEX list of columns.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                             |          |             |                                                                          |                        |                    |                           |                                                                                          |
| VALUES                      | <p>value-ordering for the ORDER BY column.</p> <p>Select VALUES to optimize queries that return a contiguous range of values, especially for a covering index or a nested join.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                             |          |             |                                                                          |                        |                    |                           |                                                                                          |
| HASH                        | <p>hash-ordering for the ORDER BY column.</p> <p>Select HASH to limit hash-ordering to one column, rather than all columns, which is the default.</p> <p>Hash-ordering a multicolumn NUSI on one of its columns allows the NUSI to participate in a nested join where join conditions involve only that ordering column.</p>                                                                                                                                                                                                                                                                                                          |                             |          |             |                                                                          |                        |                    |                           |                                                                                          |
| <i>order_column_name</i>    | <p>a column in the INDEX list of columns that specifies the sort order to be used.</p> <p>Supported data types for a value-ordered, four-bytes-or-less <i>order_column_name</i> are:</p> <ul style="list-style-type: none"> <li>• BYTEINT</li> <li>• DATE</li> <li>• DECIMAL</li> <li>• INTEGER</li> <li>• SMALLINT</li> </ul>                                                                                                                                                                                                                                                                                                        |                             |          |             |                                                                          |                        |                    |                           |                                                                                          |

a. A multicolumn NUSI defined with an ORDER BY clause counts as two indexes in this calculation.

## ANSI Compliance

The queue table form of CREATE TABLE is a Teradata extension to the ANSI SQL-2003 standard.

## Required Privileges

You must have the CREATE TABLE privilege on the database or user in which the queue table is created.

The creator receives all the following privileges on the newly created queue table:

- CREATE TRIGGER (WITH GRANT OPTION)
- DELETE
- DROP TABLE
- DUMP
- INDEX
- INSERT
- REFERENCE
- RESTORE
- SELECT
- UPDATE

## Example 1

This example creates a simple queue table.

Note the following things about this example:

- The first column defined for the table is the QITS column.  
This is mandatory for all queue tables.
- The QITS column must be defined with a timestamp data type with exactly the same precision and default value as specified in the example.<sup>3</sup>  
This is mandatory for all queue tables.

- The QITS column is not the (nonunique) primary index for the table.

```
CREATE SET TABLE qtbl_1, QUEUE, FALLBACK,
NO BEFORE JOURNAL,
NO AFTER JOURNAL (
  col_1 TIMESTAMP(6) NOT NULL DEFAULT CURRENT_TIMESTAMP(6),
  col_2 INTEGER,
  col_3 INTEGER)
PRIMARY INDEX (col_2, col_3);
```

## Example 2

This example creates a queue table with constraints and a UPI to uniquely identify rows externally.

Note that while the definitively nonunique QITS column, col\_1\_qits, is a component of the unique primary index for the table, that index is composite, and its other component has the attributes NOT NULL and UNIQUE, ensuring that the composite primary index is unique.

```
CREATE SET TABLE qtbl_2, QUEUE, NO FALLBACK (
  col_1_qits TIMESTAMP(6) NOT NULL DEFAULT CURRENT_TIMESTAMP(6),
  col_2 INTEGER NOT NULL UNIQUE,
  col_3 INTEGER, CONSTRAINT check_1 CHECK (col_3 > 0))
UNIQUE PRIMARY INDEX primary_1 (col_1_qits, col_2);
```

3. You need not stipulate a precision for the TIMESTAMP data type specification because it defaults to 6 when no precision is stipulated; however, you *cannot* explicitly specify a precision *other* than 6 for the timestamp.

### Example 3

This example creates a multiset queue table with constraints defined at the column level:

```
CREATE MULTISET TABLE qtbl_3, QUEUE,  
  NO BEFORE JOURNAL,  
  NO AFTER JOURNAL (  
    qits  TIMESTAMP(6) NOT NULL DEFAULT CURRENT_TIMESTAMP(6),  
    col_2 INTEGER,  
    col_3 INTEGER CHECK (col_3 > 10))  
  PRIMARY INDEX (qits);
```

This queue table permits duplicate rows. The system uniquely identifies its rows, including duplicates, by their internally-generated ROWID value.

### Example 4

This example creates a queue table defined with an identity column for the queue sequence number, which is named QSN. Because the primary index for the table is simple, defined only on the QITS column, it must be defined as a NUPI (compare with [“Example 2” on page 479](#)):

```
CREATE TABLE qtbl_4, QUEUE (  
  qits  TIMESTAMP(6) NOT NULL DEFAULT CURRENT_TIMESTAMP(6),  
  qsn   INTEGER GENERATED ALWAYS AS IDENTITY (CYCLE),  
  col_3 INTEGER)  
  PRIMARY INDEX (qits);
```

The value of a QSN is expected to be unique under normal circumstances because queue table rows should be consumed at a high enough rate that the queue (which is modeled as one table row per enqueued event) does not grow large enough for the QSN value to be reused by completing a cycle through the identity column values.

### Example 5

This example creates a queue table with a UPI defined on the queue sequence number identity column, QSN, and a NUSI defined on the queue insertion timestamp, QITS:

```
CREATE TABLE qtbl_5, QUEUE (  
  qits  TIMESTAMP(6) NOT NULL DEFAULT CURRENT_TIMESTAMP(6),  
  qsn   INTEGER GENERATED ALWAYS AS IDENTITY (NO CYCLE),  
  col_3 INTEGER)  
  UNIQUE PRIMARY INDEX (qsn)  
  INDEX qits;
```

Operating under the assumption of a high rate of consumption of queue table rows as outlined in [“Example 4” on page 480](#), you would typically replace the NO CYCLE option with CYCLE. This strategy has the advantage of enabling the reuse of QSN numbers while not failing when MAXVALUE is exceeded. The UPI on QSN would then guarantee that, at any point, the value of QSN is unique.



## Related Topics

For more detailed information about the available options for creating tables, see the following references:

| FOR more information about this subject ...                                                                                                                                                                                                                               | Refer to this topic ...                                                                                                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Table kinds                                                                                                                                                                                                                                                               | “CREATE TABLE (Table Kind Clause)” in <i>SQL Data Definition Language Detailed Topics</i>                                                                                                                                            |
| Table options                                                                                                                                                                                                                                                             | “CREATE TABLE (Table Options Clause)” in <i>SQL Data Definition Language Detailed Topics</i>                                                                                                                                         |
| Column definition                                                                                                                                                                                                                                                         | “CREATE TABLE (Column Definition Clause)” in <i>SQL Data Definition Language Detailed Topics</i>                                                                                                                                     |
| Primary and secondary indexes                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>• “CREATE TABLE (Index Definition Clause)” in <i>SQL Data Definition Language Detailed Topics</i></li> <li>• <a href="#">“CREATE INDEX” on page 211</a></li> <li>• Database Design</li> </ul> |
| Error tables                                                                                                                                                                                                                                                              | <a href="#">“CREATE ERROR TABLE” on page 135</a>                                                                                                                                                                                     |
| SQL DML operations on a queue table, including the following: <ul style="list-style-type: none"> <li>• DELETE</li> <li>• INNER JOIN</li> <li>• INSERT</li> <li>• MERGE</li> <li>• OUTER JOIN</li> <li>• SELECT</li> <li>• SELECT AND CONSUME</li> <li>• UPDATE</li> </ul> | <ul style="list-style-type: none"> <li>• <i>SQL Data Manipulation Language</i></li> <li>• <i>SQL Stored Procedures and Embedded SQL</i></li> </ul>                                                                                   |



## CHAPTER 6 **CREATE TRANSFORM - CREATE VIEW**

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DDL statements define, modify, and remove database object definitions.

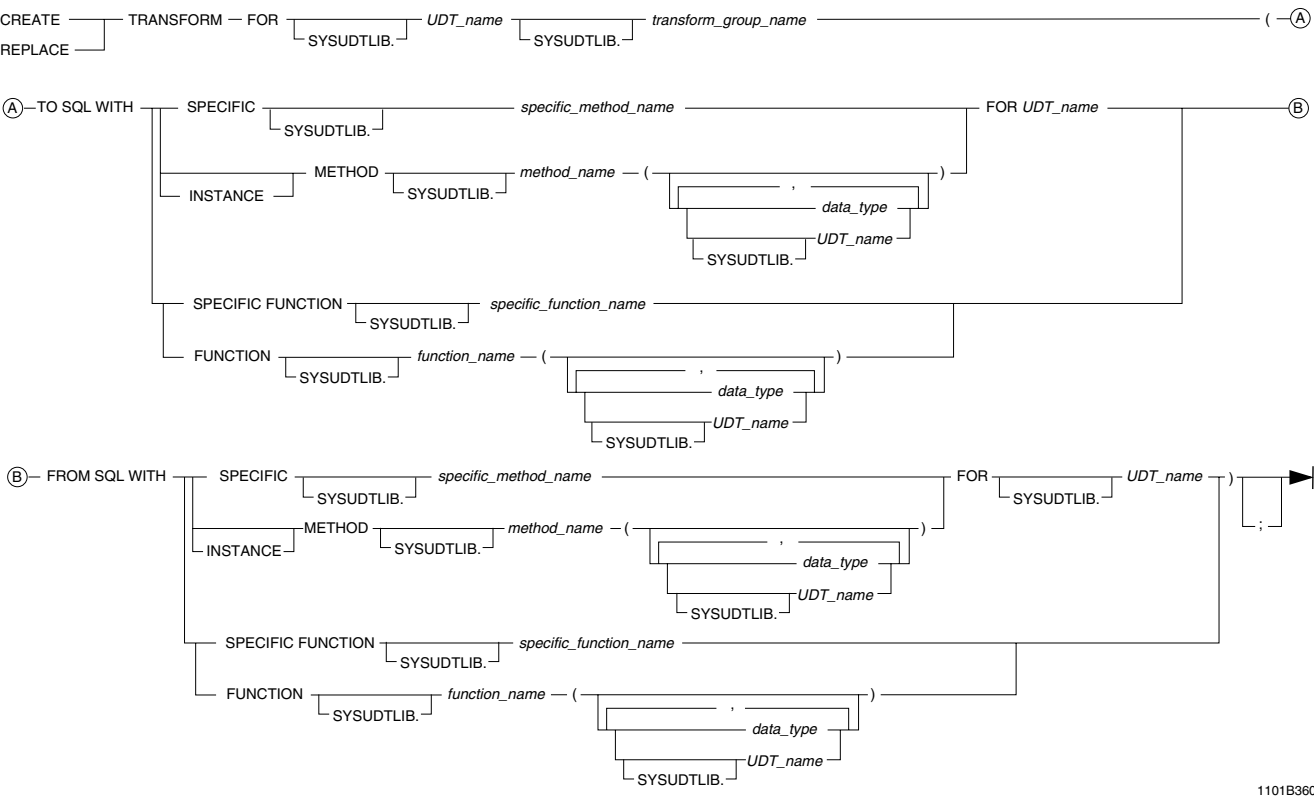
This chapter documents the syntax for, and provides examples of, the Teradata Database DDL statements from CREATE TRANSFORM through CREATE VIEW.

# CREATE TRANSFORM/ REPLACE TRANSFORM

## Purpose

Creates a transform group to handle the import and export of UDT data from a client system to the Teradata Database and from the Teradata Database to a client system.

## Syntax



where:

| Syntax element ...        | Specifies ...                                            |
|---------------------------|----------------------------------------------------------|
| FOR [SYDUDTLIB.] UDT_name | the name of the UDT associated with the transform group. |

| Syntax element ...                       | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [SYDUDTLIB.] <i>transform_group_name</i> | <p>a mandatory name for the transform group.</p> <p>The rules for naming a transform group are identical to the rules for naming any other database object with the following exception: the name of a transform group cannot begin with the characters <i>TD_</i>, which are reserved as a transform group name prefix for internal use.</p> <p>UDT transform names need not be unique across UDTs.</p> <p>Note that transform group names are <i>not</i> stored in <i>DBC.TVM</i>, but in the <i>DBC.UDTTransform</i> table.</p> |

#### tosql Clause

The tosql routine maps a predefined data type value to a UDT value. The system invokes it automatically whenever a UDT value is transferred to the Teradata Database from a client application.

Note that the external routine invoked by a tosql clause must be a UDF. It cannot be a UDM.

|                                                                             |                                                                                                              |
|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| TO SQL WITH SPECIFIC<br>[SYSUDTLIB.] <i>specific_method_name</i>            | the name of the specific method to be used as the tosql routine for this transform group.                    |
| TO SQL WITH [INSTANCE]<br>METHOD [SYSUDTLIB.]<br><i>method_name</i>         | the name of the method to be used as the tosql routine for this transform group.                             |
| ( <i>data_type</i> )                                                        | the list of data types that uniquely identifies an overloaded <i>method_name</i> for this transform group.   |
| [SYSUDTLIB.] <i>UDT_name</i>                                                | the user-defined data type list for <i>method_name</i> .                                                     |
| TO SQL WITH SPECIFIC FUNCTION<br>[SYDUDTLIB.] <i>specific_function_name</i> | the name of the specific UDF to be used as the tosql routine for this transform group.                       |
| TO SQL WITH [SYDUDTLIB.]<br><i>function_name</i>                            | the name of the UDF to be used as the tosql routine for this transform group.                                |
| TO SQL WITH SPECIFIC METHOD<br><i>specific_method_name</i>                  | the specific method name for the method to be used as the tosql routine for this transform group.            |
| TO SQL WITH [INSTANCE]<br>METHOD <i>method_name</i> ( <i>data_type</i> )    | the method name and data type list for the method to be used as the tosql routine for this transform group.  |
| ( <i>data_type</i> )                                                        | the list of data types that uniquely identifies an overloaded <i>function_name</i> for this transform group. |
| [SYSUDTLIB.] <i>UDT_name</i>                                                | the user-defined data type list for <i>function_name</i> .                                                   |

#### fromsql Clause

The fromsql routine maps a UDT value to a predefined data type value. The system invokes it automatically whenever a UDT value is transferred from the Teradata Database to a client application.

The external routine invoked by a fromsql clause can be either a UDF or a UDM.

| Syntax element ...                                                                | Specifies ...                                                                                                |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| FROM SQL WITH SPECIFIC<br>METHOD [SYSUDTLIB.]<br><i>specific_method_name</i>      | the name of the specific method to be used as the fromsql routine for this transform group.                  |
| FROM SQL WITH [INSTANCE]<br>METHOD [SYSUDTLIB.]<br><i>method_name (data_type)</i> | the name of the method to be used as the fromsql routine for this transform group.                           |
| <i>(data_type)</i>                                                                | the list of data types that uniquely identifies an overloaded <i>method_name</i> for this transform group.   |
| [SYSUDTLIB.] <i>UDT_name</i>                                                      | the user-defined data type list for <i>method_name</i> .                                                     |
| FROM SQL WITH SPECIFIC<br>FUNCTION [SYSUDTLIB.]<br><i>specific_function_name</i>  | the name of the specific UDF to be used as the fromsql routine for this transform group.                     |
| FROM SQL WITH [SYSUDTLIB.]<br><i>function_name (data_type)</i>                    | the name of the UDF to be used as the fromsql routine for this transform group.                              |
| <i>(data_type)</i>                                                                | the list of data types that uniquely identifies an overloaded <i>function_name</i> for this transform group. |
| [SYSUDTLIB.] <i>UDT_name</i>                                                      | the user-defined data type list for <i>function_name</i> .                                                   |

## ANSI Compliance

CREATE TRANSFORM is ANSI SQL:2008-compliant.

REPLACE TRANSFORM is a Teradata extension to the ANSI SQL-2003 standard.

## Required Privileges

You must have at least one of the following privileges on the *SYSUDTLIB* database to perform CREATE TRANSFORM or REPLACE TRANSFORM:

- UDTMETHOD
- UDTTYPE

If any of the specified external routines is a UDF, then you must also have the EXECUTE FUNCTION privilege on the UDF, and the UDF must be contained within the *SYSUDTLIB* database.

## Example

The following CREATE TRANSFORM statement creates the transform group named *client\_IO*, which is composed of the tosql transform *stringToAddress* and the fromsql transform *toString* for the UDT named *address*.

```
CREATE TRANSFORM FOR address client_IO (
  TO SQL WITH SPECIFIC FUNCTION SYSUDTLIB.stringToAddress,
  FROM SQL WITH SPECIFIC METHOD toString);
```

## Related Topics

See the documentation for the following statements, as appropriate, for additional information about user-defined data types:

- [“ALTER FUNCTION” on page 16](#)
- [“ALTER TYPE” on page 71](#)
- [“CREATE CAST/ REPLACE CAST” on page 125](#)
- [“CREATE METHOD” on page 259](#)
- [“CREATE ORDERING/ REPLACE ORDERING” on page 272](#)
- [“CREATE TYPE \(Distinct Form\)” on page 507](#)
- [“CREATE TYPE \(Structured Form\)” on page 515](#)
- [“DROP CAST” on page 554](#)
- [“DROP ORDERING” on page 577](#)
- [“DROP TRANSFORM” on page 591](#)
- [“DROP TYPE” on page 592](#)
- [“REPLACE METHOD” on page 640](#)
- [“HELP CAST” on page 693](#)
- [“HELP METHOD” on page 735](#)
- [“HELP TRANSFORM” on page 775](#)
- [“HELP TYPE” on page 779](#)

See the documentation for the following statements, as appropriate, for additional information about user-defined functions:

- [“ALTER FUNCTION” on page 16](#)
- [“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120](#)
- [“CREATE FUNCTION/ REPLACE FUNCTION” on page 138](#)
- [“CREATE FUNCTION \(Table Form\)” on page 161](#)
- [“DROP AUTHORIZATION” on page 553](#)
- [“DROP FUNCTION” on page 562](#)
- [“HELP FUNCTION” on page 715](#)

See *SQL Functions, Operators, Expressions, and Predicates* for information about the standard SQL CAST function and its uses with predefined data types.

See *SQL External Routine Programming* for information about coding methods for external routines to support UDMs and UDFs.

See the following Teradata Tools and Utilities manuals for details about how the software they document deals with UDTs:

- *Teradata Archive/Recovery Utility Reference*
- *Basic Teradata Query Reference*
- *Teradata FastExport Reference*
- *Teradata FastLoad Reference*
- *Teradata JDBC Driver User Guide*
- *Teradata MultiLoad Reference*
- *ODBC Driver for Teradata User Guide*
- *Teradata Preprocessor2 for Embedded SQL Programmer Guide*
- *Teradata Parallel Data Pump Reference*
- *Teradata Parallel Transporter Reference*
- *Teradata Tools and Utilities Access Module Reference*



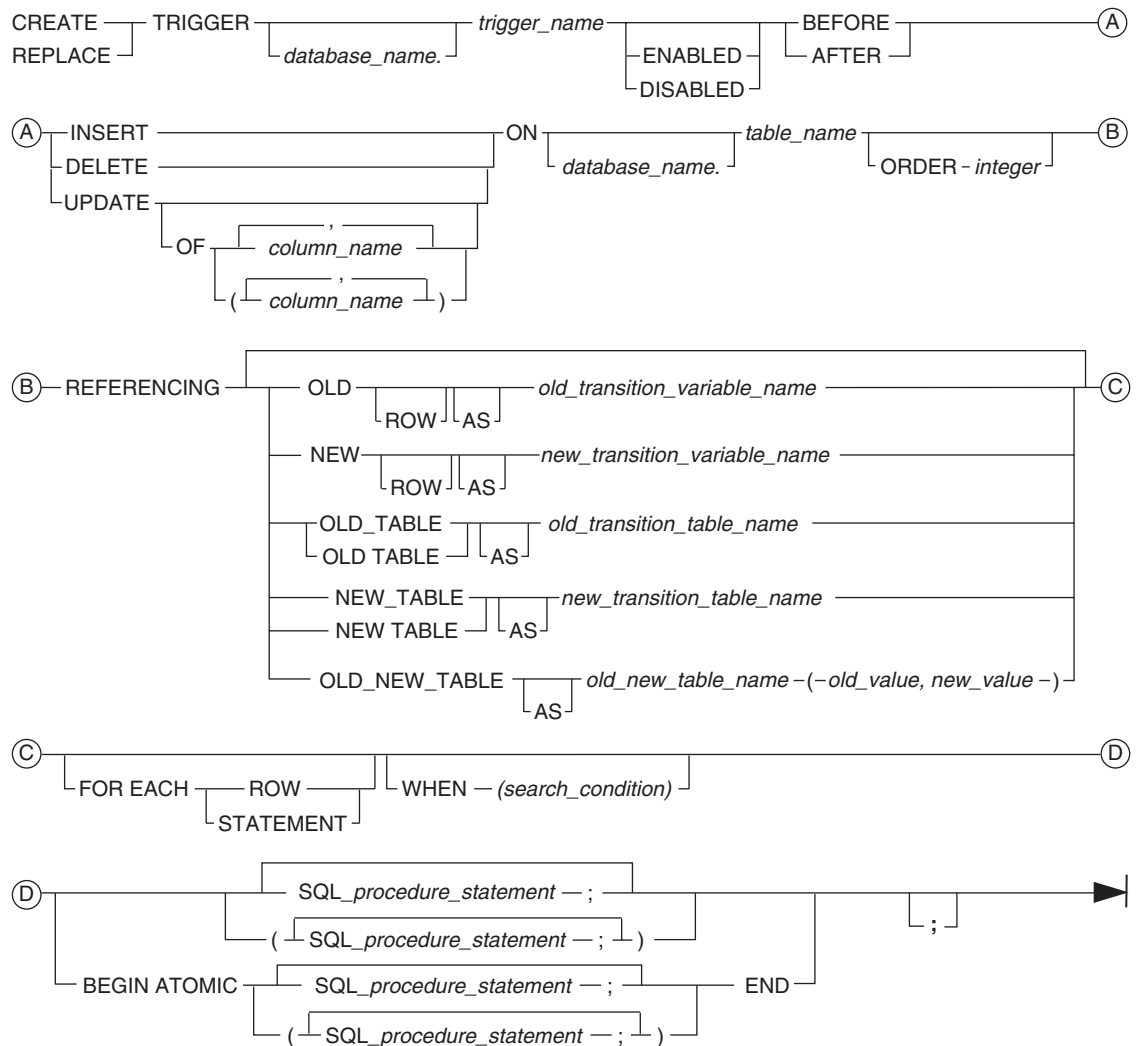
# CREATE TRIGGER/ REPLACE TRIGGER

## Purpose

CREATE TRIGGER creates a new trigger definition.

REPLACE TRIGGER changes the definition for a trigger without having to drop and recreate it.

## Syntax



1101D202

where:

| Syntax Element ...                                                                                                     | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                 |                            |     |                                                                          |           |                                       |
|------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|----------------------------|-----|--------------------------------------------------------------------------|-----------|---------------------------------------|
| <i>database_name</i>                                                                                                   | an optional qualifier for the <i>trigger_name</i> .<br>A <i>database_name</i> is required if the trigger is being created in a database other than the default for the current user.                                                                                                                                                                                                                                                                                                                        |                                 |                            |     |                                                                          |           |                                       |
| <i>trigger_name</i>                                                                                                    | the name of the trigger to being created or replaced.<br>A <i>trigger_name</i> must be unique within the database in which it is created.                                                                                                                                                                                                                                                                                                                                                                   |                                 |                            |     |                                                                          |           |                                       |
| ENABLED                                                                                                                | the keyword that enables a trigger to execute.<br>ENABLED is the default.                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                 |                            |     |                                                                          |           |                                       |
| DISABLED                                                                                                               | the keyword that disables a trigger from executing.<br>The definition of a disabled trigger remains is not dropped, but it must be enabled before it can execute (see <a href="#">“ALTER TRIGGER” on page 69</a> ).                                                                                                                                                                                                                                                                                         |                                 |                            |     |                                                                          |           |                                       |
| BEFORE                                                                                                                 | that the trigger performs <i>before</i> the triggering event, or triggering statement, is executed. <table border="1"> <thead> <tr> <th>This type of BEFORE trigger ...</th><th>Has these restrictions ...</th></tr> </thead> <tbody> <tr> <td>row</td><td>cannot have data-changing statements as triggered action SQL statements.</td></tr> <tr> <td>statement</td><td>is not valid under any circumstances.</td></tr> </tbody> </table> <p>Teradata Database returns an error message in both cases.</p> | This type of BEFORE trigger ... | Has these restrictions ... | row | cannot have data-changing statements as triggered action SQL statements. | statement | is not valid under any circumstances. |
| This type of BEFORE trigger ...                                                                                        | Has these restrictions ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                 |                            |     |                                                                          |           |                                       |
| row                                                                                                                    | cannot have data-changing statements as triggered action SQL statements.                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                 |                            |     |                                                                          |           |                                       |
| statement                                                                                                              | is not valid under any circumstances.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                 |                            |     |                                                                          |           |                                       |
| AFTER                                                                                                                  | that the trigger performs <i>after</i> the triggering event.                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                 |                            |     |                                                                          |           |                                       |
| Triggering Event                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                 |                            |     |                                                                          |           |                                       |
| A triggering event, or triggering statement, can be an INSERT, DELETE, UPDATE, or MERGE statement, as described below: |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                 |                            |     |                                                                          |           |                                       |
| INSERT                                                                                                                 | that the triggering event for this trigger is one of the following: <ul style="list-style-type: none"> <li>• INSERT</li> <li>• INSERT... SELECT</li> <li>• Atomic Upsert</li> <li>• MERGE</li> </ul>                                                                                                                                                                                                                                                                                                        |                                 |                            |     |                                                                          |           |                                       |
| DELETE                                                                                                                 | that the triggering event for this trigger is a DELETE.                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                 |                            |     |                                                                          |           |                                       |

| Syntax Element ...                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UPDATE                                  | <p>that the triggering statement for this trigger is one of the following:</p> <ul style="list-style-type: none"> <li>• UPDATE</li> <li>• Atomic Upsert</li> <li>• MERGE</li> </ul> <p>Any number of rows, including none, can be updated.</p>                                                                                                                                                                                                                              |
| <i>column_name</i>                      | <p>the name of a column in a set of column names.</p> <p>The trigger fires when any column in the list is updated.</p> <p>You can optionally enclose the list in parentheses.</p> <p>If you do not specify a column name list, the default is all columns.</p> <p>The list cannot contain duplicate column names.</p> <p>The <i>column_name</i> list does not apply to INSERT or DELETE triggering events.</p>                                                              |
| <i>database_name</i>   <i>user_name</i> | <p>an optional qualifier for the subject table.</p> <p>If the subject table is in a database or user other than the default for the current user, then this specification is mandatory.</p>                                                                                                                                                                                                                                                                                 |
| <i>table_name</i>                       | <p>the name of the subject table with which this trigger is associated.</p> <p><i>table_name</i> must be the name of an existing base table.</p> <p>The object referenced by <i>table_name</i> cannot be any of the following:</p> <ul style="list-style-type: none"> <li>• global temporary table</li> <li>• volatile table</li> <li>• trace table</li> <li>• queue table</li> <li>• view</li> <li>• recursive view</li> <li>• hash index</li> <li>• join index</li> </ul> |
| ORDER                                   | <p>a keyword allowing you to control the order of trigger execution within a request when multiple triggers are defined on a subject table.</p> <p>ORDER values determine the execution sequence when two or more triggers have the identical trigger action time and trigger event.</p> <p>If triggers have the same ORDER value, trigger action time, and trigger event, then <i>they execute in</i> order of their creation timestamp.</p>                               |
| <i>integer</i>                          | <p>the value assigned to ORDER.</p> <p>The value must be any positive small integer not greater than 32,767.</p> <p>If the ORDER clause is not specified, the system assigns a default value of 32,767 to the trigger.</p>                                                                                                                                                                                                                                                  |

| Syntax Element ...                                                                                                                                                                                            | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>REFERENCING Clause</b>                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| The REFERENCING clause allows the WHEN condition and the triggered actions of a trigger to reference the set of rows in one or more transition tables. The REFERENCING clause is optional and has no default. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| OLD [ROW]                                                                                                                                                                                                     | <p>an introduction to a correlation name for the current row <i>before</i> it is modified. The current row is called a transition row. The ROW keyword is optional.</p> <p>You can specify OLD or OLD ROW only for ROW triggers.</p> <p>OLD and OLD ROW are valid only for DELETE, MERGE UPDATE, and UPDATE triggering events.</p>                                                                                                                                             |
| [AS] <i>old_transition_variable_name</i>                                                                                                                                                                      | a row alias name specified with the OLD [ROW] option used for referencing old values in the current row of the transition table.                                                                                                                                                                                                                                                                                                                                               |
| NEW [ROW]                                                                                                                                                                                                     | <p>an introduction to a correlation name for the current row <i>after</i> it is modified. The current row is called a transition row. The ROW keyword is optional.</p> <p>You can specify NEW or NEW ROW only for ROW triggers.</p> <p>NEW and NEW ROW are valid only for INSERT, MERGE INSERT, MERGE UPDATE, and UPDATE triggering events.</p>                                                                                                                                |
| [AS] <i>new_transition_variable_name</i>                                                                                                                                                                      | a row alias name specified with the NEW [ROW] option used for referencing new values in the current row of the transition table.                                                                                                                                                                                                                                                                                                                                               |
| OLD TABLE<br>OLD_TABLE                                                                                                                                                                                        | <p>equivalent introductions to a table correlation name for the old values transition table.</p> <p>OLD TABLE is the form specified by the ANSI SQL-2003 standard.</p> <p>OLD_TABLE is a Teradata extension retained for backward compatibility.</p> <p>You can specify OLD_TABLE or OLD TABLE references in both statement triggers and row triggers.</p> <p>OLD_TABLE and OLD TABLE are valid only for DELETE, MERGE UPDATE, and UPDATE triggering events.</p>               |
| [AS] <i>old_transition_table_name</i>                                                                                                                                                                         | a table alias name specified with the OLD TABLE or OLD_TABLE options for referencing the transition table of old values.                                                                                                                                                                                                                                                                                                                                                       |
| NEW TABLE<br>NEW_TABLE                                                                                                                                                                                        | <p>equivalent introductions to a table correlation name for the new values transition table.</p> <p>NEW TABLE is the form specified by the ANSI SQL:2008 standard.</p> <p>NEW_TABLE is a Teradata extension retained for backward compatibility.</p> <p>You can specify NEW_TABLE or NEW TABLE references in both statement triggers and row triggers.</p> <p>NEW_TABLE and NEW TABLE are valid only for INSERT, MERGE INSERT, MERGE UPDATE, and UPDATE triggering events.</p> |

| Syntax Element ...                    | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [AS] <i>new_transition_table_name</i> | a table alias name specified with the NEW TABLE or NEW_TABLE options for referencing the transition table of new values.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| OLD_NEW_TABLE                         | <p>introduction to a table correlation name for the old new values transition table.</p> <p>You can only specify an OLD_NEW_TABLE reference for an AFTER UPDATE trigger.</p> <p>This clause provides two advantages for statement triggers over the NEW TABLE and OLD TABLE syntax:</p> <ul style="list-style-type: none"> <li>• Enables a statement trigger to store all the old and new values in a single row.</li> <li>• Eliminates the need for a self-join between the transition table and itself.</li> <li>• Enables the capability to compare the old value with its corresponding new value in the affected row rather than comparing the old value with the new values in all affected new rows.</li> </ul> |
| [AS] <i>old_new_table_name</i>        | a table alias name specified with the OLD_NEW_TABLE option for referencing the transition table of old and new values in the same row.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <i>old_value</i>                      | an alias you can use to reference specific old value columns of the row in the old new table transition table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <i>new_value</i>                      | an alias you can use to reference specific new value columns of the row in the old new table transition table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| FOR EACH ROW                          | <p>keywords specifying that the trigger is to fire for each qualified row. That is, each row that evaluates to TRUE for any WHEN condition specified for the trigger.</p> <p>FOR EACH STATEMENT is the default.</p> <p>See the CREATE TRIGGER topic “When To Use Row Triggers” in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                                                                                                                                                             |
| FOR EACH STATEMENT                    | <p>keywords specifying that the trigger is to fire once per processed SQL statement in the request whenever a WHEN condition for the trigger evaluates to TRUE.</p> <p>FOR EACH STATEMENT is the default.</p> <p>See the CREATE TRIGGER topic “When to Use Statement Triggers” in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                                                                                                                                                             |
| WHEN                                  | <p>a keyword introducing a search condition clause to refine the conditions that fire the trigger.</p> <p>This clause is optional and has no default.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

| Syntax Element ...                          | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                             |                                         |      |                                         |       |                                                |         |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|-----------------------------------------|------|-----------------------------------------|-------|------------------------------------------------|---------|
| ( <i>search_condition</i> )                 | <p>logic that further refines the conditions for firing the trigger.</p> <p><i>search_condition</i> is any valid search condition based on comparisons of items within the scope of the trigger definition. This includes UDT comparisons as long as orderings have been defined for the UDTs (see <a href="#">“CREATE ORDERING/ REPLACE ORDERING” on page 272</a>).</p> <p>If the trigger is a row trigger, then <i>search_condition</i> is based on row correlation names for the current row.</p> <p>If <i>search_condition</i> specifies a subquery, then it can contain aggregates; otherwise, aggregates are not valid as part of a WHEN clause search condition specification.</p> <p>This is important because any time you reference an OLD TABLE or NEW TABLE transition table from a WHEN clause search condition, the predicate must be expressed as a subquery. Because a WHEN condition must provide a <i>single</i> result, the typical use of OLD TABLE and NEW TABLE column references is with aggregates.</p> <p>Like all other SQL conditions, the condition is Boolean. Therefore, any expression that does not evaluate to TRUE or FALSE is not valid either as a search condition or as a cursor name.</p> <p><i>search_condition</i> is evaluated once for each:</p> <ul style="list-style-type: none"> <li>• execution of the triggering statement for statement triggers</li> <li>• row of the transition table of changed rows for row triggers</li> </ul> <p>Whether a triggered action is taken or not depends on the evaluation of the search condition result, as described by the following table:</p> <table> <tr> <th>IF <i>search_condition</i> evaluates to ...</th><th>THEN the evaluated statement or row ...</th></tr> <tr> <td>TRUE</td><td>qualifies to fire the triggered action.</td></tr> <tr> <td>FALSE</td><td rowspan="2">does not qualify to fire the triggered action.</td></tr> <tr> <td>unknown</td></tr> </table> | IF <i>search_condition</i> evaluates to ... | THEN the evaluated statement or row ... | TRUE | qualifies to fire the triggered action. | FALSE | does not qualify to fire the triggered action. | unknown |
| IF <i>search_condition</i> evaluates to ... | THEN the evaluated statement or row ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |                                         |      |                                         |       |                                                |         |
| TRUE                                        | qualifies to fire the triggered action.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |                                         |      |                                         |       |                                                |         |
| FALSE                                       | does not qualify to fire the triggered action.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                             |                                         |      |                                         |       |                                                |         |
| unknown                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                             |                                         |      |                                         |       |                                                |         |

| Syntax Element ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Specifies ...                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Triggered SQL Statement Clause</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                            |
| <p>The triggered SQL statement clause is composed of one or more SQL procedure statements.</p> <p>The ANSI SQL:2008 specification requires multiple statements to be enclosed within the BEGIN ATOMIC and END keywords. The Teradata Database complies with this, and also allows you to specify multiple SQL procedure statements without the BEGIN ATOMIC and END keywords.</p> <p>Each triggered action statement in an SQL procedure statement list must be terminated by a SEMICOLON (;) character.</p> <p>You can specify the list of SQL procedure statements either enclosed or not enclosed by parentheses.</p> <p>If you are typing the SQL text using BTEQ and you specify the list of SQL procedure statements without enclosing it in parentheses, then the SEMICOLON character terminating each statement must be typed at the beginning of the next line following the statement line. The next triggered action statement in the list must be continued in the same line as the SEMICOLON character.</p> <p>UDT expressions are valid in triggered SQL statements.</p> |                                                                                                                                                                                                                            |
| BEGIN ATOMIC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <p>a keyword introducing multiple triggered action statements.</p> <p>If you begin the triggered SQL statement clause with BEGIN ATOMIC, then you must also terminate it with the END keyword.</p>                         |
| <i>SQL_procedure_statement</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | one or more valid triggered action statements. See the CREATE TRIGGER topic “Triggered Action Statements” in <i>SQL Data Definition Language Detailed Topics</i> for a list of the valid statements for each trigger type. |
| END                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p>a keyword terminating the statement block introduced by the BEGIN ATOMIC keywords.</p> <p>If you use BEGIN ATOMIC, then you must also specify END to terminate the triggered SQL statements clause.</p>                 |

## ANSI Compliance

CREATE TRIGGER is ANSI SQL-2008-compliant with extensions.

REPLACE TRIGGER is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

To create a trigger, you must have the following privileges:

- CREATE TRIGGER on both of the following:
  - The database in which the trigger is created.
  - Either the subject table or its containing database.
- SELECT on any column referenced in a WHEN clause or a triggered SQL statement subquery.
- Depending on the triggered SQL statement, INSERT, UPDATE, or DELETE on the triggered SQL statement target table.
- The access rights that would normally be required to execute the individual triggered SQL statements.

Creating or replacing a trigger does not grant trigger-related privileges to either the creator or the immediate owner of that trigger.

To replace a trigger you must have the following privileges:

- DROP TRIGGER on the subject table or the database.

The exception is when you use REPLACE TRIGGER when no target trigger exists and you instead create a new trigger.

In that case, you need the CREATE TRIGGER privilege on both of the following:

  - The database in which the trigger is created.
  - Either the subject table or its containing database.
- SELECT on any column referenced in a WHEN clause or a triggered SQL statement subquery.
- Depending on the triggered SQL statement, INSERT, UPDATE, or DELETE on the triggered SQL statement target table.
- The access rights that would normally be required to execute the individual triggered SQL statements.

The following privilege requirements apply to any user, other than the immediate owner, who performs a triggering statement:

- You must have the privileges required to execute that triggering statement, and the immediate owner of the trigger must also hold all the privileges required to create the trigger.
- If you have the required privileges for the triggering statement, but the immediate owner of the trigger no longer has the privileges required to perform the triggered action statements, then neither you nor any other user can run the triggering statement.

## Privileges Granted Automatically

None.



## Example 1: Ensure That Parent Table Updates Propagate to Its Child

Suppose you want to ensure that all UPDATES and DELETES to a parent table are propagated to a child table. This example, which is designed to enforce referential integrity procedurally, defines two AFTER statement triggers on the parent table to ensure that primary key updates to the parent table propagate to the appropriate foreign key column in a child table.

These are the table definitions:

```

CREATE TABLE parent_tab (
    prime_key INTEGER,
    column_2   INTEGER,
    column_3   INTEGER)
UNIQUE PRIMARY INDEX (prime_key);

CREATE TABLE child_tab (
    prime_key INTEGER,
    for_key   INTEGER,
    column_3   INTEGER
FOREIGN KEY (for_key) REFERENCES WITH NO CHECK OPTION
Parent_Tab(prime_key));

```

Now define the triggers on Parent\_Tab, the subject table:

```

CREATE TRIGGER UpdateForKey
AFTER UPDATE OF prime_key ON parent_tab
REFERENCING OLD TABLE AS OldTable NEW TABLE AS NewTable
FOR EACH STATEMENT
    (UPDATE child_tab
    SET for_key=NewTable.prime_key
    WHERE child_tab.for_key=OldTable.prime_key);

CREATE TRIGGER DelForKey
AFTER DELETE ON parent_tab
REFERENCING OLD TABLE AS OldTable
FOR EACH STATEMENT
    (UPDATE child_tab
    SET for_key=NULL
    WHERE for_key=OldTable.prime_key);

```

## Example 2: Audit Log for Large Pay Raises

Triggers are particularly useful for audits of all kinds. This example shows an AFTER row trigger that inserts a log record whenever an employee gets a raise larger than ten percent.

These are the table definitions:

```

CREATE TABLE employee (
    name      CHARACTER(30),
    dept_Id   INTEGER,
    salary     DECIMAL(10,2),
    comments   CHARACTER(30));

CREATE TABLE salary_log (
    user_name  CHARACTER(30),
    emp_name   CHARACTER(30),
    old_salary DECIMAL(10,2),
    new_salary DECIMAL(10,2));

```

Now define the trigger on the *employee* table:

```
CREATE TRIGGER RaiseTrig
AFTER UPDATE OF salary ON employee
REFERENCING OLD AS OldRow NEW AS NewRow
FOR EACH ROW
WHEN ((NewRow.salary-OldRow.salary)/OldRow.salary >.10)
INSERT INTO salary_log
VALUES ('USER', NewRow.name, OldRow.salary, NewRow.salary);
```

When the following requests are processed, two inserts are made to *salary\_log*. The third update does not meet the WHEN condition of the trigger, so no corresponding row is inserted in *salary\_log*.

```
UPDATE employee
SET salary = salary*1.5, comments = 'Employee of the Year'
WHERE name = 'John Smith';

UPDATE employee
SET salary = salary*2, comments = 'Employee of the Decade'
WHERE name = 'Min Chan';

UPDATE employee
SET salary = salary*1.05, comments = 'Normal midrange raise'
WHERE name = 'Lev Ulyanov';
```

### Example 3: Using a SET Clause

This example uses a SET clause as a triggered action statement in a BEFORE row trigger.

This is the subject table definition. Assume that values are loaded into the amount column of the table from a source file employing a USING ... INSERT statement.

```
CREATE TABLE subject_table (
    entry_date DATE,
    amount      INTEGER);
```

This is the trigger definition:

```
CREATE TRIGGER set_trig
BEFORE INSERT ON subject_table
REFERENCING NEW AS curr_value
FOR EACH ROW
SET curr_value.entry_date = DATE;
-- Adds the current system date to the entry_date column
```

Because of the SET clause assignment, the following triggering statement:

```
USING (amount INTEGER)
INSERT INTO subject_table VALUES (NULL, :amount);
```

executes as if it were *this* statement:

```
USING (thisdate DATE, amount INTEGER)
INSERT INTO subject_table VALUES (:thisdate, :amount);
```

## Example 4: Cascaded Triggers

This example demonstrates how one triggered action statement can cause another trigger to fire.

These are the table definitions:

```
CREATE TABLE tab1 (  
  a INTEGER,  
  b INTEGER,  
  c INTEGER);  
  
CREATE TABLE tab2 (  
  d INTEGER,  
  e INTEGER,  
  f INTEGER);  
  
CREATE TABLE tab3 (  
  g INTEGER,  
  h INTEGER,  
  i INTEGER);
```

These are the trigger definitions:

```
CREATE TRIGGER trig1  
AFTER INSERT ON tab1  
  REFERENCING NEW AS NewRow  
FOR EACH ROW  
(  
  INSERT INTO tab2  
  VALUES (NewRow.a + 10, NewRow.b + 10, NewRow.c);  
);  
  
CREATE TRIGGER trig2  
AFTER INSERT ON tab2  
  REFERENCING NEW AS NewRow  
FOR EACH ROW  
(  
  INSERT INTO tab3  
  VALUES (NewRow.d + 100, NewRow.e + 100, NewRow.f);  
);
```

Now, suppose the following INSERT request is submitted:

```
INSERT INTO tab1 VALUES (1,2,3);
```

This triggering event fires a trigger to insert into *tab2*. This operation is equivalent to the following INSERT statement:

```
INSERT INTO tab2 VALUES (11,12,3);
```

This triggering event fires a trigger to insert into *tab3*. This operation is equivalent to the following INSERT statement:

```
INSERT INTO tab3 VALUES (111,112,3);
```

### Example 5: Valid WHEN Clause

The following WHEN clause is valid because an aggregate appears on the right-hand side of the search condition, and the left-hand side of the inequality condition is a constant.

```
CREATE TRIGGER TrigWhen
AFTER INSERT ON t1
REFERENCING NEW AS NewRow
FOR EACH ROW
WHEN (10 >
      (SELECT SUM(b)
       FROM t2
       WHERE t2.c < 5)
)
ABORT;
```

If you insert values into *t1* and the WHEN condition is satisfied, then the triggered action statement, ABORT, performs and a failure message is returned.

```
INSERT INTO t1 (1, 1, 1);

*** Failure 3514 User-generated transaction ABORT.
```

### Example 6: Non-Valid WHEN Clause

The following CREATE TRIGGER request fails because the WHEN condition contains an aggregate function, but is not specified in a subquery:

```
CREATE TRIGGER trigwhen2
AFTER INSERT ON t1
REFERENCING NEW_TABLE AS NewTab
FOR EACH STATEMENT
WHEN (10 < MAX(NewTab.a))
ABORT;
```

```
*** Failure 5430 The Trigger WHEN clause cannot contain an aggregate
or table reference.
```

### Example 7: Valid Use of Subquery in WHEN Clause

The following CREATE TRIGGER request succeeds because its WHEN clause aggregate function is specified as part of a subquery:

Note that the aggregate subquery is on the right hand side of the inequality condition, as it must be.

```
CREATE TRIGGER trigwhen3
BEFORE INSERT ON t1
REFERENCING OLD AS previous
FOR EACH ROW
WHEN (previous.a <=
      (SELECT SUM(b)
       FROM t2, t3
       WHERE t2.c = t3.c)
)
ABORT;
```

### Example 8: Non-Valid Use of Subquery in WHEN Clause

The following WHEN clause is not valid because the subquery in the search condition returns multiple values and therefore cannot evaluate to either TRUE or FALSE:

```
CREATE TRIGGER trigwhen4
AFTER INSERT ON t1
REFERENCING NEW AS NewRow
FOR EACH ROW
WHEN (t2.a >
      (SELECT b
       FROM t2
       WHERE t2.c < 5)
      )
ABORT;
```

If you insert multiple values into *t1*, the SELECT request returns an “unknown” response, which the WHEN condition cannot evaluate, and the transaction fails.

```
*** Failure 3669 More than one value was returned by a subquery.
```

### Example 9: OLD\_NEW\_TABLE AFTER UPDATE Trigger

The following OLD\_NEW\_TABLE trigger definition is equivalent to the OLD\_TABLE, NEW\_TABLE trigger definition that follows it in terms of functionality; however, the OLD\_NEW\_TABLE syntax eliminates a join between OLD\_TABLE and NEW\_TABLE in the subquery, which makes it more performant.

```
CREATE TRIGGER inventory_trigger AFTER UPDATE ON inventory
REFERENCING OLD_NEW_TABLE AS OldNewTab (OldValue, NewValue)
(ININSERT INTO InventoryLogTbl
 SELECT OldValue.ProductKey,
        OldValue.AvailQty,
        NewValue.AvailQty
 FROM OldNewTab);

CREATE TRIGGER inventory_trigger AFTER UPDATE ON inventory
REFERENCING OLD_TABLE AS OldTab
          NEW_TABLE AS NewTab
(ININSERT INTO InventoryLogTbl
 SELECT OldTab.ProductKey,
        OldTab.AvailQty,
        NewTab.AvailQty
 FROM OldTab, NewTab
 WHERE OldTab.ProductKey = NewTab.ProductKey);
```

### Example 10: Calling a Stored Procedure From Within a Trigger

The following trigger is used to track changes to documents. There is a document table and a journal table. As changes are made to the document table, the trigger changes the journal table. A separate application processes and removes rows from the journal table. The trigger ensures that there is at most one row in the journal table for each corresponding row in the document table. So, if a document is changed more than once, then the trigger maintains a single journal row for that document.

```
CREATE TABLE document_table (
    docnum    INTEGER,
    document  BLOB)
UNIQUE PRIMARY INDEX(docnum);

CREATE TABLE document_journal_table (
    docnum INTEGER,
    action CHARACTER(1))
UNIQUE PRIMARY INDEX(docnum);

CREATE TRIGGER log_inserts_to_doc AFTER INSERT ON document_table
REFERENCING new AS new_row
FOR EACH ROW
BEGIN ATOMIC
    CALL insert_doc_journal( new_row.docnum );
END;

CREATE PROCEDURE insert_doc_journal(IN docnum INTEGER)
BEGIN
    DECLARE num_delete_journal_records INTEGER;

    SELECT COUNT(docnum) INTO :num_delete_journal_records
    FROM document_journal_table
    WHERE docnum=:docnum
    AND   action = 'D';

    IF num_delete_journal_records > 0 THEN
        -- We have a delete journal record.  So, this document
        -- was previously deleted and now they are inserting it.
        -- A delete followed by an insert is really an update so
        -- remove the delete journal record and add an update
        -- change the journal record

        UPDATE document_journal_table
        SET action = 'U'
        WHERE docnum = :docnum;
    ELSE
        -- We either have no journal records or we have an insert or
        -- update record. An insert followed by an insert is still an
        -- insert. An insert followed by an update is really an insert
        -- so remove any journal record and add an insert journal
        -- record.

        UPDATE document_journal_table
        SET action = 'I'
        WHERE docnum = :docnum;
        ELSE INSERT INTO document_journal_table VALUES (:docnum,'I');
    END IF;
END;
```

## Example 11: Calling a UDF From a Trigger

The following example calls a user-defined function (internal form) named *firstlerr* from a trigger.

The relevant CREATE TABLE definitions are as follows:

```

CREATE TABLE trg_udf007_04 (
    a INTEGER,
    b FLOAT);

CREATE TABLE trg_udf007_03 (
    a INTEGER,
    b FLOAT);

CREATE TABLE trg_udf007_01 (
    a INTEGER,
    b FLOAT);

```

Now insert a row into *trg\_udf007\_01*:

```

INSERT INTO trg_udf007_01 VALUES (4, 2.5);

```

Create the following UDF body:

```

#define SQL_TEXT Latin_Text
#include <udfdefs.h>
/* Select statement:
CREATE FUNCTION firstlerr(integer, float)
RETURNS float
LANGUAGE C
NO SQL
EXTERNAL NAME 'sc:firstlerr:firstlerr.c';
*/
void firstlerr(INTEGER *a,
               FLOAT *b,
               FLOAT *result,
               int *indc_a,
               int *indc_b,
               int *indc_result,
               char sqlstate[6],
               SQL_TEXT extname[129],
               SQL_TEXT specific_name[129],
               SQL_TEXT error_message[257])
{
    if (*indc_a == -1 || *indc_b == -1)
    {
        *indc_result = -1;
        return;
    }
    *result = *a + *b;
    *indc_result = 0;
    /* handle warning */
    if (*a == -1 )
    {
        strcpy(sqlstate, "01H01");
        strcpy((char *) error_message, "You have been warned no nulls");
        return;
    }
}

```

```
        /* create a divide fault */
    if (*a == -2 )
    {
        int  f2 = 2;
        int  f1 = 0;
volatile      int  f3 = 99999;
        f3 = f2/f1;
        if (f3 < 0)
            f3 = 5;
        return;
    }
    if ( *result < 0.0 )
    {
        strcpy(sqlstate, "22H01");
        strcpy((char *) error_message, "This is a user created error.");
        return;
    }
}
```

Create the following trigger:

```
CREATE TRIGGER trg_udf007_01_trigger
AFTER INSERT ON trg_udf007_03
REFERENCING NEW AS cur
FOR EACH ROW
WHEN ( 11 > firstlerr(cur.a, cur.b))
(
    INSERT INTO trg_udf007_04 (cur.a, cur.b);
);
```

Note that the WHEN clause of this trigger definition calls the UDF named *firstlerr*.

Now perform the following INSERT request:

```
INSERT INTO trg_udf007_03
SELECT *
FROM trg_udf007_01;
```

The output produces one row in *trg\_udf007\_03* and one row in *trg\_udf007\_04*.

## Example 12

The following example adds new California customers to a mailing list using UDTs:

```
CREATE TRIGGER CA_Mailing_list
AFTER INSERT ON customer
REFERENCING NEW AS NewRow
FOR EACH ROW
WHEN (NewRow.address.state() = 'CA')
INSERT INTO MailingAddresses
VALUES (NewRow.Name.Last(), NewRow.Name.First(), NewRow.address);
```



### Example 13

The following example sets a UDT employee address to a default if the inserted address is null:

```

CREATE TRIGGER DefaultEmployeeAddress
BEFORE INSERT ON Employee
REFERENCING NEW AS NewRow
FOR EACH ROW
WHEN (NewRow.address IS NULL)
SET NewRow.address =
    address().street('17095 Via Del Campo').zip('92127');

```

### Example 14: Dynamic UDT Input From a Trigger

The following example creates an AFTER INSERT row trigger that specifies a NEW VARIANT\_TYPE constructor expression in its WHEN clause.

First, create the trigger.

```

CREATE TRIGGER Dyn_TestTrigger02
AFTER INSERT ON Source_DynTriggerTest2
REFERENCING NEW AS NewRow
FOR EACH ROW
WHEN (scalar001dynRtnint_1p(NEW VARIANT_TYPE(NewRow.a AS a,
  NewRow.b AS b))<8)

INSERT INTO Target_DynTriggerTest2
VALUES (1,NewRow.a,NewRow.b);

*** Trigger has been created.
*** Total elapsed time was 1 second.

```

Assume that there are no rows in *Target\_DynTriggerTest2*. Now insert a row into *Source\_DynTriggerTest2*, which invokes the newly created trigger, *Dyn\_TestTrigger02*, to insert a row into *Target\_DynTriggerTest2* if the evaluation of the scalar UDF *scalar001dynRtnint\_1p* satisfies the specified WHEN clause condition.

```

INSERT INTO Source_DynTriggerTest2 VALUES (3,3,3);

*** Insert completed. One row added.
*** Total elapsed time was 1 second.

```

Select all columns from *Target\_DynTriggerTest2*:

```

SELECT *
FROM Target_DynTriggerTest2;

*** Query completed. One row found. 3 columns returned.
*** Total elapsed time was 1 second.

```

| Integer1 | NewColA | NewColB |
|----------|---------|---------|
| 1        | 3       | 3       |

As expected given the definition for trigger *DynTestTrigger02*, the newly inserted row in *Target\_DynTriggerTest2* contains the values 1, 3, and 3 for its three columns.

## Example 15: Using a Trigger to Update a NoPI Table

The following CREATE TRIGGER request creates a statement trigger that does an INSERT ... SELECT of the values represented by *a* and *b* from the OLD\_TABLE transition table (aliased as *myold*) into NoPI table *nopi008\_t999* whenever NoPI table *nopi008\_ti* is updated.

```
CREATE TRIGGER nopi008_trig4
  AFTER UPDATE ON nopi008_t1
  REFERENCING OLD_TABLE AS myold
  FOR EACH STATEMENT
    (INSERT INTO nopi008_t999(a,b)
     SELECT a,b
     FROM myold;);
```

## Related Topics

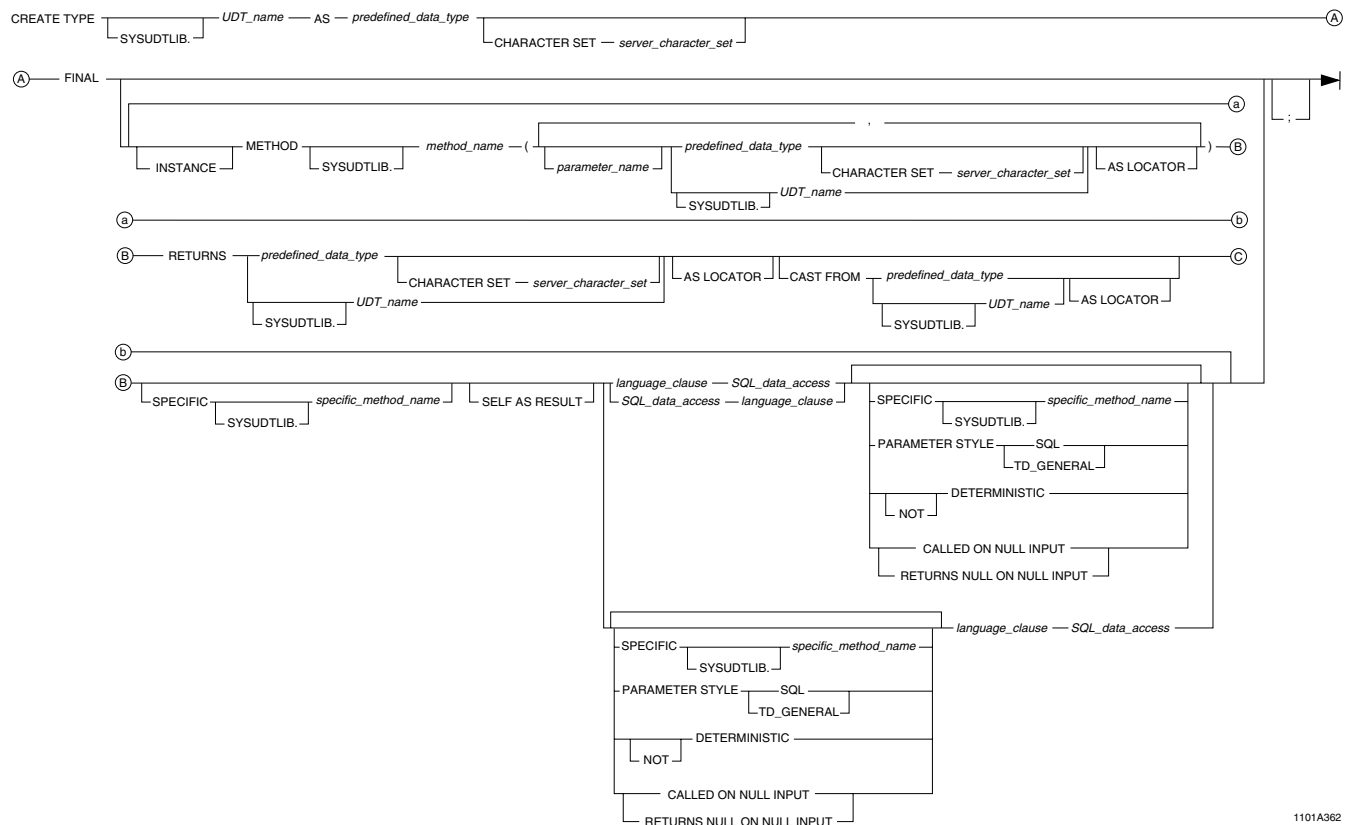
See [“DROP MACRO/ DROP PROCEDURE/ DROP TABLE/ DROP TRIGGER/ DROP VIEW” on page 574.](#)

# CREATE TYPE (Distinct Form)

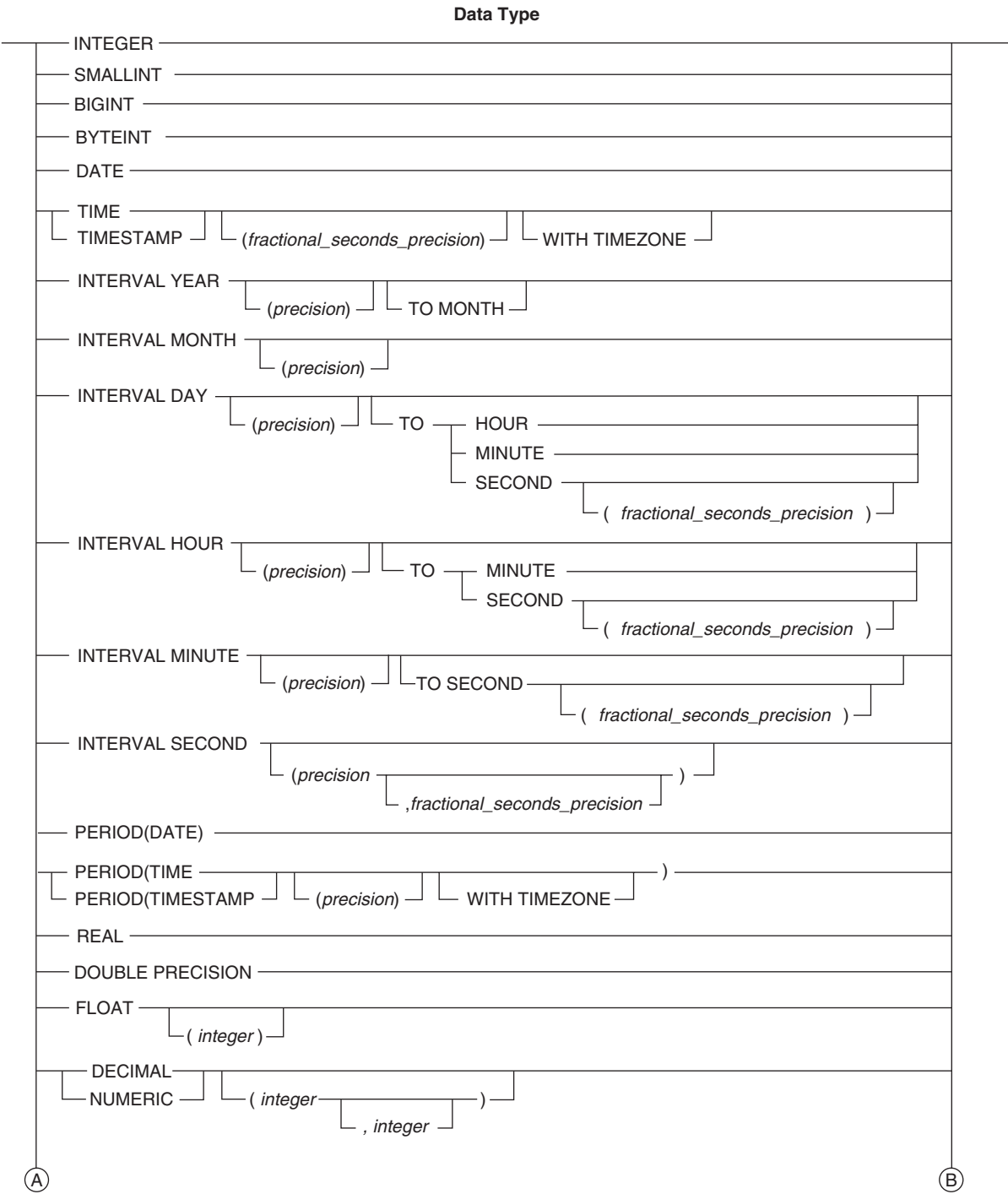
## Purpose

Creates a user-defined data type that is constructed directly from a predefined Teradata Database data type.

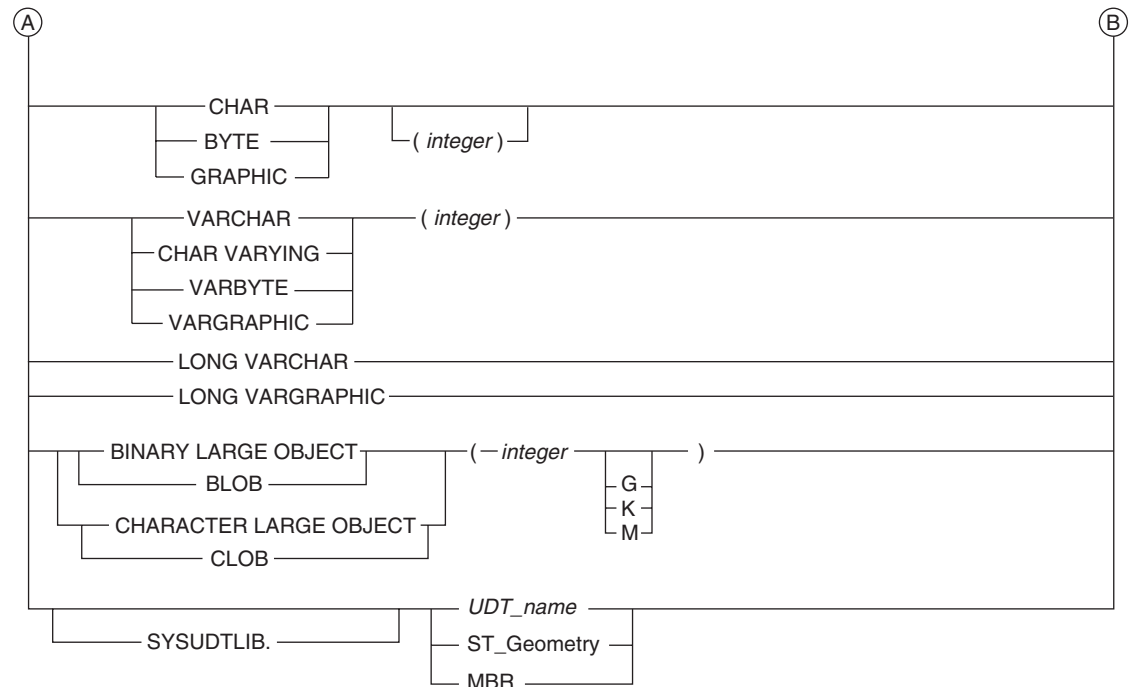
## Syntax



1101A362



1101A535



1101A536

where:

| Syntax element ... | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>SYSUDTLIB</i>   | an optional specification of the containing database for <i>UDT_name</i> , which must always be <i>SYSUDTLIB</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>UDT_name</i>    | <p>the name of the distinct UDT to be created.</p> <p>If your Teradata Database runs on the MP-RAS operating system, you should keep the UDT name as short as possible (see the CREATE TYPE topic “Maximum Size of UNIX MP-RAS Command Line Argument Affects Names and Number of External Routines in a Database” in <i>SQL Data Definition Language Detailed Topics</i>).</p> <p>Note that the creation of a distinct type consumes two names in the <i>TVMNameI</i> name space for <i>SYSUDTLIB</i>:</p> <ul style="list-style-type: none"> <li>The first name consumed corresponds to the name of the UDT itself.</li> <li>The second name corresponds to the system-generated UDF. The system constructs this name as explained in the topic on naming conventions.</li> </ul> <p>You cannot create a UDF within the <i>SYSUDTLIB</i> database with the same specific name or same routine signature.</p> <p>If such a UDF already exists in <i>SYSUDTLIB</i> at the time you submit a CREATE TYPE statement, then the request fails because a routine with the same signature already exists.</p> |

| Syntax element ...          | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>data_type</i>            | <p>the data type on which the distinct UDT is based.</p> <p>All supported predefined data types except the Period types are valid.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <i>server_character_set</i> | <p>if <i>data_type</i> is a character type, then this is the server character set used by <i>data_type</i>, otherwise you cannot specify anything.</p> <p>The purpose of the CHARACTER SET clause is to influence the system-generated routines.</p> <p>The CHARACTER SET clause causes the following things to occur when the system creates the distinct type named <i>UDF_name</i>:</p> <ul style="list-style-type: none"> <li>• The system-generated CAST routines are registered to cast to and cast from a character source type of the specified server character set.</li> <li>• The system-generated ORDERING routine is registered to map to a character source type of the specified server character set.</li> <li>• The system-generated tosql and fromsql TRANSFORM routines are registered to transform the UDT to and from a character source type of the specified server character set.</li> </ul> |
| FINAL                       | <p>a mandatory keyword required for the definition of all distinct UDTs.</p> <p>The FINAL keyword indicates that you cannot create subtypes of the type being defined.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| INSTANCE                    | <p>that the method signature being defined is an instance method.</p> <p>This is the default.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| METHOD                      | <p>a keyword that indicates a method signature definition.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <i>SYSUDTLIB</i>            | <p>an optional keyword that indicates that <i>method_name</i> is being created in the <i>SYSUDTLIB</i> database.</p> <p>All methods must be created within the <i>SYSUDTLIB</i> database.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>method_name</i>          | <p>the name for the method whose signature being added to the type definition for <i>UDT_name</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

| Syntax element ...                                                                                                               | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>[parameter_name]</code><br><code>data_type server_character_set  </code><br><code>UDT_name [AS LOCATOR]</code>             | <p>one or all of the following:</p> <ul style="list-style-type: none"> <li>• A set of parameter names for the method.</li> <li>• Whether you specify a list of parameter names or not, you must specify a set of data types for the parameters specified. <ul style="list-style-type: none"> <li>• If a parameter in the <i>parameter_name</i> list has a predefined data type, the <i>data_type</i> entry is that data type.</li> <li>• If the type specified as <i>data_type</i> is a character type, the <i>server_character_set</i> entry is its server character set.</li> <li>• If a parameter in the <i>parameter_name</i> list has a UDT type, the <i>UDT_name</i> entry is the name of that UDT.</li> </ul> </li> <li>• If a parameter has a LOB data type, you must specify a locator indication for it.</li> </ul> <p>The following text explains this in more detail:</p> <p>The parameter list is a parenthetical comma-separated list of data types, including UDTs, and optional parameter names and locators for the variables to be passed to the method.</p> <p>Parameter names must be unique within a method definition.</p> <p>You cannot use the keyword SELF to name UDM parameters.</p> <p>The maximum number of parameters a UDM accepts is 128.</p> <p>BLOB and CLOB types must be represented by a locator (see <i>SQL Data Manipulation Language</i> for a description of locators).</p> <p>The Teradata Database does not support in-memory LOB parameters: an AS LOCATOR phrase must be specified for each LOB parameter and return value.</p> <p>Note, however, that whenever a LOB that requires data type conversion is passed to a UDM, the LOB must be materialized for the conversion to take place.</p> |
| <code>[parameter_name] data_type</code><br><code>server_character_set   UDT_name</code><br><code>[AS LOCATOR] (continued)</code> | <p>The data type associated with each parameter is the type of the parameter or returned value. All Teradata Database data types except the Period types are valid. Distinct and structured UDTs are valid for scalar UDFs only. Character data can also specify a CHARACTER SET clause.</p> <p>For data types that take a length or size specification, like BYTE, CHARACTER, DECIMAL, VARCHAR, and so on, the size of the parameter indicates the largest number of bytes that can be passed (see the CREATE FUNCTION/REPLACE FUNCTION topic “Parameter Names and Data Types” in <i>SQL Data Definition Language Detailed Topics</i>).</p> <p>You must specify opening and closing parentheses even if no parameters are to be passed to the function.</p> <p>If you specify one parameter name, then you must specify names for all the parameters passed to the function.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

| Syntax element ...                                                                                                                  | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>[parameter_name] data_type</code><br><code>server_character_set   UDT_name</code><br><code>[AS LOCATOR]</code><br>(continued) | If you do not specify parameter names, the system assigns unique names to them in the form P1, P2, ..., Pn. These names are used in the COMMENT statement (see <a href="#">“COMMENT (Comment Placing Form)” on page 112</a> ), displayed in the report produced by the HELP METHOD statement in the PARAMETER NAME column (see <a href="#">“HELP METHOD” on page 735</a> ), and appear in the text of error messages. |
| <code>RETURNS data_type  </code><br><code>UDT_name</code>                                                                           | the name of the data type returned by the method, which can be either a predefined data type or a UDT.                                                                                                                                                                                                                                                                                                                |
| <code>CAST FROM data_type  </code><br><code>[SYSUDTLIB.]UDT_name</code>                                                             | the result type returned by the external function that is to be converted to the type specified by the RETURNS clause.<br><br>Example:<br><pre>...RETURNS DECIMAL(9,5) CAST FROM FLOAT...</pre> Whenever a LOB that requires data type conversion is passed to a UDM, the LOB must first be materialized for the conversion to take place.                                                                            |
| <code>SPECIFIC [SYSUDTLIB.]</code><br><code>specific_method_name</code>                                                             | the specific name and optional containing database name, which is always SYSUDTLIB, of the method whose signature is being added to the type definition for UDT_name.                                                                                                                                                                                                                                                 |
| <code>SELF AS RESULT</code>                                                                                                         | that the method is type-preserving.<br><br>If you specify SELF AS RESULT, then the data type specified in the RETURNS clause for the method must have the same name as UDT_name.                                                                                                                                                                                                                                      |
| <code>PARAMETER STYLE SQL</code>                                                                                                    | that the parameter style for the method defined by this signature is SQL.<br><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Parameter Names and Data Types” in <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                                                                  |
| <code>PARAMETER STYLE</code><br><code>TD_GENERAL</code>                                                                             | that the parameter style for the method defined by this signature is TD_GENERAL.<br><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Parameter Names and Data Types” in <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                                                           |
| <code>[NOT] DETERMINISTIC</code>                                                                                                    | that the result of invoking the method defined by this signature is either deterministic or not deterministic.<br><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Deterministic Characteristics Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                       |
| <code>CALLED ON NULL INPUT</code>                                                                                                   | that the method defined by this signature is called if any of the arguments passed to is null.<br><br>See the CREATE FUNCTION/REPLACE FUNCTION topic “Null Call Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                                                           |



| Syntax element ...                            | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                               |                                                 |   |   |     |     |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|-------------------------------------------------|---|---|-----|-----|
| RETURNS NULL ON NULL INPUT                    | <p>that the method defined by this signature is not called if any of the arguments passed to it is null. Instead, it returns a null.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “Null Call Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                               |                                                 |   |   |     |     |
| <i>language_clause</i>                        | <p>the language used to write the source code for the method defined by this signature.</p> <p>The valid languages for writing methods are C and C++.</p> <table border="1"> <thead> <tr> <th>IF the method is written in this language ...</th><th>THEN the code for <i>language_clause</i> is ...</th></tr> </thead> <tbody> <tr> <td>C</td><td>C</td></tr> <tr> <td>C++</td><td>CPP</td></tr> </tbody> </table> <p>This must be specified as LANGUAGE C or LANGUAGE CPP even if the external method routine is supplied in object form.</p> <p>If the external method object is not written in C or C++, it must be compatible with C or C++ object code.</p> <p>This clause is mandatory for each method signature you specify as part of a distinct UDT definition.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic in <i>SQL Data Definition Language Detailed Topics</i> for details.</p> | IF the method is written in this language ... | THEN the code for <i>language_clause</i> is ... | C | C | C++ | CPP |
| IF the method is written in this language ... | THEN the code for <i>language_clause</i> is ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                               |                                                 |   |   |     |     |
| C                                             | C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                               |                                                 |   |   |     |     |
| C++                                           | CPP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                               |                                                 |   |   |     |     |
| <i>SQL_data_access</i>                        | <p>whether SQL statements are permitted within the user-written external routine for the method defined by this signature.</p> <p>The only valid specification is NO SQL.</p> <p>See the CREATE FUNCTION/REPLACE FUNCTION topic “SQL Data Access Clause” in <i>SQL Data Definition Language Detailed Topics</i> for details.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                               |                                                 |   |   |     |     |

## ANSI Compliance

CREATE TYPE (Distinct Form) is ANSI SQL-2003-compliant with extensions.

## Required Privileges

You must have either the UDTTYPE or UDTMETHOD privilege on the *SYSUDTLIB* database to create a distinct UDT.

If the type definition includes a set of method signatures, then you must also have the UDTMETHOD privilege on the *SYSUDTLIB* database.

## Privileges Granted Automatically

None.

## Example 1

The following example creates a distinct UDT named *euro* based on the source data type DECIMAL(8,2):

```
CREATE TYPE euro
AS DECIMAL(8, 2)
FINAL
METHOD toUS()
RETURNS us_dollar CAST FROM DECIMAL(8,2)
LANGUAGE C
DETERMINISTIC
NO SQL
RETURNS NULL ON NULL INPUT
...
```

## Example 2

The following example creates a distinct UDT named *us\_dollar* based on the source data type DECIMAL(8,2):

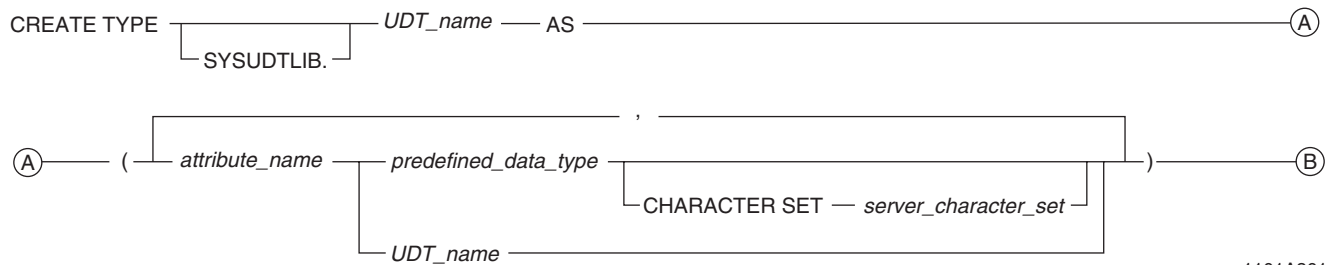
```
CREATE TYPE SYSUDTLIB.us_dollar
AS DECIMAL(8, 2)
FINAL
METHOD toEuro()
RETURNS euro CAST FROM DECIMAL(8,2)
LANGUAGE C
DETERMINISTIC
NO SQL
RETURNS NULL ON NULL INPUT
...
```

## CREATE TYPE (Structured Form)

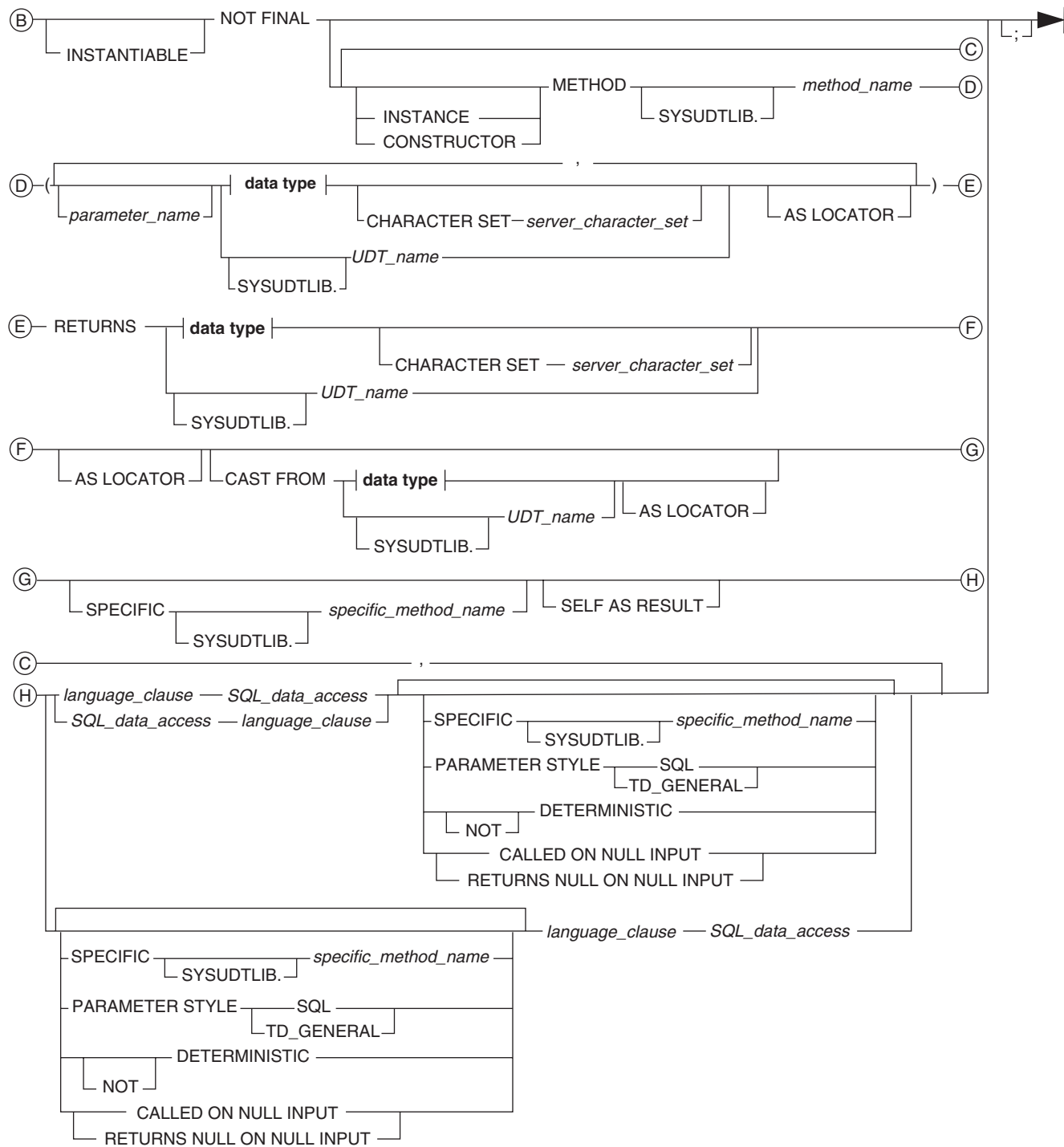
### Purpose

Creates the body of a structured user-defined data type.

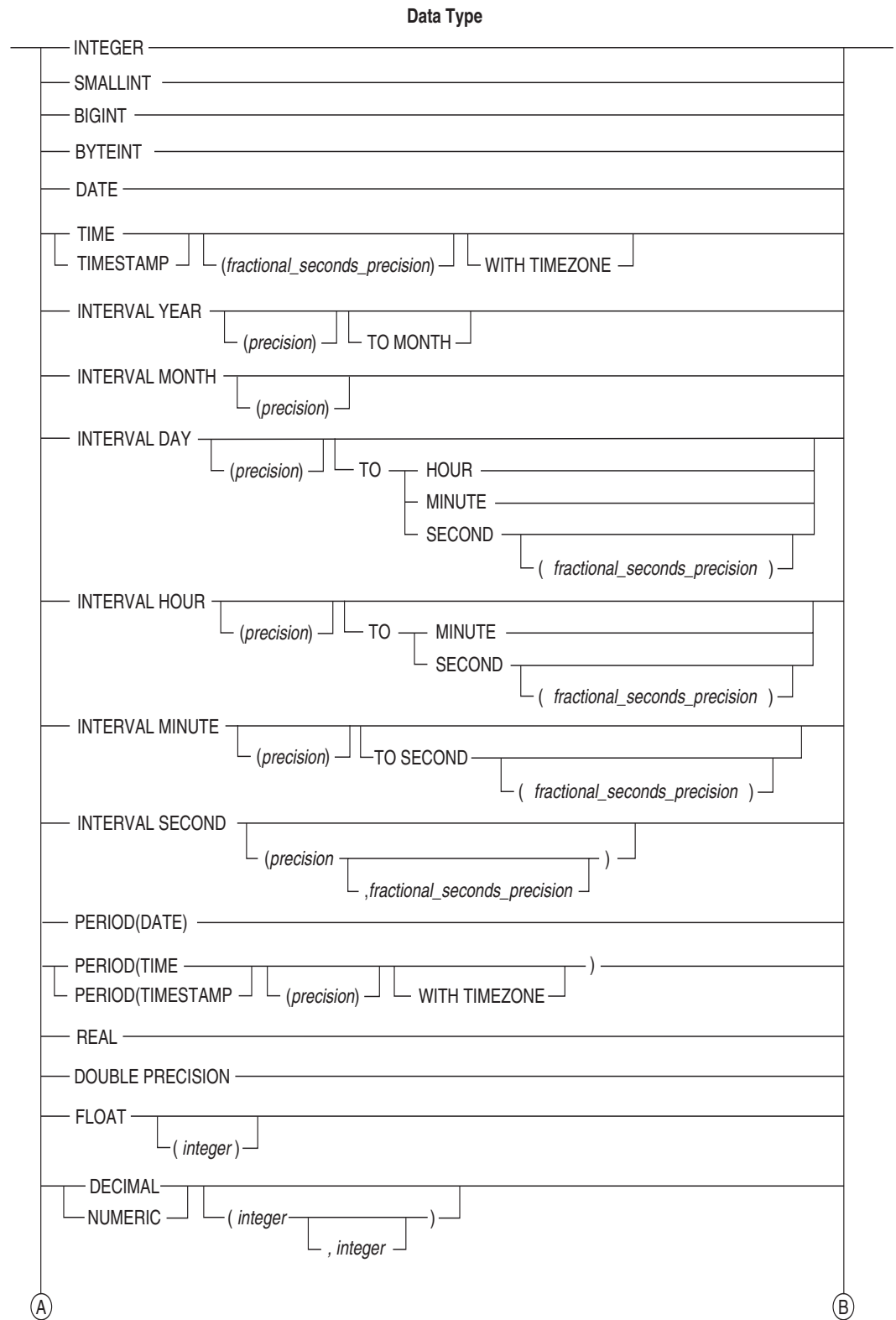
### Syntax



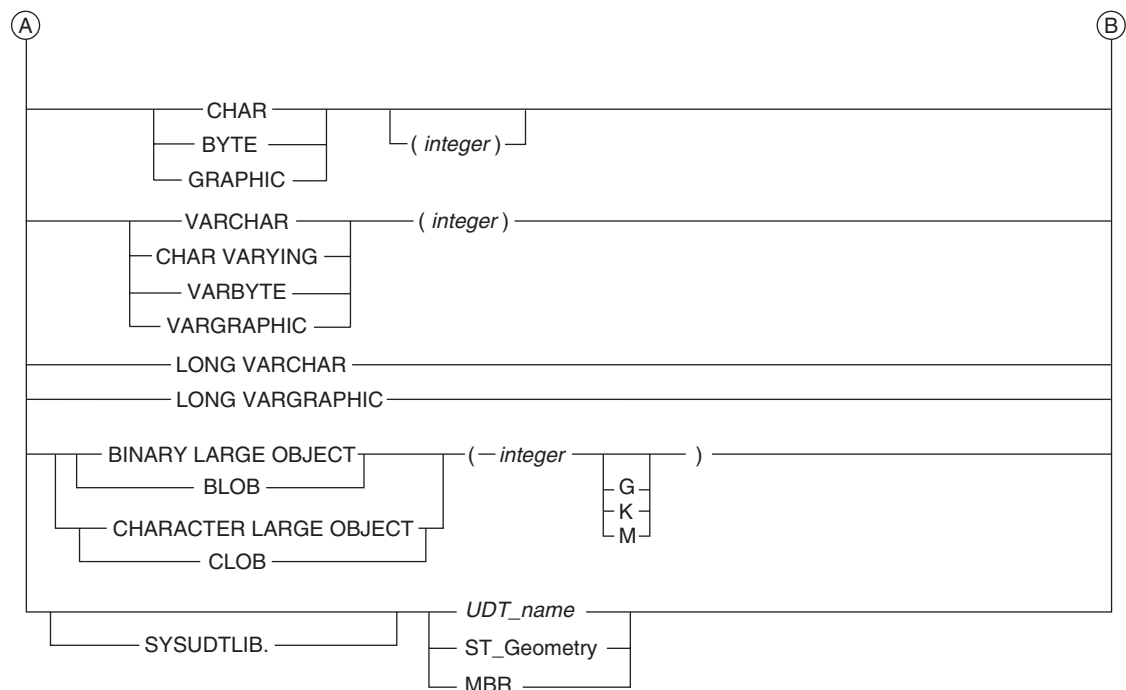
1101A361



1101A645



1101A535



1101A536

where:

| Syntax element ...       | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>SYSUDTLIB</i>         | an optional specification of the containing database for <i>UDT_name</i> , which must always be <i>SYSUDTLIB</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <i>UDT_name</i>          | <p>the name of the structured UDT to be created.</p> <p>See <i>SQL Fundamentals</i> for the rules for naming database objects.</p> <p>Note that the creation of a structured type consumes two names in the <i>TVMNameI</i> name space for <i>SYSUDTLIB</i>:</p> <ul style="list-style-type: none"> <li>• The first name consumed corresponds to the name of the UDT itself.</li> <li>• The second name corresponds to the system-generated constructor function for the UDT.</li> </ul> <p>The system constructs this name as explained in the topic on naming conventions.</p> <p>You cannot create a UDF within the <i>SYSUDTLIB</i> database with the same specific name or same routine signature.</p> <p>If such a UDF already exists in <i>SYSUDTLIB</i> at the time you submit a CREATE TYPE request, the request fails because a routine with the same signature already exists.</p> |
| <i>AS attribute_name</i> | <p>the name of an attribute of the structured UDT.</p> <p>See <i>SQL Fundamentals</i> for the rules for naming database objects.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| data type                | <p>the predefined data type on which the current attribute of the structured UDT is based if that attribute is not a UDT.</p> <p>All supported data types are valid, including distinct and structured UDTs, Period, and Geospatial types.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

| Syntax element ...          | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>server_character_set</i> | <p>if <i>data_type</i> is a character type, then this is the server character set used by <i>data_type</i>, otherwise you cannot specify anything.</p> <p>The purpose of the CHARACTER SET clause is to influence the system-generated routines.</p> <p>The CHARACTER SET clause causes the following things to occur when the system creates the distinct type named <i>UDF_name</i>:</p> <ul style="list-style-type: none"> <li>• The system-generated CAST routines are registered to cast to and cast from a character source type of the specified server character set.</li> <li>• The system-generated ORDERING routine is registered to map to a character source type of the specified server character set.</li> <li>• The system-generated tosql and fromsql TRANSFORM routines are registered to transform the UDT to and from a character source type of the specified server character set.</li> </ul> |
| <i>UDT_name</i>             | <p>the name of a UDT on which the current attribute of the structured UDT is based if that attribute is not a predefined data type.</p> <p>See <i>SQL Fundamentals</i> for the rules for naming database objects.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| INSTANTIABLE                | <p>an optional keyword specification that makes it possible to create a constructor method for the type, enabling you to instantiate a value having that type.</p> <p>INSTANTIABLE is the default and only valid specification.</p> <p>Teradata Database does not support a NOT INSTANTIABLE option.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| NOT FINAL                   | <p>a mandatory keyword sequence required for the definition of all structured UDTs.</p> <p>The NOT FINAL keywords indicate that you can create subtypes of the type being defined.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| INSTANCE                    | <p>that the method signature being defined is an instance method.</p> <p>This is the default.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| CONSTRUCTOR                 | <p>that the method signature being defined is a constructor method.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| METHOD                      | <p>a keyword that indicates a method signature definition.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <i>SYSUDTLIB</i>            | <p>an optional keyword that indicates that <i>method_name</i> is being created in the <i>SYSUDTLIB</i> database.</p> <p>All methods must be created within the <i>SYSUDTLIB</i> database.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>method_name</i>          | <p>the name for the method whose signature being added to the type definition for <i>UDT_name</i>.</p> <p>See <i>SQL Fundamentals</i> for the rules for naming database objects.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

| Syntax element ...                                                                                                            | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>[parameter_name]</code><br><code>data_type server_character_set  </code><br><code>UDT_name</code>                       | <p>one or all of the following:</p> <ul style="list-style-type: none"> <li>• A set of parameter names for the method.</li> <li>• Whether you specify a list of parameter names or not, you must specify a set of data types for the parameters specified. <ul style="list-style-type: none"> <li>• If a parameter in the <i>parameter_name</i> list has a predefined data type, the <i>data_type</i> entry is that data type.</li> <li>• If the type specified as <i>data_type</i> is a character type, the <i>server_character_set</i> entry is its server character set.</li> <li>• If a parameter in the <i>parameter_name</i> list has a UDT type, the <i>UDT_name</i> entry is the name of that UDT.</li> </ul> </li> </ul> <p>The following text explains this in more detail:</p> <p>The parameter list is a parenthetical comma-separated list of data types, including UDTs, and optional parameter names and locators for the variables to be passed to the method.</p> <p>Parameter names must be unique within a method definition.</p> <p>You cannot use the keyword SELF to name method parameters.</p> <p>The maximum number of parameters a method accepts is 128.</p> <p>You must specify opening and closing parentheses even if no parameters are to be passed to the method.</p> <p>If you specify one parameter name, then you must specify names for all the parameters passed to the method.</p> <p>If you do not specify parameter names, the system assigns unique names to them in the form P1, P2, ..., Pn. These names are used in the COMMENT statement (see <a href="#">“COMMENT (Comment Placing Form)” on page 137</a>), displayed in the report produced by the HELP METHOD statement in the PARAMETER NAME column (see <a href="#">“HELP METHOD” on page 802</a>), and appear in the text of error messages.</p> <p>The data type associated with each parameter is the type of the parameter or returned value. All Teradata Database data types are valid. Distinct and structured UDTs are valid for scalar UDFs only. Character data can also specify a CHARACTER SET clause.</p> <p>For data types that take a length or size specification, like BYTE, CHARACTER, DECIMAL, VARCHAR, and so on, the size of the parameter indicates the largest number of bytes that can be passed.</p> |
| <code>[AS LOCATOR]</code>                                                                                                     | <p>that a BLOB or CLOB parameter type is represented by a locator (see <i>SQL Data Manipulation Language</i> for a description of locators). LOB parameters must always be represented by a locator. Teradata Database does not support in-memory LOB parameters: an AS LOCATOR phrase must be specified for each LOB parameter and return value.</p> <p>Whenever a LOB that requires data type conversion is passed to a method, the LOB must be materialized for the conversion to take place.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| RETURNS data type<br><code>[CHARACTER SET</code><br><code>server_character_set  </code><br><code>[SYSUDTLIB.] UDT_name</code> | <p>the name of the data type returned by the method, which can be either a predefined type or a UDT.</p> <p>If the returned data has a character type, you can also specify its server character set.</p> <p>See <i>SQL Fundamentals</i> for the rules for naming database objects.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |



| Syntax element ...                             | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                               |                                          |   |   |     |     |
|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|------------------------------------------|---|---|-----|-----|
| AS LOCATOR                                     | <p>a locator that must be defined for any LOB return value. Teradata Database does not support in-memory LOB return values: an AS LOCATOR phrase must be specified for each LOB return value.</p> <p>Note, however, that whenever a LOB that requires data type conversion is passed to a UDT, the LOB must be materialized for the conversion to take place.</p>                                                                                                                                                                                                                                                                                                                                                                                                     |                                               |                                          |   |   |     |     |
| CAST FROM data type  <br>[SYSUDTLIB.] UDT_name | <p>the result type returned by the external function that is to be converted to the type specified by the RETURNS clause.</p> <p>Example:</p> <pre>...RETURNS DECIMAL(9,5) CAST FROM FLOAT...</pre> <p>Whenever a LOB that requires data type conversion is passed to a method, the LOB must first be materialized for the conversion to take place.</p>                                                                                                                                                                                                                                                                                                                                                                                                              |                                               |                                          |   |   |     |     |
| SPECIFIC [SYSUDTLIB.]<br>specific_method_name  | <p>the specific name and optional containing database name, which is always SYSUDTLIB, of the method whose signature is being added to the type definition for UDT_name.</p> <p>See <i>SQL Fundamentals</i> for the rules for naming database objects.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                               |                                          |   |   |     |     |
| SELF AS RESULT                                 | <p>that the method is type-preserving.</p> <p>If you specify SELF AS RESULT, then the data type specified in the RETURNS clause for the method must have the same name as UDT_name.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                               |                                          |   |   |     |     |
| PARAMETER STYLE SQL                            | that the parameter style for the method defined by this signature is SQL.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                               |                                          |   |   |     |     |
| PARAMETER STYLE<br>TD_GENERAL                  | that the parameter style for the method defined by this signature is TD_GENERAL.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                               |                                          |   |   |     |     |
| [NOT] DETERMINISTIC                            | that the result of invoking the method defined by this signature is either deterministic or not deterministic.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                               |                                          |   |   |     |     |
| CALLED ON NULL INPUT                           | that the method defined by this signature is called if any of the arguments passed to is null.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                               |                                          |   |   |     |     |
| RETURNS NULL ON NULL<br>INPUT                  | that the method defined by this signature is not called if any of the arguments passed to it is null. Instead, it returns a null.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                               |                                          |   |   |     |     |
| language_clause                                | <p>the language used to write the source code for the method defined by this signature.</p> <p>The valid languages for writing methods are C and C++.</p> <table border="1"> <thead> <tr> <th>IF the method is written in this language ...</th><th>THEN the code for language_clause is ...</th></tr> </thead> <tbody> <tr> <td>C</td><td>C</td></tr> <tr> <td>C++</td><td>CPP</td></tr> </tbody> </table> <p>This must be specified as LANGUAGE C or LANGUAGE CPP even if the external method routine is supplied in object form.</p> <p>If the external method object is not written in C or C++, it must be compatible with C or C++ object code.</p> <p>This clause is mandatory for each method signature you specify as part of a distinct UDT definition.</p> | IF the method is written in this language ... | THEN the code for language_clause is ... | C | C | C++ | CPP |
| IF the method is written in this language ...  | THEN the code for language_clause is ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                               |                                          |   |   |     |     |
| C                                              | C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                               |                                          |   |   |     |     |
| C++                                            | CPP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                               |                                          |   |   |     |     |

| Syntax element ...     | Specifies ...                                                                                                                                                          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>SQL_data_access</i> | whether SQL statements are permitted within the user-written external routine for the method defined by this signature.<br><br>The only valid specification is NO SQL. |

## ANSI Compliance

CREATE TYPE (Structured Form) is ANSI SQL-2003-compliant with extensions.

## Required Privileges

You must have either the UDTTYPE or UDTMETHOD privilege on the *SYSUDTLIB* database to create a distinct UDT.

If the type definition includes a set of method signatures, then you must also have the UDTMETHOD privilege on the *SYSUDTLIB* database.

## Privileges Granted Automatically

None.

## Example 1

The following example creates a structured UDT named *address* that has two attributes defined with predefined data types: *street* and *zip*. This type is also defined with one constructor method (*address*(*VARCHAR*(20), *CHAR*(5))) and three instance methods (*city*(), *state*(), and *in\_state*()).

Because no SPECIFIC method names are specified for the instance methods *city*() and *in\_state*(*CHAR*(2)) in this example, the system autogenerates and registers the following *TVMNameI* SPECIFIC names for them in the *SYSUDTLIB* database:

- *ADDRESS\_CITY\_R* on behalf of the *city*() method.
- *ADDRESS\_IN\_STATE\_R* on behalf of the *in\_state*(*CHAR*(2)) method.

```
CREATE TYPE address AS (  
    street VARCHAR(20),  
    zip    CHARACTER(5) )  
NOT FINAL  
CONSTRUCTOR METHOD address( VARCHAR(20), CHARACTER(5) )  
RETURNS address  
SPECIFIC address_constructor_1  
SELF AS RESULT  
LANGUAGE C  
PARAMETER STYLE SQL  
DETERMINISTIC  
NO SQL,
```

```

INSTANCE METHOD city()
RETURNS VARCHAR(20)
LANGUAGE C
PARAMETER STYLE SQL
DETERMINISTIC
NO SQL,
METHOD state()
RETURNS CHARACTER(2)
SPECIFIC address_state
RETURNS NULL ON NULL INPUT
LANGUAGE C
PARAMETER STYLE SQL
DETERMINISTIC
NO SQL,
METHOD in_state(CHARACTER(2))
RETURNS CHARACTER(1)
LANGUAGE C
PARAMETER STYLE SQL
DETERMINISTIC
NO SQL;

```

## Example 2

This example creates a structured UDT named *person* from four predefined data types and the structured UDT *address*, making it a 2-level nested<sup>1</sup> type.

```

CREATE TYPE SYSUDTLIB.person AS (
    ssn          CHARACTER(11),
    first_name   VARCHAR(20),
    middle_name  VARCHAR(20),
    last_name    VARCHAR(20),
    domicile     address )
NOT FINAL;

```

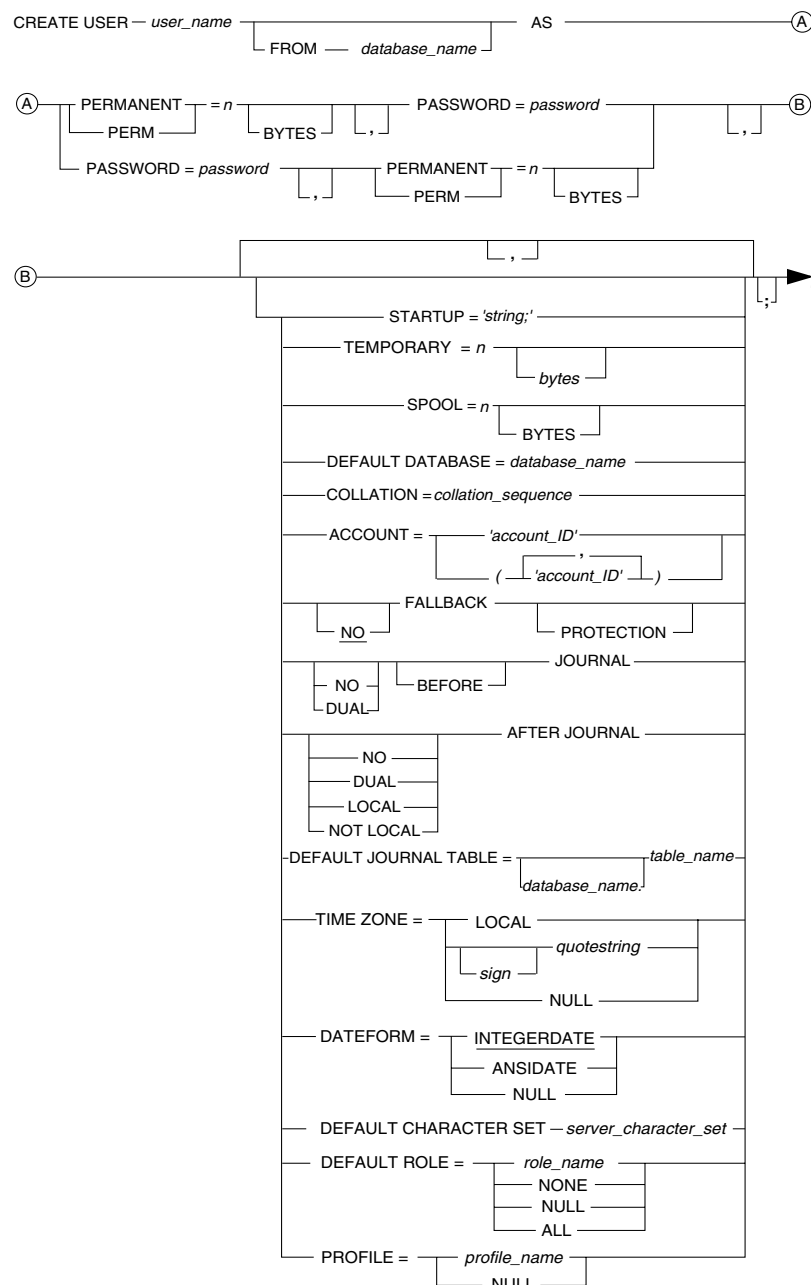
1. Nested because the type *address* is a structured UDT having two attributes. In this case, both of those attributes are predefined types, but if one or more of them had been a structured type, *person* would be a 3-level nested type.

# CREATE USER

## Purpose

Defines a new database user.

## Syntax



1101C007

where:

| Syntax Element ...                         | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>user_name</i>                           | the name of the user being created.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <i>database_name</i>  <br><i>user_name</i> | the name of the immediate owner user or database.<br>The default is the current creator of this user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| AS                                         | an introduction to the first user options.<br>Subsequent options can be entered in any order.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| PERMANENT = <i>n</i><br>BYTES              | the number of bytes to be reserved for permanent storage of the new user database. The space is taken from unallocated space in the database or user of the immediate owner.<br><br>The value can be expressed either as a decimal or integer number or using exponential notation. For example, you can write <i>one thousand</i> as either 1000 or 1E3.<br><br>This option must be specified. There is no default.<br><br>To create a user with no database component, specify a value of 0 bytes for PERMANENT space. If you do this, you must still specify some minimal SPOOL space value for the user.<br><br>You cannot specify any other options for the new user until after you specify the PERMANENT and PASSWORD options. |
| <i>password</i>                            | the password associated with the new user. A password is a Teradata Database object and can contain up to 30 characters.<br><br>This option must be specified. There is no default.<br><br>You cannot specify any other options for the new user until after you specify the PERMANENT and PASSWORD options.<br><br>See <i>Utilities</i> for DBS Control flags that can affect passwording.                                                                                                                                                                                                                                                                                                                                           |
| ' <i>string</i> ;'                         | one or more SQL requests, separated by SEMICOLON characters, that are performed to establish the session environment when the user logs on.<br><br>Strings can be up to 255 characters, must be terminated by a SEMICOLON character, and must be enclosed by APOSTROPHE characters. The default is null, meaning no startup string.<br><br>A startup string can perform a macro, however, the USING request modifier is not supported in a startup string. If a string includes a DDL statement, no other statement is allowed in the string.<br><br>Startup strings are only performed if you log onto Teradata Database using BTEQ. All other Teradata client APIs ignore the string when Teradata Database returns it to them.     |

| Syntax Element ...                         | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TEMPORARY = <i>n</i><br>[BYTES]            | <p>the number of bytes allowed for creating materialized global temporary tables by this user. Note that temporary space is reserved prior to spool space for any user defined with this characteristic.</p> <p>Also note that each materialized global temporary table requires a minimum of 512 bytes of PERM space to contain its table header.</p> <p>Disk usage for a materialized temporary table is charged to the temporary space allocation of the user who referenced the table.</p> <p>If no temporary space is defined for a user, then the space allocated for any materialized global temporary tables referenced by that user is set to the maximum temporary space allocated for the immediate owner.</p>                                                                                                                          |
| SPOOL = <i>n</i> [BYTES]                   | <p>the number of bytes allowed for spool files. The default is the largest value that is not greater than the owner spool space, and that is a multiple of the number of AMPs on the system.</p> <p>The default is the amount of spool space allocated to the owner of this user. As a general guideline, specify a minimum of 20 percent of the permanent space allocated for this user. See <i>Database Design</i> for details.</p> <p><i>n</i> must not exceed the size of the owner spool space.</p> <p>Note that even if you specify a PERMANENT space value of 0 bytes for a user, you must still specify some minimum number of bytes for its SPOOL space.</p> <p>The value can be expressed either as a decimal or integer number or using exponential notation. For example, you can write <i>one thousand</i> as either 1000 or 1E3.</p> |
| <i>database_name</i>  <br><i>user_name</i> | <p>the name of the default database or user established each time a user logs onto the system.</p> <p>The default is the user name associated with the current session.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

| Syntax Element ...        | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  |                            |       |                                                                                                                                                                            |        |                                                                    |               |                                                                                                                                                                                    |             |                                                          |              |                                                                                                                                                                                                                                                                                                                          |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------------------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------------------------------------------------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>collation_sequence</i> | the name of the collation to be used as the default for this user. <table> <tr> <th>This keyword ...</th><th>Defines this collation ...</th></tr> <tr> <td>ASCII</td><td>HOST.<br/>The collation is ASCII for configurations other than an IBM channel-attached host.<br/>In this case, ASCII refers to the Teradata extension to the ASCII standard.</td></tr> <tr> <td>EBCDIC</td><td>HOST.<br/>The collation is EBCDIC for an IBM channel-attached host.</td></tr> <tr> <td>MULTINATIONAL</td><td>One of the European or Japanese language sort sequences (see the CREATE USER topic “MULTINATIONAL Collation” on page 601 in <i>SQL Data Definition Language Detailed Topics</i>).</td></tr> <tr> <td><u>HOST</u></td><td>that of the logon client system.<br/>This is the default.</td></tr> <tr> <td>CHARSET_COLL</td><td>HOST.<br/>The collation is binary in the order of the current client character set.<br/>Strings are compared character-by-character and padded with the pad character for the appropriate character data type where necessary.<br/>When not CASE SPECIFIC, lowercase characters are mapped to their uppercase counterparts.</td></tr> </table> | This keyword ... | Defines this collation ... | ASCII | HOST.<br>The collation is ASCII for configurations other than an IBM channel-attached host.<br>In this case, ASCII refers to the Teradata extension to the ASCII standard. | EBCDIC | HOST.<br>The collation is EBCDIC for an IBM channel-attached host. | MULTINATIONAL | One of the European or Japanese language sort sequences (see the CREATE USER topic “MULTINATIONAL Collation” on page 601 in <i>SQL Data Definition Language Detailed Topics</i> ). | <u>HOST</u> | that of the logon client system.<br>This is the default. | CHARSET_COLL | HOST.<br>The collation is binary in the order of the current client character set.<br>Strings are compared character-by-character and padded with the pad character for the appropriate character data type where necessary.<br>When not CASE SPECIFIC, lowercase characters are mapped to their uppercase counterparts. |
| This keyword ...          | Defines this collation ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                  |                            |       |                                                                                                                                                                            |        |                                                                    |               |                                                                                                                                                                                    |             |                                                          |              |                                                                                                                                                                                                                                                                                                                          |
| ASCII                     | HOST.<br>The collation is ASCII for configurations other than an IBM channel-attached host.<br>In this case, ASCII refers to the Teradata extension to the ASCII standard.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                  |                            |       |                                                                                                                                                                            |        |                                                                    |               |                                                                                                                                                                                    |             |                                                          |              |                                                                                                                                                                                                                                                                                                                          |
| EBCDIC                    | HOST.<br>The collation is EBCDIC for an IBM channel-attached host.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                  |                            |       |                                                                                                                                                                            |        |                                                                    |               |                                                                                                                                                                                    |             |                                                          |              |                                                                                                                                                                                                                                                                                                                          |
| MULTINATIONAL             | One of the European or Japanese language sort sequences (see the CREATE USER topic “MULTINATIONAL Collation” on page 601 in <i>SQL Data Definition Language Detailed Topics</i> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                  |                            |       |                                                                                                                                                                            |        |                                                                    |               |                                                                                                                                                                                    |             |                                                          |              |                                                                                                                                                                                                                                                                                                                          |
| <u>HOST</u>               | that of the logon client system.<br>This is the default.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  |                            |       |                                                                                                                                                                            |        |                                                                    |               |                                                                                                                                                                                    |             |                                                          |              |                                                                                                                                                                                                                                                                                                                          |
| CHARSET_COLL              | HOST.<br>The collation is binary in the order of the current client character set.<br>Strings are compared character-by-character and padded with the pad character for the appropriate character data type where necessary.<br>When not CASE SPECIFIC, lowercase characters are mapped to their uppercase counterparts.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  |                            |       |                                                                                                                                                                            |        |                                                                    |               |                                                                                                                                                                                    |             |                                                          |              |                                                                                                                                                                                                                                                                                                                          |

| Syntax Element ...                | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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| collation_sequence<br>(continued) | This keyword ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Defines this collation ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                   | JIS_COLL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <p>Japanese Industrial Standards (JIS).</p> <p>The collation is as follows.</p> <ol style="list-style-type: none"><li>1 Characters and symbols from the JIS X 0201 standard (in JIX X 0201 order)</li><li>2 Ideographs, characters, and symbols from the JIS X 0208 standard (in JIS X 0208 order)</li><li>3 Ideographs, characters, and symbols from the JIS 0212 standard (in JIS X 0212 order)</li><li>4 IBM Kanji ideographs not present in JIS X 0208 and JIS X 0212 (in KanjiEBCDIC order)</li><li>5 User-defined ideographs (in U+ order)</li><li>6 Any remaining characters in Unicode (in U+ order)</li></ol> <p>Treatment of KANJI, GRAPHIC, and LATIN character types is as if the data were first converted to Unicode and then the appropriate JIS_COLL ordering is applied.</p> |
| account_id                        | <p>a set of identifiers for the account set to be charged for the space used by this user. The first identifier you specify becomes the default account for the user.</p> <p>Each value for <i>account_ID</i> can be up to 30 characters (provided they are not Japanese characters, in which case <i>account_ID</i> can be up to 30 bytes), using any of the supported character sets (see <i>SQL Fundamentals</i> for a description of Teradata Database identifiers and a list of the characters they can contain), and must be enclosed by APOSTROPHE characters. A list of <i>account_ids</i> must be separated by COMMA characters and enclosed by LEFT PARENTHESIS and RIGHT PARENTHESIS characters.</p> <p>If you do not specify an account ID, the user inherits the first account ID that is assigned to the immediate owner of this user.</p> <p>If you specify <i>account_id</i> in the logon string, it must have been specified in the ACCOUNT option of the most current CREATE USER or MODIFY USER statement for the user.</p> <p>If you do not specify <i>account_id</i> in the logon string, its value defaults to the first account identifier of the immediate owner user or database.</p> <p>You can associate a Priority Scheduler performance group with each account ID you specify. This assignment specifies the relative service priority for the account based on the Priority Scheduler parameters specified for it by the system administrator.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |



| Syntax Element ...                           | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>account_id</i> (continued)                | <p>Because users can inherit performance groups with inherited default account IDs from their parent user or database, it is important that you either associate a Priority Scheduler performance group with a user explicitly or ensure that its parent user or database is defined in such a way that its children inherit an appropriate set of performance groups.</p> <p>Each performance group for an account is limited to 16 single-byte characters (or 16 bytes for multibyte character sets) and is named using the syntax <i>\$group_name\$</i>.</p> <p>If you specify a performance group name when you create a user, the system does not verify the name at that time. Validation occurs only at logon.</p> <p>When you log on, the performance group name you specify is validated against existing performance group names. If no match is found, the system assigns one to you by default. The default is one of the following, depending on the situation:</p> <ul style="list-style-type: none"> <li>• First account string defined for the user.</li> <li>• Performance group M if the user has no account string with a defined performance group.</li> </ul> <p>The performance group names H, L, M, and R do not require the trailing \$ character to maintain backward compatibility with earlier Teradata Database releases and can be typed as \$H, \$L, \$M, and \$R, respectively. For example, both of the following account specifications are valid and equivalent:</p> <pre>' \$H\$acctPUB '</pre> <pre>' \$HacctPUB '</pre> <p>The following interactive mode BTEQ logon commands are valid examples of how you can specify a performance group:</p> <pre>.LOGON elnino/GMK '\$L1\$&amp;D&amp;TacctPUB '</pre> <pre>.LOGON elnino/KGM '\$L&amp;D&amp;TacctPUB '</pre> <p>Performance group names, their relative levels of service, and other related parameters are defined either by default or as individually customized variables by your system administrator.</p> <p>See <i>Utilities</i> for more information about performance groups and other Priority Scheduler parameters.</p> |
| [NO] FALLBACK<br>[NO] FALLBACK<br>PROTECTION | <p>whether to create and store a duplicate copy of each table created in the new user. The default value is NO FALLBACK. This setting can be overridden for a particular table when the table is created (see <a href="#">“CREATE TABLE” on page 382</a>).</p> <p>The FALLBACK keyword used alone implies PROTECTION, which is a noise keyword.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

| Syntax Element ...                                                                                       | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [NO] JOURNAL<br>DUAL JOURNAL<br>BEFORE<br>JOURNAL                                                        | <p>the number of before change images to be maintained by default for each data table created in the new user.</p> <p>Specifying the JOURNAL keyword without also specifying either NO or DUAL implies single copy journaling.</p> <p>If journaling is specified, a DUAL journal is maintained for data tables with FALLBACK protection.</p> <p>The JOURNAL keyword without BEFORE implies both types (BEFORE and AFTER) of images.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| [NO] AFTER<br>JOURNAL<br>DUAL AFTER<br>JOURNAL<br>LOCAL AFTER<br>JOURNAL<br>[NOT] LOCAL<br>AFTER JOURNAL | <p>the type of image to be maintained by default for data tables created in the new user.</p> <p>Specifying the JOURNAL keyword without also specifying either NO or DUAL implies single copy journaling.</p> <p>If journaling is specified, a DUAL journal is maintained for data tables with FALLBACK protection.</p> <p>NOT LOCAL and LOCAL specify whether single after-image journal rows for non-fallback data tables are written on the same virtual AMP (LOCAL) as the changed data rows, or on another virtual AMP in the cluster (NOT LOCAL).</p> <p>The JOURNAL keyword without AFTER implies both types (BEFORE and AFTER) of images.</p> <p>The default is no journaling</p> <p>If only AFTER JOURNAL is specified, then a before change image is not maintained. If both types are specified, the two specifications must not conflict.</p> <p>This setting can be overridden for a particular data table when the table is created (see <a href="#">“CREATE TABLE” on page 382</a>).</p> |
| DEFAULT JOURNAL<br>TABLE =<br><i>database_name</i> .<br><i>table_name</i>                                | <p>the default table that is to receive the journal images of data tables created in the new user.</p> <p><i>table_name</i> must be defined if journaling is requested, but it need not be contained within the new user.</p> <p><i>table_name</i> is automatically created in the new database if <i>database_name</i> is not specified.</p> <p>If a different database is specified, then that database must exist and <i>table_name</i> must have been defined as its default journal table.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| TIME ZONE                                                                                                | the default time zone displacement for the user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| LOCAL                                                                                                    | <p>the value for TIME ZONE defined as the system default.</p> <p>Note that this is a persistent setting. If the system-defined default TIME ZONE should change, the value defined for the user remains at the value defined for it when she was created.</p> <p>To change the value, you must submit a MODIFY USER request.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| Syntax Element ...                                                             | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                |                                                                 |                   |                                                                                                                                                                                                                                                                                                                                                                                                           |          |                                                                                                                                                                                                    |      |                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|-----------------------------------------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>quotedstring</i>                                                            | a signed value that sets a non-system-default interval offset for converting the user TIME ZONE.<br><br>The format is hh:mm.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                |                                                                 |                   |                                                                                                                                                                                                                                                                                                                                                                                                           |          |                                                                                                                                                                                                    |      |                                                                                                                                                                                                                                                                |
| NULL                                                                           | that no default TIME ZONE is defined for the user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                |                                                                 |                   |                                                                                                                                                                                                                                                                                                                                                                                                           |          |                                                                                                                                                                                                    |      |                                                                                                                                                                                                                                                                |
| DATEFORM                                                                       | <p>the default format for importing and exporting DATE values for the user.<br/>For further information, see <i>SQL Data Types and Literals</i>.<br/>Valid options are listed in the following table:</p> <table> <tr> <th>Option</th><th>Description</th></tr> <tr> <td>INTEGERDATE</td><td> <p>Sets the DATEFORM option to import and export DATE values as encoded integers.</p> <p>INTEGERDATE results in a default DATE format in field mode of 'YY/MM/DD' for date columns created and for date constants in character form. The 'YY/MM/DD' default DATE format can be changed by using the <i>tdlocaledef</i> utility. For details, see <i>Utilities</i>.</p> <p>INTEGERDATE is the default.</p> </td></tr> <tr> <td>ANSIDATE</td><td> <p>Sets the DATEFORM option to import and export DATE values as CHARACTER(10).</p> <p>Results in a 'YYYY-MM-DD' date format for date columns created and for date constants in character form.</p> </td></tr> <tr> <td>NULL</td><td> <p>Sets DATEFORM null.</p> <p>When DATEFORM is null, the default format for a date in field mode, and the default format for importing and exporting DATE values, is the same as the system default defined by the DATEFORM flag in the DBSControl record.</p> </td></tr> </table> | Option                                                                         | Description                                                     | INTEGERDATE       | <p>Sets the DATEFORM option to import and export DATE values as encoded integers.</p> <p>INTEGERDATE results in a default DATE format in field mode of 'YY/MM/DD' for date columns created and for date constants in character form. The 'YY/MM/DD' default DATE format can be changed by using the <i>tdlocaledef</i> utility. For details, see <i>Utilities</i>.</p> <p>INTEGERDATE is the default.</p> | ANSIDATE | <p>Sets the DATEFORM option to import and export DATE values as CHARACTER(10).</p> <p>Results in a 'YYYY-MM-DD' date format for date columns created and for date constants in character form.</p> | NULL | <p>Sets DATEFORM null.</p> <p>When DATEFORM is null, the default format for a date in field mode, and the default format for importing and exporting DATE values, is the same as the system default defined by the DATEFORM flag in the DBSControl record.</p> |
| Option                                                                         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                |                                                                 |                   |                                                                                                                                                                                                                                                                                                                                                                                                           |          |                                                                                                                                                                                                    |      |                                                                                                                                                                                                                                                                |
| INTEGERDATE                                                                    | <p>Sets the DATEFORM option to import and export DATE values as encoded integers.</p> <p>INTEGERDATE results in a default DATE format in field mode of 'YY/MM/DD' for date columns created and for date constants in character form. The 'YY/MM/DD' default DATE format can be changed by using the <i>tdlocaledef</i> utility. For details, see <i>Utilities</i>.</p> <p>INTEGERDATE is the default.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                |                                                                 |                   |                                                                                                                                                                                                                                                                                                                                                                                                           |          |                                                                                                                                                                                                    |      |                                                                                                                                                                                                                                                                |
| ANSIDATE                                                                       | <p>Sets the DATEFORM option to import and export DATE values as CHARACTER(10).</p> <p>Results in a 'YYYY-MM-DD' date format for date columns created and for date constants in character form.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                |                                                                 |                   |                                                                                                                                                                                                                                                                                                                                                                                                           |          |                                                                                                                                                                                                    |      |                                                                                                                                                                                                                                                                |
| NULL                                                                           | <p>Sets DATEFORM null.</p> <p>When DATEFORM is null, the default format for a date in field mode, and the default format for importing and exporting DATE values, is the same as the system default defined by the DATEFORM flag in the DBSControl record.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                |                                                                 |                   |                                                                                                                                                                                                                                                                                                                                                                                                           |          |                                                                                                                                                                                                    |      |                                                                                                                                                                                                                                                                |
| DEFAULT CHARACTER SET                                                          | <p>the user default for server character set.</p> <p>If no user default server character set is defined, then one is assigned automatically according to the following rules:</p> <table> <tr> <th>WHEN no user default server character set is defined for this type of site ...</th><th>The definition defaults to this <i>server_character_set</i> ...</th></tr> <tr> <td>U.S. and European</td><td>Latin</td></tr> <tr> <td>Japanese</td><td>Unicode</td></tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | WHEN no user default server character set is defined for this type of site ... | The definition defaults to this <i>server_character_set</i> ... | U.S. and European | Latin                                                                                                                                                                                                                                                                                                                                                                                                     | Japanese | Unicode                                                                                                                                                                                            |      |                                                                                                                                                                                                                                                                |
| WHEN no user default server character set is defined for this type of site ... | The definition defaults to this <i>server_character_set</i> ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                |                                                                 |                   |                                                                                                                                                                                                                                                                                                                                                                                                           |          |                                                                                                                                                                                                    |      |                                                                                                                                                                                                                                                                |
| U.S. and European                                                              | Latin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                |                                                                 |                   |                                                                                                                                                                                                                                                                                                                                                                                                           |          |                                                                                                                                                                                                    |      |                                                                                                                                                                                                                                                                |
| Japanese                                                                       | Unicode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                |                                                                 |                   |                                                                                                                                                                                                                                                                                                                                                                                                           |          |                                                                                                                                                                                                    |      |                                                                                                                                                                                                                                                                |

| Syntax Element ...          | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                  |                                       |       |                    |         |                       |         |                                                                    |           |                                                             |        |                                                                                                                                                    |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------------------------|-------|--------------------|---------|-----------------------|---------|--------------------------------------------------------------------|-----------|-------------------------------------------------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>server_character_set</i> | <p>the default server character set for the user.</p> <table> <tr> <th>This keyword ...</th><th>Defines this server character set ...</th></tr> <tr> <td>LATIN</td><td>fixed 8-bit Latin.</td></tr> <tr> <td>UNICODE</td><td>fixed 16-bit Unicode.</td></tr> <tr> <td>GRAPHIC</td><td>fixed 16-bit Unicode as defined by IBM Corporation for Database 2.</td></tr> <tr> <td>KANJISJIS</td><td>mixed single and multibyte characters defined by KanjiSJIS.</td></tr> <tr> <td>KANJI1</td><td>mixed single and multibyte characters defined by KanjiEBCDIC, KanjiShift-JIS, or KanjiEUC, depending on the current character set for the session.</td></tr> </table> | This keyword ... | Defines this server character set ... | LATIN | fixed 8-bit Latin. | UNICODE | fixed 16-bit Unicode. | GRAPHIC | fixed 16-bit Unicode as defined by IBM Corporation for Database 2. | KANJISJIS | mixed single and multibyte characters defined by KanjiSJIS. | KANJI1 | mixed single and multibyte characters defined by KanjiEBCDIC, KanjiShift-JIS, or KanjiEUC, depending on the current character set for the session. |
| This keyword ...            | Defines this server character set ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                  |                                       |       |                    |         |                       |         |                                                                    |           |                                                             |        |                                                                                                                                                    |
| LATIN                       | fixed 8-bit Latin.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |                                       |       |                    |         |                       |         |                                                                    |           |                                                             |        |                                                                                                                                                    |
| UNICODE                     | fixed 16-bit Unicode.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                  |                                       |       |                    |         |                       |         |                                                                    |           |                                                             |        |                                                                                                                                                    |
| GRAPHIC                     | fixed 16-bit Unicode as defined by IBM Corporation for Database 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |                                       |       |                    |         |                       |         |                                                                    |           |                                                             |        |                                                                                                                                                    |
| KANJISJIS                   | mixed single and multibyte characters defined by KanjiSJIS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  |                                       |       |                    |         |                       |         |                                                                    |           |                                                             |        |                                                                                                                                                    |
| KANJI1                      | mixed single and multibyte characters defined by KanjiEBCDIC, KanjiShift-JIS, or KanjiEUC, depending on the current character set for the session.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |                                       |       |                    |         |                       |         |                                                                    |           |                                                             |        |                                                                                                                                                    |
| <i>role_name</i>            | <p>the name of a role or set of roles to assign as the default role set for the user.</p> <p>The assignment of a default role provides a user with an enabled role at logon. If you do not assign a default role to the user, you must submit a SET ROLE request (see <a href="#">“SET ROLE” on page 656</a>) to enable the necessary role set for the session.</p>                                                                                                                                                                                                                                                                                               |                  |                                       |       |                    |         |                       |         |                                                                    |           |                                                             |        |                                                                                                                                                    |
| NONE<br>NULL                | that no default role exists for the user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                  |                                       |       |                    |         |                       |         |                                                                    |           |                                                             |        |                                                                                                                                                    |
| ALL                         | the default role for the user to be all roles that are directly and indirectly granted to the user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |                                       |       |                    |         |                       |         |                                                                    |           |                                                             |        |                                                                                                                                                    |
| <i>profile_name</i>         | <p>the name of an optimizer cost profile to assign to the user.</p> <p>If you do not assign an optimizer cost profile to the user, <i>profile_name</i> is set null.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |                                       |       |                    |         |                       |         |                                                                    |           |                                                             |        |                                                                                                                                                    |
| NULL                        | that no profile exists for the user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |                                       |       |                    |         |                       |         |                                                                    |           |                                                             |        |                                                                                                                                                    |

## ANSI Compliance

CREATE USER is a Teradata extension to the ANSI SQL:2008 standard.

CREATE USER is functionally equivalent to the ANSI SQL:2008 CREATE SCHEMA statement.

## Required Privileges

To create a user, you must have CREATE USER privilege on the immediate owner database or user. The creator receives all of the following privileges on the newly created user:

- CHECKPOINT
- CREATE DATABASE
- CREATE MACRO
- CREATE TABLE
- CREATE TRIGGER
- CREATE USER
- CREATE VIEW
- DELETE
- DROP DATABASE
- DROP
- DROP MACRO
- DROP TABLE
- DROP TRIGGER
- DROP USER
- DROP VIEW
- DUMP
- EXECUTE
- INSERT
- REVOKE
- RESTORE
- UPDATE

Privileges given to the creator and owner are WITH GRANT OPTION.

Newly created users do *not* receive WITH GRANT OPTION privileges by default.

Newly created users are automatically granted the privileges needed to create and maintain objects in their space, but must be explicitly granted the privileges needed to CREATE USER/MODIFY USER or CREATE DATABASE (see also “GRANT (SQL Form)” in *SQL Data Control Language*).

The *account\_ID* can include an optional priority-level prefix. User priorities are used to maintain efficient operation of the Teradata Database while providing equitable service to multiple client systems and users. Any user who has the CREATE/MODIFY USER privilege can assign a priority; therefore, the DBA should monitor priority assignments closely.

## Privileges Granted Automatically

The following privileges are automatically granted to a user when it is created:

- CHECKPOINT
- CREATE AUTHORIZATION
- CREATE MACRO
- CREATE TABLE
- CREATE TRIGGER
- CREATE VIEW
- DELETE
- DROP AUTHORIZATION
- DROP FUNCTION
- DROP MACRO
- DROP TABLE
- DROP PROCEDURE
- DROP TABLE
- DROP TRIGGER
- DROP VIEW
- DUMP
- EXECUTE
- INSERT
- RESTORE
- SELECT

The following privileges on itself are *not* automatically granted to a user when it is created:

- ALTER EXTERNAL PROCEDURE
- ALTER FUNCTION
- ALTER PROCEDURE
- CREATE DATABASE
- CREATE EXTERNAL PROCEDURE
- CREATE FUNCTION
- CREATE PROCEDURE
- CREATE USER
- DROP DATABASE
- DROP USER
- EXECUTE FUNCTION
- EXECUTE PROCEDURE

## Example

Assume that a Teradata system has just been installed. The DBA has logged on as user *DBC* and has submitted a CREATE USER request to create the administrative user called *SYSADMIN*. As user *SYSADMIN*, the DBA submits CREATE DATABASE statements to create such required databases as *finance*, *executive*, *engineering*, *manufacturing*, and *marketing*.

Still logged on as user *SYSADMIN*, the DBA then adds a new user to the *finance* database using a CREATE USER request, as follows:

```
CREATE USER marks
FROM finance
AS
PERMANENT = 1000000,
PASSWORD = finan1,
SPOOL = 1200000,
FALLBACK PROTECTION,
DUAL AFTER JOURNAL,
DEFAULT JOURNAL TABLE = finance.journals,
DEFAULT DATABASE = finance,
STARTUP = 'EXEC setpf;'
ACCOUNT = '$mfinance', '$hfinance';
```

After user *marks* is created, the DBA submits the following request to grant *finance* privileges WITH GRANT OPTION to *marks*:

```
GRANT ALL ON finance
TO marks
WITH GRANT OPTION;
```

## Related Topics

See the following for more information related to users.

- *Data Dictionary*
- [“DROP USER” on page 594.](#)
- [“CREATE PROFILE” on page 347](#)

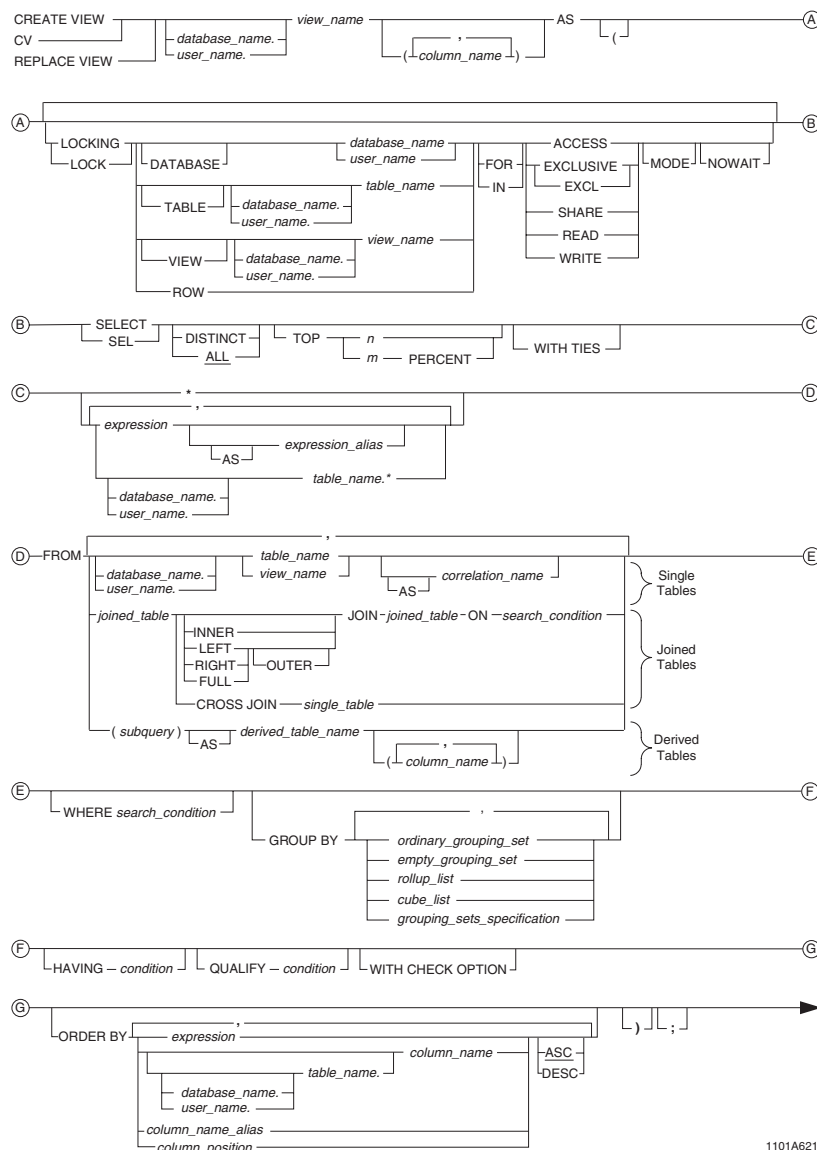
# CREATE VIEW/ REPLACE VIEW

## Purpose

CREATE VIEW defines a view on a set of tables or views or both.

REPLACE VIEW redefines an existing view or, if the specified view does not exist, creates a new view with the specified name.

## Syntax



1101A621

where:

| Syntax Element ...                            | Specifies ...                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i>       | the name of the database or user to contain <i>view_name</i> if something other than the current database or user.                                                                                                                                                                                                                                              |
| <i>view_name</i>                              | the name of the new view.<br>If <i>view_name</i> is not fully qualified, the default database is used.                                                                                                                                                                                                                                                          |
| <i>column_name</i>                            | the name of a view column. If more than one column is specified, list their names in the order in which each column is to be displayed for the view.                                                                                                                                                                                                            |
| AS                                            | an introduction to the view definition.                                                                                                                                                                                                                                                                                                                         |
| LOCKING Clause                                |                                                                                                                                                                                                                                                                                                                                                                 |
| LOCK[ING]                                     | the type of lock to be placed on a database, table, view, or row hash. This setting will override any default lock placed on that object by the system (see the CREATE VIEW REPLACE VIEW topic “Views and the LOCKING Request Modifier” in <i>SQL Data Definition Language Detailed Topics</i> and <i>SQL Data Manipulation Language</i> ).                     |
| DATABASE                                      | that a lock is to be placed at the database level for this view definition.                                                                                                                                                                                                                                                                                     |
| <i>database_name</i>   <i>user_name</i>       | the name of the database or user that is to be locked for this view definition.                                                                                                                                                                                                                                                                                 |
| TABLE<br>VIEW                                 | that a lock is to be placed at the table or view level for this view definition.                                                                                                                                                                                                                                                                                |
| <i>database_name</i>   <i>user_name</i>       | the name of the containing database or user for <i>table_name</i> or <i>view_name</i> if something other than the current database or user.                                                                                                                                                                                                                     |
| <i>table_name</i><br><i>view_name</i>         | the name of a user base table or view to be locked for this view definition.                                                                                                                                                                                                                                                                                    |
| ROW                                           | that a lock is to be placed at the row hash level for this view definition.                                                                                                                                                                                                                                                                                     |
| FOR<br>IN                                     | a noise keyword that introduces the severity of the lock to be placed.                                                                                                                                                                                                                                                                                          |
| ACCESS<br>READ<br>SHARE<br>WRITE<br>EXCLUSIVE | the severity of the lock to be placed when accessing base tables through this view.<br>SHARE is a synonym for READ.                                                                                                                                                                                                                                             |
| MODE                                          | an optional keyword.                                                                                                                                                                                                                                                                                                                                            |
| NOWAIT                                        | that if the indicated lock cannot be obtained, the statement using this view should be aborted.<br><br>This feature is used to handle conditions such as a potential deadly embrace situation, where it is not desirable to have a statement waiting for resources, possibly tying up other resources in the process of waiting for a lock to become available. |



| Syntax Element ...                                                                                                                                                                        | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SELECT Clause</b><br><br><b>You can delimit the SELECT clause with parentheses. If you do, you must specify both opening and closing parentheses or the system aborts the request.</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| SELECT                                                                                                                                                                                    | that the <i>expression</i> to be associated with the <i>column_name</i> list is to select from one or more existing user base tables or views.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| DISTINCT                                                                                                                                                                                  | <p>that only one row is to be returned from any set of duplicates that might result from a given <i>expression</i> list.</p> <p>Two rows are considered duplicates only if each value in one is equal to each corresponding value in the other.</p> <p>You cannot specify a DISTINCT operator if the view definition also includes a TOP <i>n</i> or TOP <i>m</i> PERCENT specification.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| ALL                                                                                                                                                                                       | <p>that all rows, including duplicates, are to be returned in the results of the expression list.</p> <p>This is the default value.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| TOP <i>n</i>                                                                                                                                                                              | <p>to return only <i>n</i> rows from the select operation, where <i>n</i> can be either a DECIMAL or an INTEGER value.</p> <p>Note that this can be more limiting than the TOP <i>n</i> clause you can specify with DML statements depending on whether you specify an ORDER BY clause or not. If you do not specify an ORDER BY clause, then a TOP <i>n</i> clause only specifies that <i>any n</i> base table rows be returned, not <i>the</i> TOP <i>n</i>.</p> <p>If you specify the TOP <i>n</i> option, then you can also specify an ORDER BY clause. Otherwise, ORDER BY clauses are not valid for view definitions.</p> <p>You cannot specify a TOP <i>n</i> clause if the view definition also includes a DISTINCT operator or a SAMPLE clause.</p> <p>Although it is possible to implement TOP <i>n</i> using the ordered analytic functions QUALIFY RANK() or QUALIFY ROW_NUMBER(), it is always at least <i>as</i> performant, and often <i>more</i> performant, to use TOP <i>n</i>.</p>                                                                                                                                                                                                                                                                                                                                  |
| TOP <i>m</i> PERCENT                                                                                                                                                                      | <p>to return only <i>m</i> percent of rows from the select operation, where <i>m</i> can be either a DECIMAL or an INTEGER value.</p> <p>If <math>(m * \text{COUNT} (*) / 100.0)</math> does not evaluate to an integer value, then the system rounds it up to the next highest integer value.</p> <p>For example, if <math>(m * \text{COUNT} (*) / 100.0)</math> evaluates to 0.1, then it is rounded up to 1.</p> <p>If <math>(m * \text{COUNT} (*) / 100.0)</math> evaluates to 9.2, then it is rounded up to 10.</p> <p>The system only applies this rounding up to the first 15 digits following the decimal point. For example, if <math>(m * \text{COUNT} (*) / 100.0)</math> evaluates to 0.000000000000001, then the system does not round it up to 1.</p> <p>You cannot specify a TOP <i>m</i> PERCENT clause if the view definition also includes a DISTINCT operator or a SAMPLE clause.</p> <p>Although it is possible to implement TOP <i>m</i> PERCENT using the ordered analytic functions QUALIFY RANK() or QUALIFY ROW_NUMBER(), it is always at least <i>as</i> performant, and often <i>more</i> performant, to use TOP <i>m</i> PERCENT.</p> <p>If you specify the TOP <i>m</i> PERCENT option, then you can also specify an ORDER BY clause. Otherwise, ORDER BY clauses are not valid for view definitions.</p> |

| Syntax Element ...                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WITH TIES                               | <p>that all qualified rows having the same value for the ORDER BY fields are to be included in the results set.</p> <p>This option only works if you also specify an ORDER BY clause; otherwise, the system ignores it.</p> <p>If you do not specify the WITH TIES option, then the system returns only the first <i>n</i> qualified rows.</p> <p>For example, suppose you specify TOP 2 WITH TIES and ORDER BY OrderValue. If the top customer for this field has an OrderValue of 300,000 USD, but there are two additional customers with the same next highest OrderValue of 295,000 USD, then all 3 are returned in the result set.</p> <p>If you did not specify WITH TIES, then only the first of the two customers encountered in the result list having an OrderValue of 295,000 USD would be returned.</p> |
| <i>expression</i>                       | <p>a valid SQL expression.</p> <p>You can specify both aggregate and arithmetic operators in a view definition expression.</p> <p>You cannot specify a SAMPLE clause if the view definition also includes a TOP <i>n</i> or TOP <i>m</i> PERCENT specification.</p> <p>The presence of aggregates in a view definition renders that view non-updatable.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| AS                                      | an optional introduction to <i>correlation_name</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>expression_alias</i>                 | <p>a temporary name for the expression.</p> <p>Correlation names are used to name expressions and must be always be specified for a self-join operation on the table.</p> <p>Correlation names are also referred to as range variables.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| *                                       | <p>that all columns from all tables referenced in the FROM clause are to be returned.</p> <p>When qualified by <i>table_name</i>, * specifies that all columns of only the user base table or view specified by <i>table_name</i> are to be returned.</p> <p>View columns are explicitly enumerated when views are defined; therefore, if a table is changed after a view is defined, those changes will not appear if the SELECT * construct is used.</p>                                                                                                                                                                                                                                                                                                                                                           |
| <i>database_name</i>   <i>user_name</i> | the name of the database or user to contain <i>view_name</i> if something other than the current database or user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <i>table_name</i><br><i>view_name</i>   | <p>the name of a user base table or view.</p> <p>Use a <i>table_name</i>.* specification in the SELECT list to define the specific table from which rows are to be returned when two or more tables are referenced in the FROM clause.</p> <p>You cannot create or replace a view on a queue table (see <a href="#">“CREATE TABLE (Queue Table Form)” on page 462</a>).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                          |

| Syntax Element ...                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>FROM Clause</b>                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| FROM                                    | <p>the names of one or more tables or views from which <i>expression</i> is to be derived.</p> <p>You can create views that reference global temporary tables and volatile tables.</p> <p>A view can reference a global temporary trace table (see <a href="#">“CREATE GLOBAL TEMPORARY TRACE TABLE” on page 186</a>), but such a view is not updatable.</p> <p>You cannot create a view that references a queue table (see <a href="#">“CREATE TABLE (Queue Table Form)” on page 462</a>).</p> <p>See <i>SQL Data Manipulation Language</i> for information about the FROM clause.</p> |
| <i>database_name</i>   <i>user_name</i> | the name of the containing database or user for <i>table_name</i> or <i>view_name</i> if something other than the current database or user.                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <i>table_name</i>                       | the name of a data table from which columns for this view are to be projected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <i>view_name</i>                        | the name of a view from which columns for this view are to be projected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>joined_table</i>                     | <p>the name of a joined user base table or view.</p> <p>You can create views that reference global temporary tables and volatile tables.</p> <p>A view can reference a global temporary trace table (see <a href="#">“CREATE GLOBAL TEMPORARY TRACE TABLE” on page 186</a>), but such a view is not updatable.</p> <p>You cannot create a view on a queue table (see <a href="#">“CREATE TABLE (Queue Table Form)” on page 462</a>).</p>                                                                                                                                                |
| INNER                                   | <p>a join in which qualifying rows from one table are combined with qualifying rows from another table according to a specified join condition.</p> <p>INNER is the form specified by the ANSI SQL-2003 standard. Teradata also supports an extension that allows you to separate join relations using COMMA characters.</p> <p>Inner join is the default join type for view definitions.</p>                                                                                                                                                                                           |
| OUTER                                   | <p>a join in which qualifying rows from one table or view that do not have matches in the other table or view, are included in the join result. The rows from the outer table or view are extended with nulls.</p> <p>See <i>SQL Data Manipulation Language</i> for more information about outer joins.</p>                                                                                                                                                                                                                                                                             |
| LEFT OUTER                              | <p>an outer join on the table or view that was listed first in the FROM clause.</p> <p>In a LEFT OUTER JOIN, the rows from the left table or view that are not returned in the result of the inner join of the two tables/views are returned in the outer join result and extended with nulls.</p>                                                                                                                                                                                                                                                                                      |
| RIGHT OUTER                             | <p>an outer join on the table or view that was listed second in the FROM clause.</p> <p>In a RIGHT OUTER JOIN, the rows from the right table or view that are not returned in the result of the inner join of the two tables/views are returned in the outer join result and extended with nulls.</p>                                                                                                                                                                                                                                                                                   |
| FULL OUTER                              | <p>a join that returns rows, including nonqualifying rows, from both tables or views.</p> <p>In a FULL OUTER JOIN, rows from both tables that have not been returned in the result of the inner join are returned in the outer join result, and extended with nulls.</p>                                                                                                                                                                                                                                                                                                                |
| JOIN                                    | an introduction to the name of the second table to participate in the join.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

| Syntax Element ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Specifies ...                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>joined_table</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | the name of the joined user base table, view, or derived table.<br>You cannot create or replace a view on a queue table (see <a href="#">“CREATE TABLE (Queue Table Form)” on page 462</a> ).                                                                                                                                |
| ON<br><i>search_condition</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | one or more conditional expressions that must be satisfied by the result rows. An ON condition clause is required if the FROM clause specifies outer join syntax.                                                                                                                                                            |
| CROSS JOIN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | A CROSS JOIN is an unconstrained, or Cartesian join. The Cartesian product of two tables/views returns a concatenated product of all rows from all tables or views specified in the FROM clause.                                                                                                                             |
| <i>single_table</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | the name of a user base table or view participating in the join.<br>You cannot create or replace a view on a queue table (see <a href="#">“CREATE TABLE (Queue Table Form)” on page 462</a> ).                                                                                                                               |
| <p style="text-align: center;"><b>Derived Tables</b></p> <p>A derived table is constructed by means of evaluating a table expression over the columns and values of its underlying table set. The semantics of derived tables are identical to those of views. In fact, a view is nothing more than a named derived table.</p> <p>Derived tables allow you to specify a spool file composed of selected data from the underlying table set supporting the table expression in the FROM list of a query.</p> |                                                                                                                                                                                                                                                                                                                              |
| <i>subquery</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | a SELECT statement that defines the derived table.<br>You cannot specify the TOP <i>n</i> or TOP <i>m</i> PERCENT options (see “TOP <i>n</i> ” and “TOP <i>m</i> PERCENT” later in this table, and <i>SQL Data Manipulation Language</i> ) in a subquery.                                                                    |
| AS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | an optional introductory clause to derived table name.                                                                                                                                                                                                                                                                       |
| <i>derived_table_name</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | the name of a derived table.                                                                                                                                                                                                                                                                                                 |
| <i>column_name</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | a column name for a member of the set of all column names specified in the subquery SELECT list.<br>Specify only an unqualified column name here; do not use fully qualified forms such as the following: <ul style="list-style-type: none"> <li>databasename.tablename.columnname</li> <li>tablename.columnname.</li> </ul> |
| <p style="text-align: center;"><b>WHERE Clause</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                              |
| WHERE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | an introduction to the search condition list in the SELECT statement.                                                                                                                                                                                                                                                        |
| <i>search_condition</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | a conditional search expression that must be satisfied by the row set returned by the specified SELECT statement.                                                                                                                                                                                                            |
| GROUP BY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | an introduction to an optional reference to one or more expressions in the select expression list used to group rows in the results set.                                                                                                                                                                                     |

| Syntax Element ...                 | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                  |            |                    |                                                                                                                                                                                                                                                                            |                        |                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ordinary_grouping_set</i>       | <p>a column expression by which the rows returned by the request are grouped.</p> <p><i>ordinary_grouping_set</i> falls into three general categories:</p> <table> <tr> <th>Ordinary Grouping Set Expression</th><th>Definition</th></tr> <tr> <td><i>column_name</i></td><td> <p>a set of column names drawn from the list of tables specified in the FROM clause of the SELECT request that is used in the GROUP BY clause to specify the columns by which data is to be grouped.</p> <p>You cannot include LOB columns in the grouping expression.</p> </td></tr> <tr> <td><i>column_position</i></td><td> <p>the sequential numeric position of columns within the <i>column_list</i> clause of the SELECT statement that is used in the GROUP BY clause to specify the order by which data is to be grouped.</p> <p>This must be a positive integer.</p> <p>You cannot include LOB columns in the grouping expression.</p> <p>Use of <i>column_position</i> is a Teradata extension to the ANSI SQL-2003 standard.</p> </td></tr> <tr> <td><i>expression</i></td><td> <p>any list of valid SQL expressions specified for the GROUP BY clause.</p> <p>You can specify <i>column_name</i>, <i>column_position</i>, and <i>expression</i> either as individual entries or as a list.</p> <p>You cannot include LOB columns in the ordinary grouping set.</p> <p>Use of <i>expression</i> is a Teradata extension to the ANSI SQL-2003 standard.</p> </td></tr> </table> | Ordinary Grouping Set Expression | Definition | <i>column_name</i> | <p>a set of column names drawn from the list of tables specified in the FROM clause of the SELECT request that is used in the GROUP BY clause to specify the columns by which data is to be grouped.</p> <p>You cannot include LOB columns in the grouping expression.</p> | <i>column_position</i> | <p>the sequential numeric position of columns within the <i>column_list</i> clause of the SELECT statement that is used in the GROUP BY clause to specify the order by which data is to be grouped.</p> <p>This must be a positive integer.</p> <p>You cannot include LOB columns in the grouping expression.</p> <p>Use of <i>column_position</i> is a Teradata extension to the ANSI SQL-2003 standard.</p> | <i>expression</i> | <p>any list of valid SQL expressions specified for the GROUP BY clause.</p> <p>You can specify <i>column_name</i>, <i>column_position</i>, and <i>expression</i> either as individual entries or as a list.</p> <p>You cannot include LOB columns in the ordinary grouping set.</p> <p>Use of <i>expression</i> is a Teradata extension to the ANSI SQL-2003 standard.</p> |
| Ordinary Grouping Set Expression   | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                  |            |                    |                                                                                                                                                                                                                                                                            |                        |                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                                                                                                                                                                                                                                                                                                                                                            |
| <i>column_name</i>                 | <p>a set of column names drawn from the list of tables specified in the FROM clause of the SELECT request that is used in the GROUP BY clause to specify the columns by which data is to be grouped.</p> <p>You cannot include LOB columns in the grouping expression.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                  |            |                    |                                                                                                                                                                                                                                                                            |                        |                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                                                                                                                                                                                                                                                                                                                                                            |
| <i>column_position</i>             | <p>the sequential numeric position of columns within the <i>column_list</i> clause of the SELECT statement that is used in the GROUP BY clause to specify the order by which data is to be grouped.</p> <p>This must be a positive integer.</p> <p>You cannot include LOB columns in the grouping expression.</p> <p>Use of <i>column_position</i> is a Teradata extension to the ANSI SQL-2003 standard.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                  |            |                    |                                                                                                                                                                                                                                                                            |                        |                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                                                                                                                                                                                                                                                                                                                                                            |
| <i>expression</i>                  | <p>any list of valid SQL expressions specified for the GROUP BY clause.</p> <p>You can specify <i>column_name</i>, <i>column_position</i>, and <i>expression</i> either as individual entries or as a list.</p> <p>You cannot include LOB columns in the ordinary grouping set.</p> <p>Use of <i>expression</i> is a Teradata extension to the ANSI SQL-2003 standard.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                  |            |                    |                                                                                                                                                                                                                                                                            |                        |                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                                                                                                                                                                                                                                                                                                                                                            |
| <i>empty_grouping_set</i>          | a contiguous LEFT PARENTHESIS, RIGHT PARENTHESIS pair with no argument. In general, this syntax is used to request a grand total.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                  |            |                    |                                                                                                                                                                                                                                                                            |                        |                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                                                                                                                                                                                                                                                                                                                                                            |
| <i>rollup_list</i>                 | a ROLLUP expression that reports result rows in a single dimension with one or more levels of detail. See <i>SQL Data Manipulation Language</i> for further information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                  |            |                    |                                                                                                                                                                                                                                                                            |                        |                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                                                                                                                                                                                                                                                                                                                                                            |
| <i>cube_list</i>                   | a CUBE expression that reports result rows in multiple dimensions with one or more levels of detail. See <i>SQL Data Manipulation Language</i> for further information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                  |            |                    |                                                                                                                                                                                                                                                                            |                        |                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                                                                                                                                                                                                                                                                                                                                                            |
| <i>grouping_sets_specification</i> | <p>a GROUPING SETS expression that reports result rows in one of two ways:</p> <ul style="list-style-type: none"> <li>As a single dimension, but without a full ROLLUP.</li> <li>As multiple dimensions, but without a full CUBE.</li> </ul> <p>See <i>SQL Data Manipulation Language</i> for further information.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                  |            |                    |                                                                                                                                                                                                                                                                            |                        |                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                                                                                                                                                                                                                                                                                                                                                            |
| HAVING Clause                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                  |            |                    |                                                                                                                                                                                                                                                                            |                        |                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                                                                                                                                                                                                                                                                                                                                                            |
| HAVING                             | an introduction to a conditional grouping clause in the SELECT statement.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                  |            |                    |                                                                                                                                                                                                                                                                            |                        |                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                                                                                                                                                                                                                                                                                                                                                            |
| <i>condition</i>                   | <p>one or more conditional Boolean expressions that must be satisfied by the results groups.</p> <p>You can use aggregate operators in a HAVING condition.</p> <p>You cannot include BLOB, CLOB, UDT, or Period columns in the HAVING condition.</p> <p>HAVING <i>condition</i> filters rows from a single group defined in the select expression list that has only aggregate results, or it selects rows from the group or groups defined in a GROUP BY clause.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                  |            |                    |                                                                                                                                                                                                                                                                            |                        |                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                                                                                                                                                                                                                                                                                                                                                            |

| Syntax Element ...                                                                                                                                   | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>QUALIFY Clause</b>                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| QUALIFY                                                                                                                                              | <p>an introduction to a conditional ordered analytical function filtering clause in the SELECT statement.</p> <p>A QUALIFY clause is valid when coded as part of a seed statement.</p> <p>QUALIFY is <i>never</i> valid when coded as part of a recursive statement.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>condition</i>                                                                                                                                     | <p>one or more conditional Boolean expressions that must be satisfied by the results groups.</p> <p>You can use aggregate operators in a QUALIFY condition.</p> <p>You cannot include BLOB, CLOB, UDT, or Period columns in the QUALIFY condition.</p> <p>QUALIFY <i>condition</i> filters rows from a previously computed ordered analytical function.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>WITH CHECK OPTION Clause</b>                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| WITH CHECK OPTION                                                                                                                                    | <p>Restricts the rows that can be updated in the table by an INSERT or UPDATE statement. See the CREATE VIEW REPLACE VIEW topic “WITH CHECK OPTION Clause in Views” in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>ORDER BY Clause</b>                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <p>You can only specify an ORDER BY clause for a view definition if you also specify either the TOP <i>n</i> or the TOP <i>m</i> PERCENT option.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| ORDER BY                                                                                                                                             | <p>the order in which result rows are to be sorted.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <i>expression</i>                                                                                                                                    | <p>an expression in the subselect expression list, either by name, or by means of a constant that specifies the numeric position of the expression in the expression list.</p> <p>If the sort field is a character string, the <i>expression</i> used in the ORDER BY phrase can include a type modifier to force the sort to be either CASESPECIFIC or NOT CASESPECIFIC.</p> <p>You cannot include LOB columns or ordered analytic functions in the ORDER BY expression list.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <i>column_name</i>                                                                                                                                   | <p>the names of columns used in the ORDER BY clause in the subselect expression. These can be ascending or descending.</p> <p>You cannot include LOB columns in the ORDER BY column list.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>column_name_alias</i>                                                                                                                             | <p>a column name alias specified in the select expression list of the view definition for the column on which the result rows are to be sorted.</p> <p>If you specify a <i>column_name_alias</i> to sort by, then that alias cannot match the name of any column that is defined in the view definition for any table or view referenced in the FROM clause of the view definition whether that column is specified in the select list or not. This does not work because the system always references the underlying physical column having the name rather than the column that you attempt to reference using that same name as its alias.</p> <p>If you attempt to specify such an improper <i>column_name_alias</i>, the system aborts the request and returns an error to the requestor.</p> <p>The workaround for this is to specify the sort column by its <i>column_position</i> value within the select list for the view definition. See “ORDER BY” in <i>SQL Data Manipulation Language</i>.</p> |

| Syntax Element ...     | Specifies ...                                                                                                                                                                                                                                                                                                                                                 |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>column_position</i> | the numeric position of the columns specified by the ORDER BY clause. These can be ascending or descending.                                                                                                                                                                                                                                                   |
| ASC<br>DESC            | <p>either an ascending or a descending sort order.</p> <p>ASC specifies ascending order; DESC specifies descending order. The default order is ASC.</p> <p>If a sort option is not given, result values are sorted in ascending order according to the client system collating sequence.</p> <p>If ORDER BY is not specified, rows are returned unsorted.</p> |

## ANSI Compliance

CREATE VIEW is ANSI SQL:2008-compliant.

REPLACE VIEW is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges: CREATE VIEW

To create a view, you must have the CREATE VIEW privilege.

The creator receives the DROP VIEW, INSERT, UPDATE, DELETE, and SELECT privileges on the newly created view WITH GRANT OPTION.

If a user other than the owner accesses a view, then all of the relevant privileges needed by the immediate owner of the view to access underlying tables and views must also be held by the immediate owner of the view WITH GRANT OPTION.

You must have the following privileges to update a table through a view:

| IF you are ...                      | THEN you must have these privileges ...                                                                                   |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| the immediate owner of the view     | <ul style="list-style-type: none"> <li>• UPDATE on the view.</li> <li>• UPDATE on the table.</li> </ul>                   |
| not the immediate owner of the view | <ul style="list-style-type: none"> <li>• UPDATE on the view.</li> <li>• UPDATE WITH GRANT OPTION on the table.</li> </ul> |

You must have the following privileges to delete rows from a table through a view:

| IF you are ...                      | THEN you must have these privileges ...                                                                                   |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| the immediate owner of the view     | <ul style="list-style-type: none"> <li>• DELETE on the view.</li> <li>• DELETE on the table.</li> </ul>                   |
| not the immediate owner of the view | <ul style="list-style-type: none"> <li>• DELETE on the view.</li> <li>• DELETE WITH GRANT OPTION on the table.</li> </ul> |

You must have the following privileges to update or delete rows from a table using a search condition through a view:

| IF you are ...                      | THEN you must have these privileges ...                                                                                                                                       |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| the immediate owner of the view     | <ul style="list-style-type: none"><li>• SELECT ACCESS on the view.</li><li>• SELECT ACCESS on the table.</li></ul>                                                            |
| not the immediate owner of the view | <ul style="list-style-type: none"><li>• SELECT ACCESS on the view.</li><li>• SELECT ACCESS WITH GRANT OPTION on the objects specified in the search condition list.</li></ul> |

## Required Privileges: REPLACE VIEW

You must have the relevant privileges listed in [“Required Privileges: CREATE VIEW” on page 543](#) as well as the following additional privileges to replace a view:

- DROP VIEW privilege.
- CREATE VIEW privilege if the specified view does not exist.

## Privileges Granted Automatically

When you create a new view, the following privileges are automatically granted to it:

- DELETE
- INSERT
- DROP VIEW
- SELECT
- GRANT
- UPDATE

## Example 1

The following statement creates a view of the *employee* table so that it provides access only to the names and job titles of the employees in department 300:

```
CREATE VIEW dept300 (name, jobtitle) AS
  SELECT name, jobtitle
  FROM employee
  WHERE DeptNo = 300
  WITH CHECK OPTION;
```

The WITH CHECK OPTION prevents using this view to INSERT a row into *employee* through the view, or to update any row of *employee* for which DeptNo <> 300.



## Example 2

The following statement creates a view of the *department* table. Each column in the view is defined with a title. Therefore, the view data is displayed with column titles that differ from those defined for the *department* table.

```
CREATE VIEW DEPT AS
SELECT   deptno(TITLE 'Department Number'),
         deptname(TITLE 'Department Name'),
         loc (TITLE 'Department Location'),
         mgrno(TITLE 'Manager Number')
FROM department;
```

## Example 3

The following statement creates a view that allows a personnel executive to keep track of employees who have more experience on the job than their supervisors. This statement defines a self-join of the *employee* table. The correlation names *workers* and *managers*, created in the FROM clause, see the two temporary tables participating in the self-join.

```
CREATE VIEW empinfo (workername,workeryrsexp,department,
                    managername,manageryrsexp) AS
SELECT workers.name, workers.yrsexp, workers.deptno,
       managers.name, managers.yrsexp
FROM employee AS workers, employee AS managers
WHERE workers.deptno = managers.deptno
AND managers.jobtitle IN ('Manager', 'Vice Pres')
AND workers.yrsexp > managers.yrsexp;
```

## Example 4

The following request illustrates the use of aggregates in a view definition. The result rows are grouped by department number and include only those rows with an average salary of \$35,000 or higher.

```
CREATE VIEW deptsal (deptno, minsal, maxsal, avgsal) AS
SELECT deptno, MIN(salary), MAX(salary), AVG(salary)
FROM employee
GROUP BY deptno
HAVING AVG(salary) >= 35000;
```

Now perform the following SELECT statement using this view:

```
SELECT *
FROM deptsal;
```

The query returns the following response set:

| DeptNo | MinSal    | MaxSal    | AvgSal    |
|--------|-----------|-----------|-----------|
| -----  | -----     | -----     | -----     |
| 600    | 28,600.00 | 45,000.00 | 36,650.00 |
| 300    | 23,000.00 | 65,000.00 | 47,666.67 |
| 700    | 30,000.00 | 45,000.00 | 37,666.67 |
| 500    | 22,000.00 | 56,000.00 | 38,285.71 |

## Example 5

The following SQL request returns the response set that follows:

```
SELECT deptno, minsal, minsal+10000, avgsal
FROM deptsal
WHERE avgsal > (minsal + 10000);
```

| DeptNo | MinSal    | (MinSal+10000) | AvgSal    |
|--------|-----------|----------------|-----------|
| 500    | 22,000.00 | 32000.00       | 38,285.71 |
| 300    | 23,000.00 | 33000.00       | 47,666.67 |

## Example 6

This example shows how use of a view name in an UPDATE, INSERT, or DELETE request allows you to add, change, or remove data in the table set on which the view is based. For example, updating data via a view changes data in the underlying table. Inserting or deleting rows via a view adds or removes rows from the underlying table.

Consider the following *staff\_info* view, which gives a personnel clerk retrieval access to employee numbers, names, job titles, department numbers, sex, and dates of birth for all employees except vice presidents and managers:

```
CREATE VIEW staff_info (number, name, position, department,
                        sex, dob) AS
SELECT employee.empno, name, jobtitle, deptno, sex, dob
FROM employee
WHERE jobtitle NOT IN ('Vice Pres', 'Manager')
WITH CHECK OPTION;
```

If the owner of *staff\_info* has the insert privilege on the *employee* table, and if the clerk has the insert privilege on *staff\_info*, then the clerk can use this view to add new rows to *employee*. For example, performing the following INSERT request inserts a row in the underlying *employee* table that contains the specified information:

```
INSERT INTO staff_info (number, name, position, department, sex,
                        dob)
VALUES (10024, 'Crowell N', 'Secretary', 200, 'F', 'Jun 03 1960');
```

The constraint on *staff\_info* illustrated by the following WHERE clause applies to any insert using this view that includes the WITH CHECK OPTION phrase.

```
...
WHERE jobtitle NOT IN ('Vice Pres', 'Manager')
...
```

Therefore, the preceding INSERT statement would fail if the Position entered for Crowell was Vice Pres or Manager.

If this view were defined to not include the WITH CHECK OPTION, and a user had UPDATE privilege, that user could update a job title to *Vice Pres* or *Manager*. The user would be unable to access the changed row through the view

Entering the following request changes the department number (from 200 to 300) entered for Crowell in the preceding INSERT request:

```
UPDATE staff_info
SET department = 300
WHERE number = 10024;
```

Performing the following DELETE request removes the row for employee Crowell from the *staff\_info* table:

```
DELETE FROM staff_info
WHERE number = 10024;
```

A view is a useful method for allowing users access to table data. However, as the preceding examples suggest, granting another user insert, update, and delete privileges on a view means relinquishing some control over your data. Carefully consider granting such privileges.

The default is *not* to constrain updated or inserted values unless the view definition explicitly includes WITH CHECK OPTION.

## Example 7: View Definition With a Dynamic UDT Expression

This example shows how a dynamic UDT can be specified in a view definition.

First, the following request shows the long version in which the column expressions are all specified:

```
SELECT udf_aggregate_mp_struct(NEW VARIANT_TYPE(MultiType.w AS w,
MultiType.x AS x,
MultiType.y AS y,
NEW MP_STRUCTURED_INT(MultiType.w, MultiType.x,
MultiType.y) AS z)) AS m
FROM MultiType;
```

```
*** Query completed. One row found. One column returned.
*** Total elapsed time was 1 second.
```

```
      m
-----
      60
```

Now create a view that incorporates the previous SELECT request verbatim:

```
CREATE VIEW multitype_v AS
SELECT udf_aggregate_mp_struct(NEW VARIANT_TYPE(MultiType.w AS w,
MultiType.x AS x,
MultiType.y AS y,
NEW MP_STRUCTURED_INT(MultiType.w, MultiType.x,
MultiType.y) AS z)) AS m FROM MultiType;
```

Running the following SELECT request against the newly created view returns the identical result:

```
SELECT *  
FROM multitype_v;
```

```
*** Query completed. One row found. One column returned.  
*** Total elapsed time was 1 second.
```

```
          m  
-----  
          60
```

## Example 8: REPLACE VIEW

To change the department *name* column in the *employee\_info* view to a department number column, type:

```
REPLACE VIEW employee_info (number, name, position, department)  
AS SELECT employee.empno, name, jobtitle, deptno  
FROM emp_info  
WHERE jobtitle NOT IN ('vice pres', 'manager');
```

You must have the DROP privilege on a view or its containing database or user to replace it.

If you enter a REPLACE VIEW statement for a view that does not exist, the system creates the view following the specifications in the REPLACE statement.

## Related Topics

- [“CREATE RECURSIVE VIEW/ REPLACE RECURSIVE VIEW” on page 354](#)
- [“DROP MACRO/ DROP PROCEDURE/ DROP TABLE/ DROP TRIGGER/ DROP VIEW” on page 574](#)

## CHAPTER 7 **DATABASE - DROP USER**

---

DDL statements define, modify, and remove database object definitions.

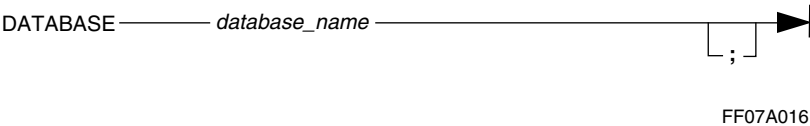
This chapter documents the syntax for, and provides examples of, the Teradata Database DDL statements from DATABASE through DROP USER.

# DATABASE

## Purpose

Establishes a new default database for the current session for SQL requests that do not require fully-qualified table, view, or macro names.

## Syntax



where:

| Syntax Element ...   | Specifies ...                         |
|----------------------|---------------------------------------|
| <i>database_name</i> | the name of the new default database. |

## ANSI Compliance

DATABASE is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

No privileges are required to use DATABASE. However, the system does check privileges at the time an object is accessed.

## Example

The following request establishes *personnel* as the default database for the current session:

```
DATABASE personnel;
```

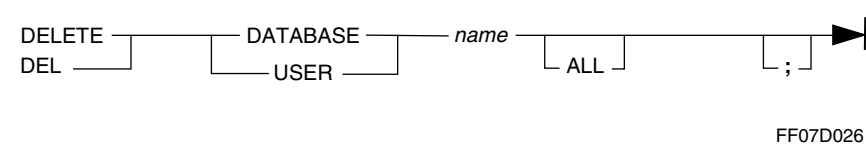
# DELETE DATABASE/ DELETE USER

## Purpose

Deletes all data tables, views, triggers, stored procedures, and macros from a database or user.

This statement does not delete the definition for a database or user from the dictionary. To do that, use the DROP DATABASE and DROP USER statements (see [“DROP DATABASE” on page 558](#) and [“DROP USER” on page 594](#)).

## Syntax



where:

| Syntax Element ... | Specifies ...                                                                                                                                                                                                                                |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>name</i>        | the name of the database or user from which all tables, views, triggers, stored procedures, user-defined functions, and macros are to be deleted.                                                                                            |
| ALL                | that all objects, including the materialized global temporary tables within the target database, are to be dropped.<br><br>If you do not specify ALL and there are materialized global temporary tables in the database, the request aborts. |

## ANSI Compliance

DELETE DATABASE and DELETE USER are Teradata extensions to the ANSI SQL:2008 standard.

## Required Privileges

You must have the DROP privilege on the referenced database or user.

DELETE DATABASE and DELETE USER are different names for the identical SQL statement: DELETE USER can delete a database, and DELETE DATABASE can delete a user.

Example

The following statement can be used to delete all tables, views, triggers, stored procedures, user-defined functions, and macros from the *UsedCars* database:

```
DELETE DATABASE usedcars;
```

Related Topics

| FOR more information on ...       | See ...                                                       |
|-----------------------------------|---------------------------------------------------------------|
| creating databases                | <a href="#">“CREATE DATABASE” on page 130</a>                 |
| creating error tables             | <a href="#">“CREATE ERROR TABLE” on page 135</a>              |
| creating tables                   | <a href="#">“CREATE TABLE” on page 382</a>                    |
| creating queue tables             | <a href="#">“CREATE TABLE (Queue Table Form)” on page 462</a> |
| creating users                    | <a href="#">“CREATE USER” on page 524.</a>                    |
| dropping databases                | <a href="#">“DROP DATABASE” on page 558</a>                   |
| dropping users                    | <a href="#">“DROP USER” on page 594</a>                       |
| logging online archive operations | <a href="#">“LOGGING ONLINE ARCHIVE ON” on page 609</a>       |
| the data dictionary               | <i>Data Dictionary</i>                                        |



# DROP AUTHORIZATION

## Purpose

Drops an authorization object.

## Syntax

```
DROP AUTHORIZATION database_name. authorization_name ;
```

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where:

| Syntax element ...                      | Specifies the name of ...                                       |
|-----------------------------------------|-----------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>authorization_name</i> . |
| <i>authorization_name</i>               | an existing authorization object to be dropped.                 |

## ANSI Compliance

DROP AUTHORIZATION is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have the DROP AUTHORIZATION privilege on the specified authorization object.

## Example

The following example drops the authorization object named sales from the dictionary:

```
DROP AUTHORIZATION sales;
```

## Related Topics

See [“CREATE AUTHORIZATION/ REPLACE AUTHORIZATION” on page 120](#) for information about creating or replacing the definition of an authorization object.

See [“CREATE FUNCTION/ REPLACE FUNCTION” on page 138](#) and [“CREATE PROCEDURE \(External Form\)/ REPLACE PROCEDURE \(External Form\)” on page 276](#) for information about how authorization objects are used with external UDFs and stored procedures.

---

# DROP CAST

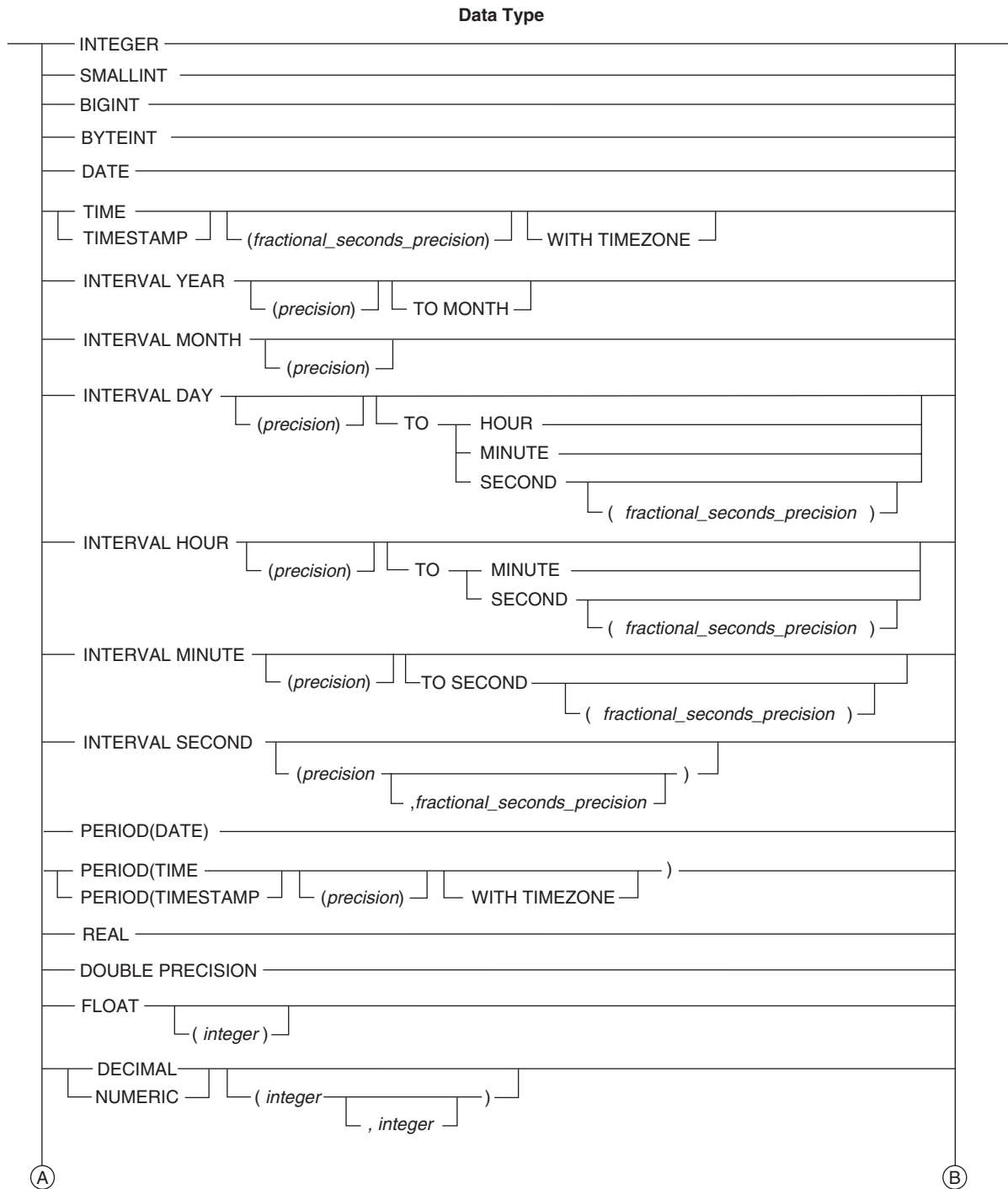
## Purpose

Drops a cast definition from the dictionary.

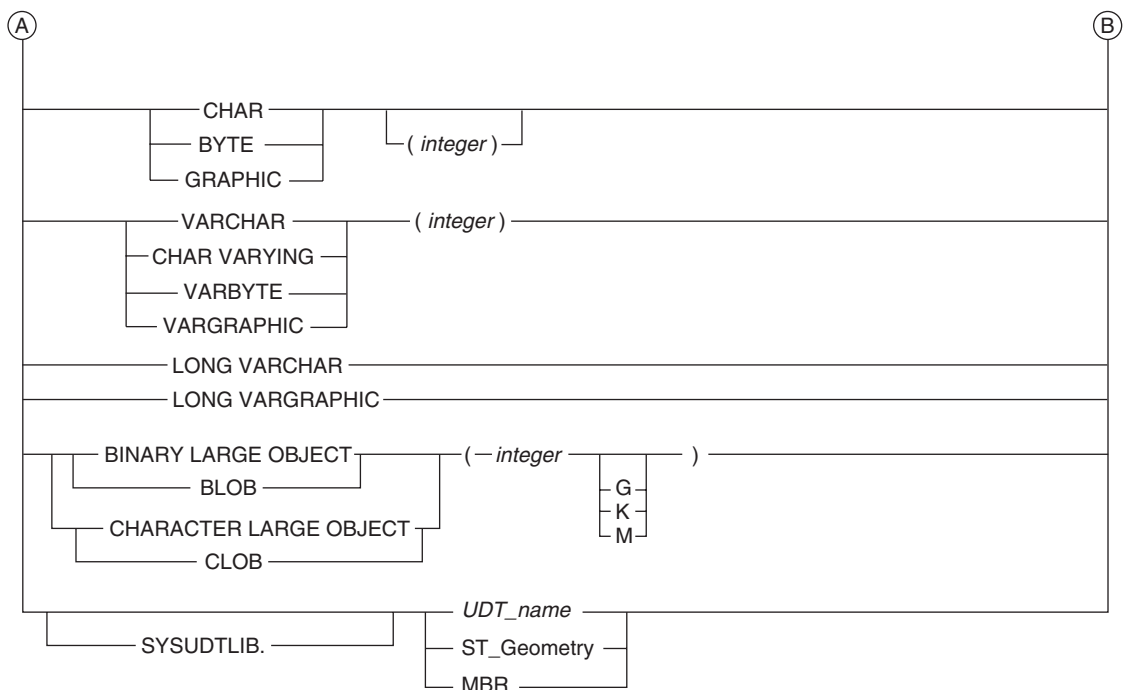
## Syntax

```
DROP CAST database_name. (— source_data_type — AS — target_data_type —) ; ►
```

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where:

| Syntax element ...      | Specifies ...                                                                                                                      |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <i>source_data_type</i> | the source data type from the cast definition.<br>Either <i>source_data_type</i> or <i>target_data_type</i> or both must be a UDT. |
| <i>target_data_type</i> | the target data type from the cast definition.<br>Either <i>target_data_type</i> or <i>source_data_type</i> or both must be a UDT. |

ANSI Compliance

DROP CAST is ANSI SQL:2008 compliant.

Required Privileges

You must have either the `UDTTYPE` or the `UDTMETHOD` privilege on the `SYSUDTLIB` database to drop a user-defined cast for a UDT.

Example 1

The following example drops the cast of UDT *circle* to UDT *ellipse*.

```
DROP CAST (circle AS ellipse);
```

## Example 2

The following example drops the cast of UDT *circle* to VARCHAR(32).

```
DROP CAST (circle AS VARCHAR(32));
```

## Example 3: Dropping the System-Generated Cast From Source Data Type to Distinct UDT

The following example drops the system-generated cast of DECIMAL to the UDT *euro*.

```
DROP CAST (DECIMAL AS euro);
```

## Example 4: Dropping the System-Generated Cast From Distinct UDT to Source Data Type

The following example drops the system-generated cast of UDT *euro* to DECIMAL.

```
DROP CAST (euro AS DECIMAL);
```

# DROP DATABASE

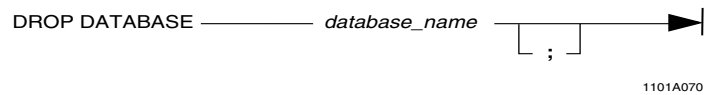
## Purpose

Drops the definition for an empty database from the data dictionary.

You must drop all the objects contained by that database before you can drop the database itself.

To delete objects from a database or user, use the DELETE DATABASE or DELETE USER statements (see [“DELETE DATABASE/ DELETE USER” on page 551](#)).

## Syntax



where:

| Syntax Element ...   | Specifies ...                                   |
|----------------------|-------------------------------------------------|
| <i>database_name</i> | the name of the database that is to be dropped. |

## ANSI Compliance

DROP DATABASE is a Teradata extension to the ANSI SQL:2008 standard.

DROP DATABASE is functionally similar to the ANSI SQL:2008 statement DROP SCHEMA.

## Required Privileges

You must have the DROP DATABASE privilege on the database. The database that is being dropped cannot own other databases or users, and must be at the bottom of the database hierarchy.

## Example

The following statement drops the empty database named *accounting*:

```
DROP DATABASE accounting;
```

## Related Topics

| FOR more information on ... | See ...                                                     |
|-----------------------------|-------------------------------------------------------------|
| creating databases          | <a href="#">“CREATE DATABASE” on page 130.</a>              |
| deleting databases          | <a href="#">“DELETE DATABASE/ DELETE USER” on page 551.</a> |

# DROP ERROR TABLE

## Purpose

Deletes the specified error table object definition from the dictionary and drops it from its containing database.

## Syntax 1

```
DROP ERROR TABLE FOR database_name. data_table_name ;
```

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## Syntax 2

```
DROP TABLE database_name. error_table_name ;
```

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where:

| Syntax element ...                      | Specifies ...                                                                                                                                                                                                                                 |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | the containing database or user for the specified data table or error table if it is defined in a database other than the current database.                                                                                                   |
| FOR <i>data_table</i>                   | the name of the data table for which the error table to be dropped is defined.<br><br>This syntax is particularly useful if you did not define a name for the error table to be dropped and you do not know its system-assigned default name. |
| <i>error_table_name</i>                 | the name of the error table to be dropped.                                                                                                                                                                                                    |

## ANSI Compliance

DROP ERROR TABLE is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have the DROP TABLE privilege on the specified error table.



## Example

This example deletes the error table defined on the *orders* table:

```
DROP ERROR TABLE FOR orders;
```

## Related Topics

- [“CREATE ERROR TABLE” on page 135](#)
- [“CREATE TABLE” on page 382](#)
- [“DROP MACRO/ DROP PROCEDURE/ DROP TABLE/ DROP TRIGGER/ DROP VIEW” on page 574](#)

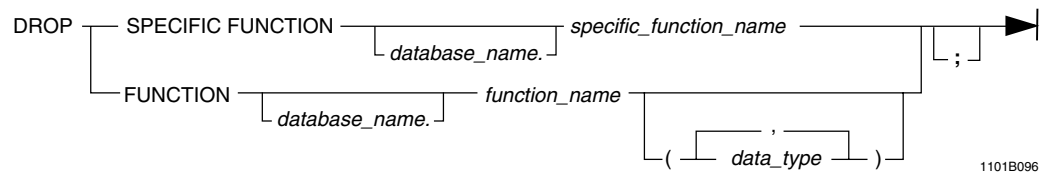
---

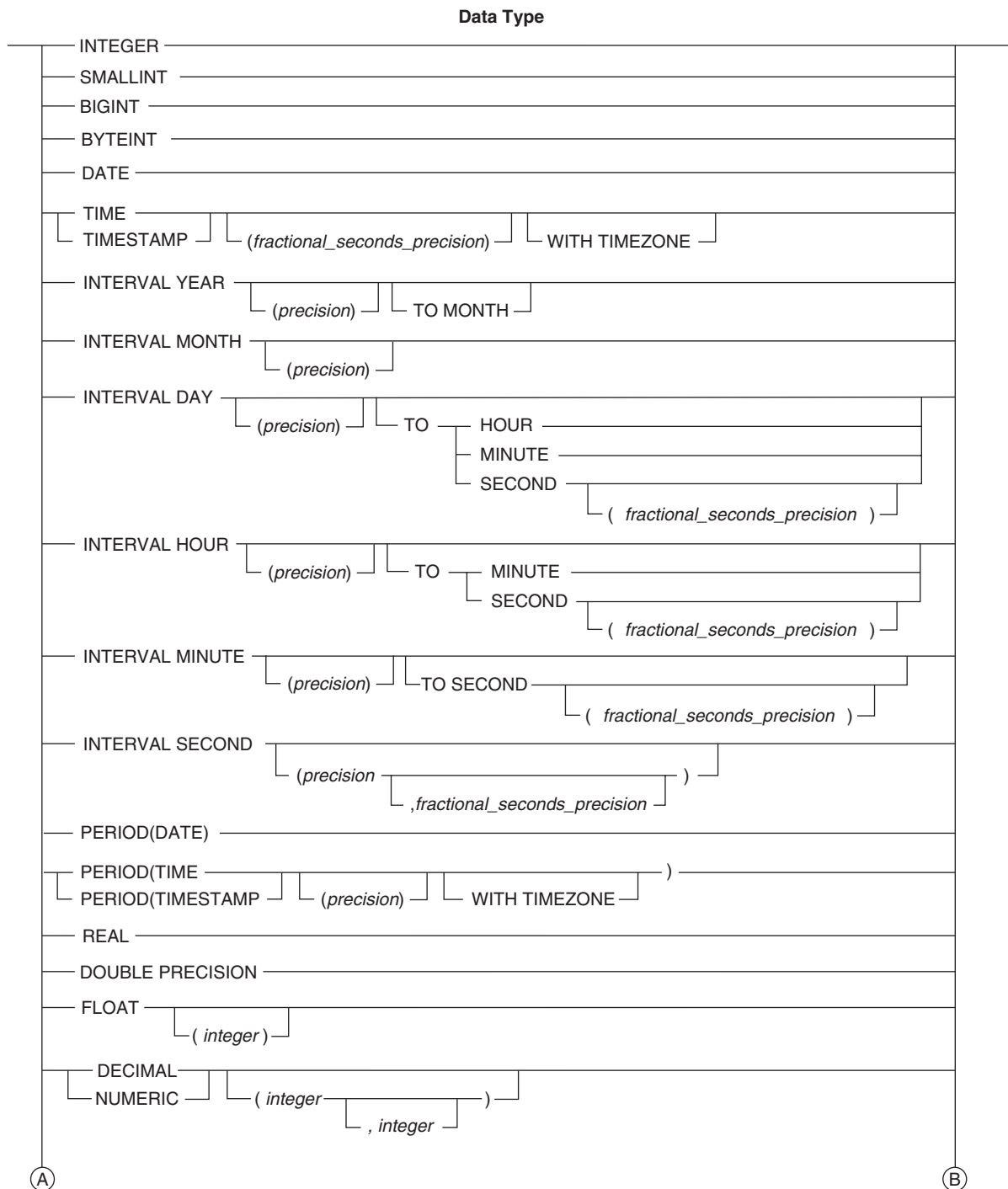
# DROP FUNCTION

## Purpose

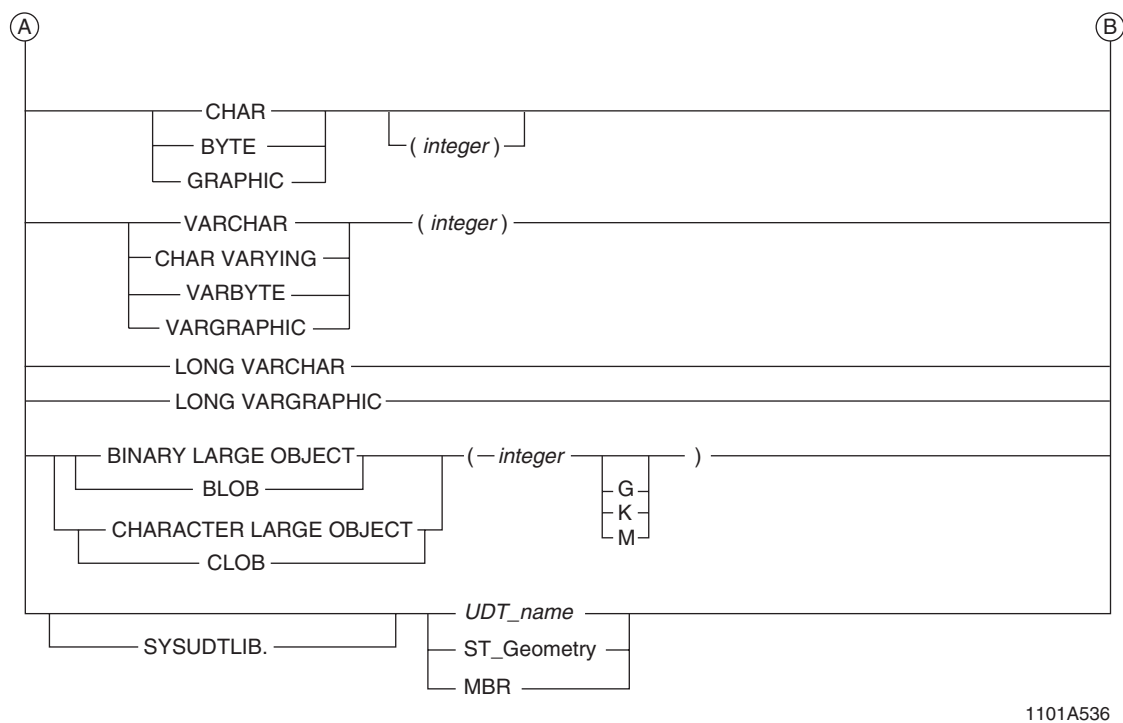
Drops the definition of the function or specific function from the data dictionary.

## Syntax





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where:

| Syntax element ...                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SPECIFIC FUNCTION                       | that the following character string is the specific function name for the function to be dropped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <i>database_name</i>   <i>user_name</i> | the name of the containing database or user for <i>specific_function_name</i> if different from the current database.                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <i>specific_function_name</i>           | the specific function name for the function to be dropped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| FUNCTION                                | that the following character string is the function name for the function to be dropped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <i>database_name</i>   <i>user_name</i> | the name of the containing database or user for <i>function_name</i> if different from the current database.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>function_name</i>                    | the function name for the function to be dropped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <i>data_type</i>                        | <p>an optional data type specification for the parameters passed to <i>function_name</i>.</p> <p>If you do not specify a data type list, then the specified function must be the only one with that name in the database.</p> <p>Only the data types associated with the function parameters need be specified.</p> <p>The length specification for a string is not relevant, but you can specify it. Likewise, neither the length for DECIMAL, TIME, TIMESTAMP, and INTERVAL types nor the decimal placement for the DECIMAL type is relevant, but you can specify it.</p> |

## ANSI Compliance

DROP FUNCTION is ANSI SQL:2008-compliant.

## Required Privileges

You must have the DROP FUNCTION privilege on a function or its containing database to drop it.

## Example 1

You can drop a function definition using either its function name or its specific function name. For example, consider the following function definition:

```
CREATE FUNCTION Finger_Print_Match(VARBYTE(1000),
VARBYTE(1000))
  RETURNS INTEGER
  SPECIFIC fpml
  LANGUAGE C
  NO SQL
  PARAMETER STYLE TD_GENERAL
  EXTERNAL;
```

Either of the following DROP FUNCTION requests drops its definition, the first using its specific function name and the second using its function name:

```
DROP SPECIFIC FUNCTION fpml;

DROP FUNCTION Finger_print_Match(VARBYTE, VARBYTE);
```

## Example 2

Like “[Example 1](#)” on page 565, this example demonstrates that you can drop a function definition using either its function name or its specific function name. The example also shows that if the name cannot be resolved to a unique object using the DROP FUNCTION statement you specify, you cannot drop it.

Consider the following function definition:

```
CREATE FUNCTION test_image(VARCHAR(5000), INTEGER) ...
  SPECIFIC testi_opt1 ...;

CREATE FUNCTION test_image(VARCHAR(5000), FLOAT)...
  SPECIFIC testi_opt2 ...;
```

The following DROP FUNCTION requests both drop this function:

```
DROP SPECIFIC FUNCTION testi_opt1;

DROP FUNCTION test_image(VARCHAR, INTEGER);
```

The following request fails because there is no instance of a function named *test\_image* that has no parameters:

```
DROP FUNCTION test_image();
```

## Related Topics

See the following statements for more information about user-defined functions:

- [“ALTER FUNCTION” on page 16](#)
- [“CREATE FUNCTION/ REPLACE FUNCTION” on page 138](#)
- [“CREATE GLOBAL TEMPORARY TRACE TABLE” on page 186](#)
- [“RENAME FUNCTION” on page 634](#)
- [“SET SESSION FUNCTION TRACE” on page 676](#)
- [“HELP FUNCTION” on page 715](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)

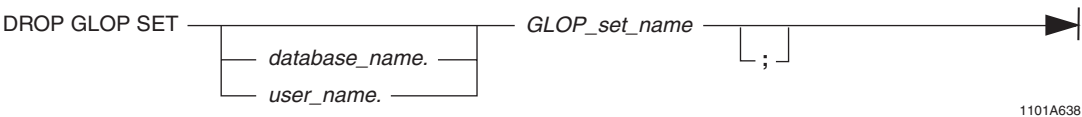
Also see *SQL External Routine Programming*.

# DROP GLOP SET

## Purpose

Drops the definition of the specified GLOP set from the data dictionary.

## Syntax



where:

| Syntax element ...                      | Specifies ...                                                                                                        |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | the name of the containing database or user for <i>GLOP_set_name</i> if different from the current database or user. |
| <i>GLOP_set_name</i>                    | the name of the GLOP set to be dropped.                                                                              |

## ANSI Compliance

DROP GLOP SET is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have the DROP GLOP privilege on the database or user containing *GLOP\_set\_name* to drop the specified GLOP set.

## Privileges Granted Automatically

None.

## Example

This example drops the GLOP set named *UDF\_glop\_1* contained by user *df2*.

```
DROP GLOP SET df2.UDF_glop_1;
```

## Related Topics

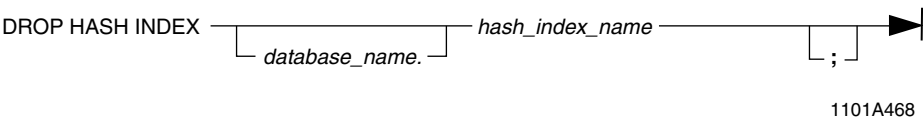
See *SQL External Routine Programming* for information about how to use GLOPs with external routines.

# DROP HASH INDEX

## Purpose

Drops a hash index definition from the data dictionary.

## Syntax



where:

| Syntax element ...                      | Specifies ...                                                                                                  |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | the name of the containing database or user for <i>hash_index_name</i> if different from the current database. |
| <i>hash_index_name</i>                  | the name of the hash index to be dropped.                                                                      |

## ANSI Compliance

DROP HASH INDEX is an extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have either of the following sets of privileges to drop a hash index:

- DROP TABLE on the join index
- INDEX or DROP TABLE on at least one of the base tables

## Example

This statement drops the definition for the hash index named *OrdHIIdx\_1* from the data dictionary.

```
DROP HASH INDEX OrdHIIdx_1;
```

## Related Topics

See [“CREATE HASH INDEX” on page 200.](#)



# DROP INDEX

## Purpose

Drops a secondary index on a table or join index.

## Syntax

There are two forms of the DROP INDEX statement:

### DROP *index\_name* Syntax

```

DROP INDEX database_name. index_name — ON TEMPORARY database_name. table_name ;
database_name. join_index_name

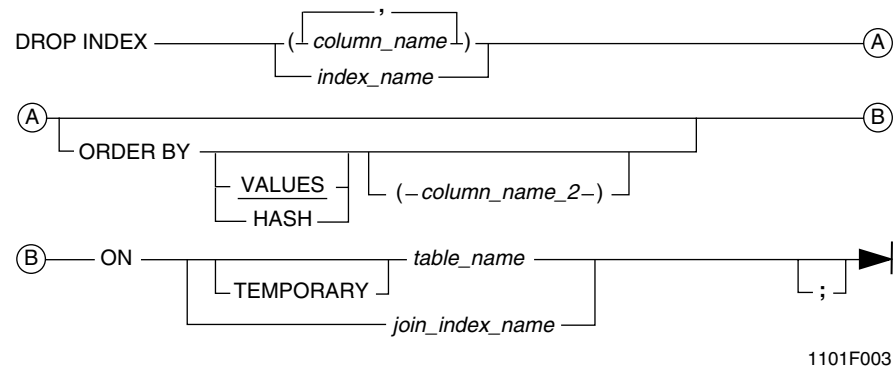
```

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where:

| Syntax element ...                      | Specifies ...                                                                                      |
|-----------------------------------------|----------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>index_name</i> if different from the current database.      |
| <i>index_name</i>                       | the name of the secondary index to be dropped.                                                     |
| TEMPORARY                               | that <i>table_name</i> refers to a global temporary table.                                         |
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>table_name</i> if different from the current database.      |
| <i>table_name</i>                       | the table on which <i>index_name</i> is defined.                                                   |
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>join_index_name</i> if different from the current database. |
| <i>join_index_name</i>                  | the join index on which <i>index_name</i> is defined.                                              |

DROP index\_definition Syntax



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where:

| Syntax Element ...                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                     |                    |          |           |                                         |               |                                                                                         |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|-----------|-----------------------------------------|---------------|-----------------------------------------------------------------------------------------|
| <i>column_name</i>                      | a list of columns defined for the index.<br>Limited to 64 columns.                                                                                                                                                                                                                                                                                                |                    |          |           |                                         |               |                                                                                         |
| <i>database_name</i>   <i>user_name</i> | the name of the containing database or user for <i>index_name</i> if different from the current database or user.                                                                                                                                                                                                                                                 |                    |          |           |                                         |               |                                                                                         |
| <i>index_name</i>                       | the name of the index to be dropped.                                                                                                                                                                                                                                                                                                                              |                    |          |           |                                         |               |                                                                                         |
| ORDER BY                                | that index rows are ordered on each AMP by a single value- or hash-ordered column. <table><tr><th>IF ORDER BY is ...</th><th>THEN ...</th></tr><tr><td>specified</td><td><i>column_name_2</i> must be specified.</td></tr><tr><td>not specified</td><td>rows are ordered by the hash value of all the columns in the <i>column_name_1</i> list.</td></tr></table> | IF ORDER BY is ... | THEN ... | specified | <i>column_name_2</i> must be specified. | not specified | rows are ordered by the hash value of all the columns in the <i>column_name_1</i> list. |
| IF ORDER BY is ...                      | THEN ...                                                                                                                                                                                                                                                                                                                                                          |                    |          |           |                                         |               |                                                                                         |
| specified                               | <i>column_name_2</i> must be specified.                                                                                                                                                                                                                                                                                                                           |                    |          |           |                                         |               |                                                                                         |
| not specified                           | rows are ordered by the hash value of all the columns in the <i>column_name_1</i> list.                                                                                                                                                                                                                                                                           |                    |          |           |                                         |               |                                                                                         |
| VALUES                                  | value-ordering for the ORDER BY column.<br>If neither VALUES nor HASH is specified, VALUES is used as the default.                                                                                                                                                                                                                                                |                    |          |           |                                         |               |                                                                                         |
| HASH                                    | hash-ordering for the ORDER BY column.                                                                                                                                                                                                                                                                                                                            |                    |          |           |                                         |               |                                                                                         |

| Syntax Element ...                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>column_name_2</i>                    | <p>a single column from the column list defined by <i>column_name_1</i> that specifies the sort order to be used for either HASH or VALUES.</p> <p>The size of the column is limited to four or fewer bytes. Supported numeric date types for <i>column_name_2</i> are the following:</p> <ul style="list-style-type: none"> <li>• BYTEINT</li> <li>• DATE</li> <li>• DECIMAL</li> <li>• INTEGER</li> <li>• SMALLINT</li> </ul> <p>If you specify ORDER BY without also specifying an explicit <i>column_name_2</i>, then the system assumes the first column specified in the <i>column_name</i> list.</p> |
| TEMPORARY                               | <p>that you are dropping an index on a materialized global temporary table.</p> <p>You can only specify this keyword when dropping an index on a global temporary table.</p> <p>If you do not specify TEMPORARY, and <i>table_name</i> identifies a global temporary table, then the statement is applied to the base global temporary table.</p> <p>There must not be any materialized instances of the named table or you cannot drop the index on the base global temporary table.</p>                                                                                                                   |
| <i>database_name</i>   <i>user_name</i> | the name of the containing database or user for <i>table_name</i> if different from the current database.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <i>table_name</i>                       | <p>table on which the secondary index is to be dropped.</p> <p>The named table cannot be one of the following table types:</p> <ul style="list-style-type: none"> <li>• volatile</li> <li>• journal</li> <li>• global temporary function trace</li> </ul>                                                                                                                                                                                                                                                                                                                                                   |
| <i>database_name</i>   <i>user_name</i> | the name of the containing database or user for <i>join_index_name</i> if different from the current database.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <i>join_index_name</i>                  | the name of the join index from which this index is to be dropped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## ANSI Compliance

DROP INDEX is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have the INDEX or DROP TABLE privilege on the table.

To drop an index from a join index, you must have one of the following privileges:

- DROP TABLE on the join index
- DROP TABLE on one of the base tables
- INDEX on the join index
- INDEX on one of the base tables

## Example 1

The following statement drops a secondary index that was defined on the *name* column of the *employee* table:

```
DROP INDEX (Name) ON Employee;
```

## Example 2: Dropping Named Indexes

This statement drops the existing named index *index\_1* from table *table\_5*.

```
DROP INDEX index_1 ON table_5;
```

## Example 3

This statement drops the existing index on columns *field\_1* and *field\_2* from table *table\_6*.

```
DROP INDEX (field_1, field_2) ON table_6;
```

## Related Topics

See the following topic and manual for more information about secondary indexes:

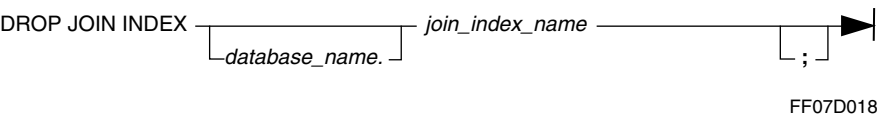
- [“CREATE INDEX” on page 211.](#)
- *Database Design*

# DROP JOIN INDEX

## Purpose

Drops the definition for a join index from the data dictionary.

## Syntax



where:

| Syntax Element ...                      | Specifies ...                                                                                                                                                                                               |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | the name of containing database or user for <i>join_index_name</i> .<br>This specification is required only if the join index to be dropped is contained in a different database than the current database. |
| <i>join_index_name</i>                  | the name of the join index to be dropped.                                                                                                                                                                   |

## ANSI Compliance

DROP JOIN INDEX is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have either of the following sets of privileges to drop a join index:

- DROP TABLE on the join index
- INDEX or DROP TABLE on at least one of the base tables

## Example

The following request drop the definition of the join index named *ji\_emp* from the data dictionary:

```
DROP JOIN INDEX ji_emp;
```

## Related Topics

See [“CREATE JOIN INDEX” on page 216.](#)

# DROP MACRO/ DROP PROCEDURE/ DROP TABLE/ DROP TRIGGER/ DROP VIEW

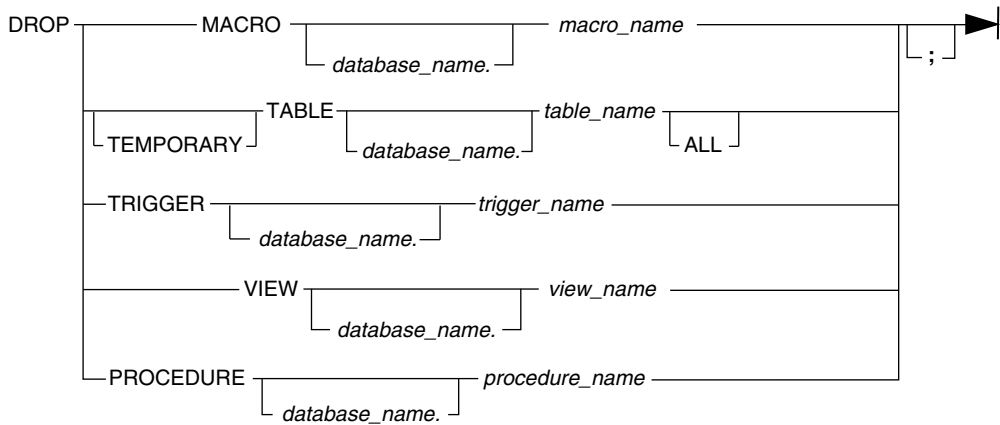
## Purpose

Drops the following database object definitions from the dictionary and drops the object from its containing database, depending on the keyword specified:

| Keyword Specified | Database Object Dropped                                |
|-------------------|--------------------------------------------------------|
| MACRO             | macro definition.                                      |
| PROCEDURE         | stored procedure definition.                           |
| TABLE             | base table definition and all table rows. <sup>1</sup> |
| TEMPORARY TABLE   | materialized global temporary table.                   |
| TRIGGER           | trigger definition from its subject table.             |
| VIEW              | view definition.                                       |

1. In this case, the definition of a base table is restricted to persistent and volatile tables. To drop a global temporary table, you must also specify the keyword TEMPORARY.

## Syntax



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where:

| Syntax Element ...                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | the name of a database or user in which the macro, table, trigger, view, or procedure to be dropped is contained.<br><br>This specification is required only if the object to be dropped is contained in a different database than the current database.                                                                                                                                                                                                                                                                                                                                                               |
| <i>macro_name</i>                       | the name of the macro to be dropped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| TEMPORARY                               | that the table to be dropped is the materialized instance of a global temporary table.<br><br>If you do not specify TEMPORARY and <i>table_name</i> identifies a global temporary table, then the base global temporary definition table is dropped.<br><br>If any materialized instances of the base global temporary table exist anywhere in the system, you cannot drop the table and an error is returned.<br><br>TEMPORARY is not valid when specified for any database object other than a global temporary table.<br><br>TEMPORARY is not valid when specified with the ALL keyword.                            |
| <i>table_name</i>                       | the name of the table to be dropped.<br><br>The <i>table_name</i> specification cannot identify a journal table.<br><br>If the table to be dropped has triggers, hash indexes, or join indexes associated with it, you must first drop those triggers, hash indexes, and join indexes else the statement aborts.                                                                                                                                                                                                                                                                                                       |
| ALL                                     | that the base global temporary table definition and all its materialized instances are to be dropped when they are not being accessed by any other transactions.<br><br>ALL is not valid when specified for any database object other than a global temporary table.<br><br>ALL is not valid when specified with the TEMPORARY keyword.<br><br>Take care in using this option because the time required for all open transactions accessing this object to commit might be significant.<br><br>If you do not specify ALL and if the global temporary table is materialized in any other session, the statement aborts. |
| <i>trigger_name</i>                     | the name of the trigger to drop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <i>view_name</i>                        | the name of the view to drop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <i>procedure_name</i>                   | the name of the stored procedure to drop.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

## ANSI Compliance

DROP PROCEDURE, DROP TABLE, DROP TRIGGER, and DROP VIEW are ANSI SQL:2008-compliant.

DROP MACRO is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have the appropriate DROP privilege on the specified table, view, stored procedure, or macro.

You do not need the DROP privilege to drop materialized global temporary or volatile tables.

To drop a trigger, you must have DROP TRIGGER privilege on either the subject table of the trigger, or the database containing that table.

## Example

The following request drops a table named *order\_ids*:

```
DROP TABLE order_ids;
```

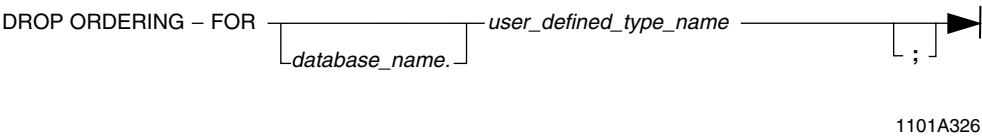


# DROP ORDERING

## Purpose

Drops the ordering definition for a UDT.

## Syntax



where:

| Syntax element ...            | Specifies ...                                                                                    |
|-------------------------------|--------------------------------------------------------------------------------------------------|
| <i>database_name</i>          | the containing database for <i>user_defined_type_name</i> .<br>This is always <i>SYSUDTLIB</i> . |
| <i>user_defined_type_name</i> | the name of the UDT on which the ordering is to be dropped.                                      |

## ANSI Compliance

DROP ORDERING is ANSI SQL:2008 compliant.

## Required Privileges

You must have either the UDTTYPE or the UDTMETHOD privilege on the *SYSUDTLIB* database to drop a user-defined ordering for a UDT.

## Example 1

The following example drops the ordering for the UDT named *circle* with the restriction that no table in the database can be using the *circle* UDT in any of its column definitions.

```
DROP ORDERING FOR circle;
```

## Example 2

The following example drops the ordering for the UDT named *address* with the restriction that no table in the database can be using the *address* UDT in any of its column definitions.

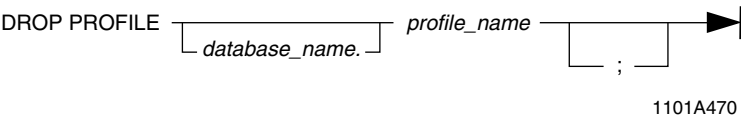
```
DROP ORDERING FOR address;
```

# DROP PROFILE

## Purpose

DROP PROFILE drops the specified profile.

## Syntax



where:

| Syntax Element ...                      | Specifies the ...                                     |
|-----------------------------------------|-------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | containing database or user for <i>profile_name</i> . |
| <i>profile_name</i>                     | name of the profile to drop.                          |

## ANSI Compliance

DROP PROFILE is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

The following users can drop a profile:

- User *DBC*.
- A user who has the DROP PROFILE privilege.

The profile creator does not have the implicit privilege to drop a profile. A profile creator who does not have the DROP PROFILE privilege cannot drop the profile.

## Example

The following statement drops the profile called *finance*:

```
DROP PROFILE finance;
```

## Related Topics

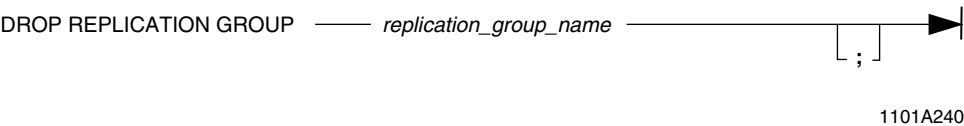
| FOR more information on ...          | SEE ...                                                                                                                                           |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| assigning profiles to users          | <ul style="list-style-type: none"><li>• <a href="#">“CREATE USER” on page 524.</a></li><li>• <a href="#">“MODIFY USER” on page 623.</a></li></ul> |
| creating profiles                    | <a href="#">“CREATE PROFILE” on page 347.</a>                                                                                                     |
| obtaining the DROP PROFILE privilege | “GRANT (SQL Form)” topic in <i>SQL Data Control Language</i> .                                                                                    |
| system-level password attributes     | <i>Security Administration</i> .                                                                                                                  |

# DROP REPLICATION GROUP

## Purpose

Drops the definition for the specified replication group and all rule sets associated with it.

## Syntax



where:

| Syntax element ...            | Specifies ...                                                                                                                            |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <i>replication_group_name</i> | the name of the replication whose definition is to be dropped.<br>The specified replication group must defined on the Teradata platform. |

## ANSI Compliance

DROP REPLICATION GROUP is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have the REPLCONTROL privilege to drop a replication group.

## Example

The following example causes the definition for the existing replication group named *inventory\_group* to be dropped from the Teradata platform. Tables that are members of the group cannot participate in change data capture functions after the DROP REPLICATION GROUP statement has been performed successfully.

```
DROP REPLICATION GROUP inventory_group;
```

## Related Topics

See the following resources for further information about replication services:


- [“ALTER REPLICATION GROUP” on page 30](#)
- [“CREATE REPLICATION GROUP” on page 371](#)
- [“SET SESSION OVERRIDE REPLICATION” on page 678](#)
- [“HELP REPLICATION GROUP” on page 740](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)
- *Teradata Replication Solutions*

# DROP REPLICATION RULESET

## Purpose

Removes a rule set from a replication group. This is done automatically if you also drop the replication group.

## Syntax

DROP REPLICATION RULESET — *rule\_set\_name* — FOR — *replication\_group\_name* 

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where:

| Syntax element ...                | Specifies the ...                                                            |
|-----------------------------------|------------------------------------------------------------------------------|
| <i>rule_set_name</i>              | name of the replication rule set definition to be dropped.                   |
| FOR <i>replication_group_name</i> | name of the replication group for which the replication rule set is defined. |

## ANSI Compliance

DROP REPLICATION RULESET is a Teradata extension to the ANSI SQL-2008 standard.

## Required Privileges

You must have the REPLCONTROL privilege to drop a replication rule set.

## Privileges Granted Automatically

None.

## Example

The following example drops the replication rule set *sales1* from replication group *myrepgroup*:

```
DROP REPLICATION RULESET sales1 FOR myrepgroup;
```

## Related Topics

The following statements are related to DROP REPLICATION RULESET:

- [“CREATE REPLICATION GROUP” on page 371](#)
- [“CREATE REPLICATION RULESET/ REPLACE REPLICATION RULESET” on page 374](#)
- [“DROP REPLICATION GROUP” on page 580](#)

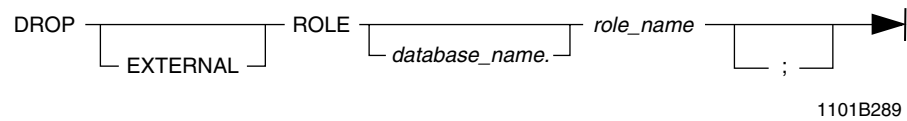
Also see *Teradata Replication Solutions*.

# DROP ROLE

## Purpose

Drops the specified role.

## Syntax



where:

| Syntax Element ...           | Specifies ...                                    |                                                                                                              |
|------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| EXTERNAL                     | that the role to be dropped is an external role. |                                                                                                              |
|                              | IF the role is this type ...                     | THEN you must...                                                                                             |
|                              | database                                         | not specify the keyword EXTERNAL.<br>If you do, the statement aborts and returns a message to the requestor. |
|                              | external                                         | specify the keyword EXTERNAL.<br>If you do not, the statement aborts and returns a message to the requestor. |
| database_name  <br>user_name | the containing database or user for role_name.   |                                                                                                              |
| role_name                    | the name of the role to drop.                    |                                                                                                              |

## ANSI Compliance

DROP ROLE is ANSI SQL:2008-compliant.



## Required Privileges

The following users can drop a specified role, whether it is a database role or an external role:

- User *DBC*.
- A user who has the DROP ROLE privilege.
- A user who has been granted the specified role WITH ADMIN OPTION.
- A user whose current role has the specified role as a nested role, and the nested role was granted to the current role WITH ADMIN OPTION.

The role creator does not have the implicit privilege to drop a role. A role creator who does not have the DROP ROLE privilege and who loses WITH ADMIN OPTION on a role cannot drop the role.

### Example 1

The following statement drops the role named *temp\_admin*:

```
DROP ROLE temp_admin;
```

### Example 2

The following statement drops the external role named *rhk*:

```
DROP EXTERNAL ROLE rhk;
```

## Related Topics

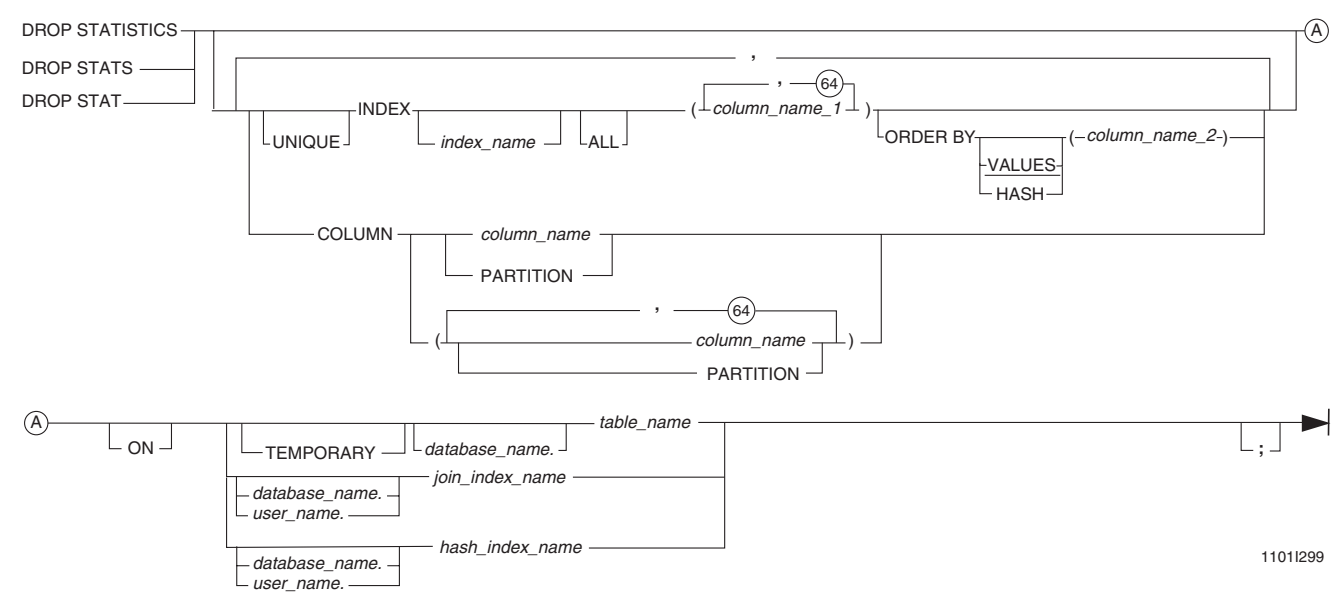
| FOR more information on ...                      | See ...                                                                                                                   |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| creating roles                                   | <a href="#">“CREATE ROLE” on page 379.</a>                                                                                |
| granting privileges on database objects to roles | <a href="#">“GRANT (SQL Form)” topic in <i>SQL Data Control Language</i>.</a>                                             |
| granting roles to users or other roles           | <a href="#">“GRANT (Role Form)” topic in <i>SQL Data Control Language</i>.</a>                                            |
| changing the current role for a session          | <a href="#">“SET ROLE” on page 656.</a>                                                                                   |
| external roles                                   | <ul style="list-style-type: none"><li>• <i>Security Administration</i></li><li>• <i>Database Administration</i></li></ul> |

# DROP STATISTICS (Optimizer Form)

## Purpose

Drops the statistical data that was collected for the specified columns of a table, hash index, or join index by a COLLECT STATISTICS (Optimizer Form) request.

## Syntax(Recommended)

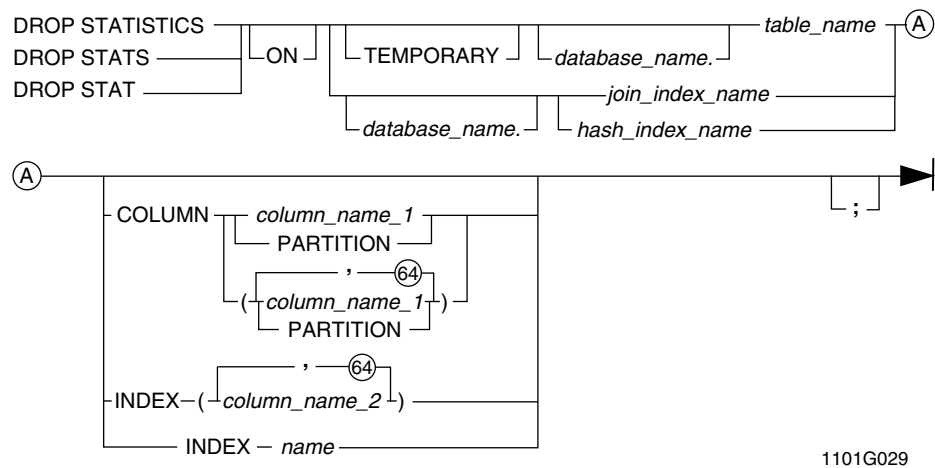


where:

| Syntax Element ...         | Specifies ...                                                                                                                                                                        |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UNIQUE                     | the index for which statistics are to be dropped is unique.                                                                                                                          |
| INDEX<br><i>index_name</i> | the name of the named index for which statistics are to be collected.<br>Note that you specify column names with a named index only when it is defined with an ORDER BY clause.      |
| ALL                        | that ALL was used to create the index.                                                                                                                                               |
| <i>column_name_1</i>       | the names of one or more columns on which the index exists and for which statistics are to be collected.                                                                             |
| ORDER BY                   | that ORDER BY was used to create the index.<br>ORDER BY orders the index by the contents of a single column. If you specify ORDER BY but not VALUES or HASH, then VALUES is assumed. |

| Syntax Element ...                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VALUES                                  | that ORDER BY VALUES was used to create the index.<br>VALUES can order a single numeric column of four bytes or less.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| HASH                                    | that ORDER BY HASH was used to create the index.<br>HASH hash-orders a single column instead of hash-ordering all columns (the default).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>column_name_2</i>                    | the name of a column on which the index is ordered.<br>If you specify an ORDER BY clause, then you must also specify a <i>column_name_2</i> set.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| COLUMN                                  | that statistics are to be dropped for the specified column set.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <i>column_name</i>                      | the names of the columns for which statistics are to be dropped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| PARTITION                               | that statistics are to be dropped for the system-derived PARTITION column set for a PPI table.<br>You <i>cannot</i> drop statistics on the system-derived PARTITION#Ln columns.<br>You cannot drop PARTITION statistics for the following PPI tables: <ul style="list-style-type: none"> <li>• Join indexes</li> <li>• Global temporary tables</li> <li>• Volatile tables</li> </ul>                                                                                                                                                                                                                                                                                                            |
| TEMPORARY                               | that statistics are to be dropped for a materialized global temporary table.<br>This keyword is not valid for permanent tables and if you use it with a table defined as permanent, an error is returned.<br>If you do not specify TEMPORARY, but the referenced table is a global temporary table, the statistics are dropped for an empty table, but on the base global temporary table rather than its materialized instance.<br>If you specify TEMPORARY correctly, but no materialized instance of the global temporary table exists in the session, the system materializes an instance with all of the statistics defined on the base temporary table before dropping statistics for it. |
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>table_name</i> if something other than the current database or user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>table_name</i>                       | the name of the table or global temporary table for which column or index statistics are to be dropped.<br>You <i>cannot</i> drop statistics on journal or global temporary trace tables.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>join_index_name</i> if something other than the current database or user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>join_index_name</i>                  | the name of the join index for which statistics are to be dropped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>hash_index_name</i> if something other than the current database or user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>hash_index_name</i>                  | the name of the hash index for which statistics are to be dropped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

Syntax (Alternate)



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where:

| Syntax Element ...                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TEMPORARY                               | that statistics are to be dropped on a materialized global temporary table named <i>table_name</i> .<br><br>This keyword is not valid for permanent tables and if you use it with a table defined as permanent, an error is returned.<br><br>If you do not specify TEMPORARY, but the referenced table is a global temporary table, the statistics are dropped, but on the base global temporary table rather than its materialized instance.<br><br>If you specify TEMPORARY correctly, but no materialized instance of the global temporary table exists in the session, the system materializes an instance with all of the statistics defined on the base global temporary table before dropping statistics for it. |
| <i>database_name</i>   <i>user_name</i> | the name of the containing database or user for <i>table_name</i> if different from the current database.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <i>table_name</i>                       | the name of the table on which statistics are to be dropped.<br><br>You <i>cannot</i> specify the name of a journal or global temporary trace table because you cannot collect statistics on journal or global temporary trace tables.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>database_name</i>   <i>user_name</i> | the name of the containing database or user for <i>join_index_name</i> or <i>hash_index_name</i> if different from the current database.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>join_index_name</i>                  | the name of the join index for which statistics are to be dropped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <i>hash_index_name</i>                  | the name of the hash index for which statistics are to be dropped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| COLUMN                                  | that statistics are to be dropped for a column set.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>column_name_1</i>                    | the name of the columns for which statistics are to be dropped.<br><br>You cannot drop statistics on a UDT column.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

| Syntax Element ...   | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PARTITION            | that statistics are to be dropped on the system-derived PARTITION column for a PPI table.<br><br>You cannot reference the system-derived PARTITION#Ln columns of a PPI table in a DROP STATISTICS request.<br><br>See the COLLECT STATISTICS (Optimizer Form) topic “Collecting Statistics on the System-Derived PARTITION Column and the Partitioning Column Set of a PPI Table” in <i>SQL Data Definition Language Detailed Topics</i> for more information about the PARTITION column. |
| INDEX                | that the statistics to be dropped are for a column set that defines an index on the table.                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>column_name_2</i> | the index columns for which statistics are to be dropped.                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <i>index_name</i>    | the name of the index for which statistics are to be dropped.<br><b>Note:</b> Do not specify column names when you specify a named index.                                                                                                                                                                                                                                                                                                                                                 |

## ANSI Compliance

DROP STATISTICS is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

| To DROP STATISTICS on a ...              | You must have STATISTICS, INDEX, or DROP TABLE privileges on ... |
|------------------------------------------|------------------------------------------------------------------|
| permanent or base global temporary table | the table.                                                       |
| materialized global temporary table      | none.                                                            |
| volatile table                           | none.                                                            |
| join index                               | the join index.                                                  |
| hash index                               | the hash index.                                                  |

## Example 1

The following requests drop statistics on an index defined on the *empno* and *name* columns of the *employee* table:

```
DROP STATISTICS INDEX(empno, name) ON employee;
```

```
DROP STATISTICS employee INDEX(empno,name);
```

## Example 2

The following requests drop any statistics that exist for the *employee* table.

```
DROP STATISTICS ON employee;  
  
DROP STATISTICS employee;
```

## Example 3: Named Index

The following example drops any statistics on a named index.

```
DROP STATISTICS INDEX unique_1 ON table_1;  
  
DROP STATISTICS ON table_1 INDEX unique_1;
```

## Example 4: Unnamed Index

The following example drops any statistics on an unnamed index.

```
DROP STATISTICS INDEX (field_1,field_2) ON table_1;  
  
DROP STATISTICS ON table_1 INDEX (field_1,field_2);
```

## Example 5: Nonvalid COLLECT STATISTICS Requests

These requests are not valid because the index named does not exist for the table.

```
DROP STATISTICS INDEX no_such_index ON table_1;  
  
DROP STATISTICS ON table_1 INDEX no_such_index;
```

The system returns the following error message:

```
The specified constraint name does not exist in table.
```

## Example 6: Dropping PARTITION Statistics

The following DROP STATISTICS request drops statistics on the PARTITION column only from the PPI table named *table\_1*:

```
DROP STATISTICS ON table_1 COLUMN PARTITION;
```

The following DROP STATISTICS request drops statistics on the column named *column\_1* and the PARTITION column from the PPI table named *table\_2*:

```
DROP STATISTICS ON table_2 COLUMN (column_1, PARTITION);
```

The following table-level DROP STATISTICS request drops all the statistics, including PARTITION statistics, from the PPI table named *table\_3*:

```
DROP STATISTICS ON table_3;
```

## Related Topics

See the following related statements for more information:

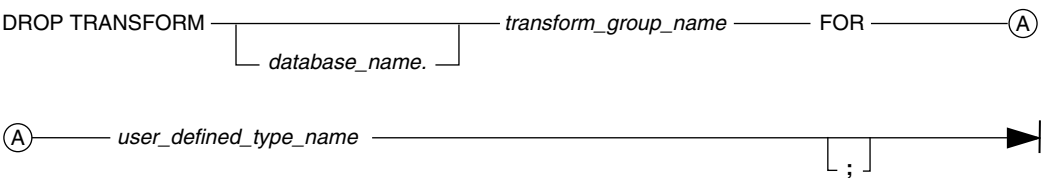
- [“COLLECT STATISTICS \(Optimizer Form\)” on page 99](#)
- [“HELP STATISTICS \(Optimizer Form\)” on page 746](#)

# DROP TRANSFORM

## Purpose

Drops the transform group for a specified UDT.

## Syntax



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where:

| Syntax element ...            | Specifies ...                                                                                                                       |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>          | the name of the database that contains the UDT for which the transform group is to be dropped.<br>This is always <i>SYSUDTLIB</i> . |
| <i>transform_group_name</i>   | the name of the transform to be dropped.                                                                                            |
| <i>user_defined_type_name</i> | the name of the UDT for which the transform is defined.                                                                             |

## ANSI Compliance

DROP TRANSFORM is ANSI SQL:2008 compliant.

## Required Privileges

You must have either the UDTYPE privilege or the UDTMETHOD privilege on the *SYSUDTLIB* database to be able to drop a transform group.

## Example

The following example drops the transform group named *C\_routine* from the UDT named *address* with the restriction that no table in the entire system can be using *address* as the data type for any of its columns:

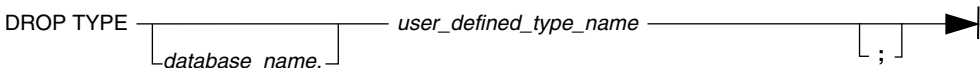
```
DROP TRANSFORM C_routine FOR SYSUDTLIB.address;
```

# DROP TYPE

## Purpose

Drops the definition for the specified UDT.

## Syntax



1101A328

where:

| Syntax element ...            | Specifies ...                                                                                                             |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>          | the name of the containing database for <i>user_defined_type_name</i> .<br>This is always <i>SYSUDTLIB</i> .              |
| <i>user_defined_type_name</i> | the name of the user-defined type, whether distinct or structured, whose definition is to be dropped from the dictionary. |

## ANSI Compliance

DROP TYPE is ANSI SQL:2008 compliant.

## Required Privileges

You must have either the `UDTTYPE` privilege or the `UDTMETHOD` privilege on the *SYSUDTLIB* database to drop a UDT.

## Example 1

The following example drops the definition of the UDT named *person*:

```
DROP TYPE SYSUDTLIB.person;
```

## Example 2

The following example drops the definition of the UDT named *employee*:

```
DROP TYPE SYSUDTLIB.employee;
```



### Example 3

The following example drops the definition of the UDT named *circle*.

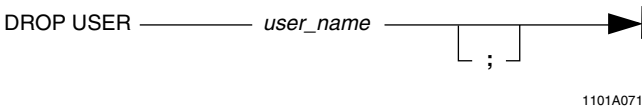
```
DROP TYPE circle;
```

# DROP USER

## Purpose

Drops the definition for an empty user from the data dictionary. All objects associated with that user must have already been dropped.

## Syntax



where:

| Syntax Element ...     | Specifies ...                               |
|------------------------|---------------------------------------------|
| <code>user_name</code> | the name of the user that is to be dropped. |

## ANSI Compliance

`DROP USER` is a Teradata extension to the ANSI SQL:2008 standard.  
`DROP USER` is functionally similar to the ANSI SQL:2008 statement `DROP SCHEMA`.

## Required Privileges

You must have the `DROP USER` privilege on the user. The user that is being dropped cannot own other databases or users, and must be at the bottom of the database hierarchy.

## Example 1

The following statement drops user *Jones*:

```
DROP USER Jones;
```

## Example 2

Suppose the following DBQL rules are in place:

- Rule 1: ALL users, any account string, default logging only.
- Rule 2: ALL users with account string '*finance*', object logging.
- Rule 3: *user1*, account string '*marketing*', step logging.
- Rule 4: *user1*, account string '*HR*', default logging only.

You need to drop *user1*. Before you can do so, you must first stop query logging explicitly for *user 1* so you can remove Rules 3 and 4.

To do this, submit the following requests in the order indicated:

```
END QUERY LOGGING ON user1 ACCOUNT = ('marketing', 'HR');  
  
DROP USER user1;
```

## Related Topics

| FOR more information on ... | See ...                                                      |
|-----------------------------|--------------------------------------------------------------|
| creating users              | <a href="#">“CREATE TYPE (Structured Form)” on page 515.</a> |
| deleting users              | <a href="#">“DELETE DATABASE/ DELETE USER” on page 551.</a>  |



## CHAPTER 8 **END LOGGING - SET TIME ZONE**

---

DDL statements define, modify, and remove database object definitions.

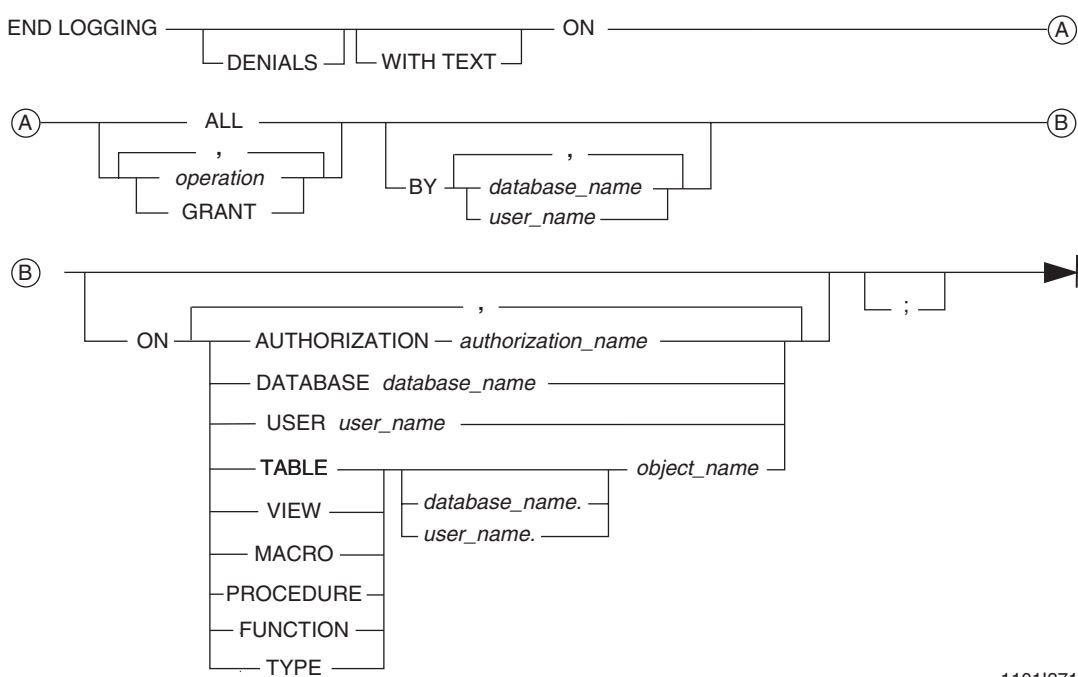
This chapter documents the syntax for, and provides examples of, the Teradata Database DDL statements from END LOGGING through SET TIME ZONE.

# END LOGGING

## Purpose

Ends the auditing of SQL requests that was started with a BEGIN LOGGING statement.

## Syntax



11011371

where:

| Syntax Element ... | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DENIALS            | <p>that entries should be made only when statement execution fails because the user did not have the privilege set necessary to perform the statement.</p> <p>DENIALS is applied to only those actions listed in the BEGIN LOGGING statement that contains it.</p> <p>For example, two BEGIN LOGGING statements can specify the same object, user, and action, but different frequency and DENIALS options. This allows the user to log all denials, but only the first successful use of a privilege.</p> <p>If this option is not specified, a log entry is potentially made if the privilege check either fails or succeeds.</p> |

| Syntax Element ...                                | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                               |                      |                                                   |                                                               |                                              |               |                |                                                                                                              |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|----------------------|---------------------------------------------------|---------------------------------------------------------------|----------------------------------------------|---------------|----------------|--------------------------------------------------------------------------------------------------------------|
| WITH TEXT                                         | <p>that the text of the statement that caused the log entry is to be saved in the log.</p> <p>If two BEGIN LOGGING statements specify the same user, object, and action, and one of the statements specifies the DENIALS option, then WITH TEXT can be specified on either one of the statements, on both statements, or on neither statement.</p> <table><tr><th>IF WITH TEXT is specified ...</th><th>THEN the text is ...</th></tr><tr><td>only on the statement that also specifies DENIALS</td><td>saved only when the entry is created as a result of a denial.</td></tr><tr><td>either without DENIALS or on both statements</td><td>always saved.</td></tr><tr><td>on END LOGGING</td><td>not saved for the specified actions or the DENIALS specification, but the logging frequency is not affected.</td></tr></table>                                                                                                                     | IF WITH TEXT is specified ... | THEN the text is ... | only on the statement that also specifies DENIALS | saved only when the entry is created as a result of a denial. | either without DENIALS or on both statements | always saved. | on END LOGGING | not saved for the specified actions or the DENIALS specification, but the logging frequency is not affected. |
| IF WITH TEXT is specified ...                     | THEN the text is ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                               |                      |                                                   |                                                               |                                              |               |                |                                                                                                              |
| only on the statement that also specifies DENIALS | saved only when the entry is created as a result of a denial.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                               |                      |                                                   |                                                               |                                              |               |                |                                                                                                              |
| either without DENIALS or on both statements      | always saved.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                               |                      |                                                   |                                                               |                                              |               |                |                                                                                                              |
| on END LOGGING                                    | not saved for the specified actions or the DENIALS specification, but the logging frequency is not affected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                               |                      |                                                   |                                                               |                                              |               |                |                                                                                                              |
| ALL<br><i>operation</i><br>GRANT                  | <p>the frequency with which log entries should be made.</p> <p>ALL specifies that a log entry will potentially be made when any of the actions listed in the table following this one is attempted against the specified object. ALL does not include the CREATE ROLE, DROP ROLE, CREATE PROFILE, or DROP PROFILE actions, because they do not apply to a specific object.</p> <p>Note that both the name <i>and</i> ID for each column are logged when you log privileges to INSERT, REFERENCES, SELECT, and UPDATE.</p> <p>If logging has already begun for ALL actions on an object, a subsequent request to begin or end logging for an action will change logging activity only for the specified action.</p> <p>One or more action names from the following list can be used to specify the type of access for which logging is to end. These are the same names as those for the statements for which an access privilege can be granted.</p> |                               |                      |                                                   |                                                               |                                              |               |                |                                                                                                              |

| Syntax Element ...                              | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ALL<br><i>operation</i><br>GRANT<br>(continued) | <ul style="list-style-type: none"> <li>• ALTER EXTERNAL PROCEDURE</li> <li>• ALTER FUNCTION</li> <li>• ALTER GROUP</li> <li>• ALTER PROCEDURE</li> <li>• CHECKPOINT</li> <li>• CREATE AUTHORIZATION</li> <li>• CREATE DATABASE</li> <li>• CREATE EXTERNAL PROCEDURE</li> <li>• CREATE FUNCTION</li> <li>• CREATE GLOP SET</li> <li>• CREATE GROUP</li> <li>• CREATE MACRO</li> <li>• CREATE PROCEDURE</li> <li>• CREATE PROFILE</li> <li>• CREATE ROLE</li> <li>• CREATE TABLE</li> <li>• CREATE TRIGGER</li> <li>• CREATE USER</li> <li>• CREATE VIEW</li> <li>• DATABASE</li> <li>• DELETE</li> <li>• DROP</li> <li>• DROP AUTHORIZATION</li> <li>• DROP DATABASE</li> <li>• DROP FUNCTION</li> <li>• DROP GLOP SET</li> <li>• DROP GROUP</li> <li>• DROP MACRO</li> <li>• DROP PROCEDURE</li> <li>• DROP PROFILE</li> <li>• DROP ROLE</li> <li>• DROP TABLE</li> <li>• DROP TRIGGER</li> <li>• DROP USER</li> <li>• DROP VIEW</li> <li>• DUMP</li> <li>• EXECUTE</li> <li>• EXECUTE FUNCTION</li> <li>• EXECUTE PROCEDURE</li> <li>• GRANT</li> <li>• INDEX</li> <li>• INSERT</li> <li>• MACRO</li> <li>• OVERRIDE REPLICATION</li> <li>• PROCEDURE</li> <li>• REFERENCES</li> <li>• RESTORE</li> <li>• ROLLBACK DATABASE</li> <li>• ROLLFORWARD DATABASE</li> <li>• SELECT</li> <li>• TABLE</li> <li>• TRIGGER</li> <li>• UDTMETHOD</li> <li>• UDTTYPE</li> <li>• UDTUSAGE</li> <li>• UPDATE</li> <li>• USER</li> <li>• VIEW</li> </ul> |
| BY <i>database_name</i>   <i>user_name</i>      | <p>the community for which log entries should be made.</p> <p>If <i>user_name</i> is specified, it must be a user currently defined in the Teradata Database; that is, a name for which space has been created and under which a session can be established.</p> <p>Absence of the BY <i>user_name</i> option implies <i>all</i> users (those already defined to the Teradata Database as well as any defined in the future while this logging directive is in effect). Logging begun for specific user names cannot be ended by omitting the BY <i>user_name</i> option.</p> <p>If both BY <i>user_name</i> and ON <i>keyword object_name</i> are absent, then the specified action is logged for all users and objects throughout the system.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |



| Syntax Element ...                                                                                                                                                                                                                                                                                                                                                                                                                              | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ON                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p>one or more entities for which log entries are to be made.</p> <p>Absence of the ON keyword <i>object_name</i> option implies logging of all entities the user attempts to access.</p> <p>If neither ON keyword <i>object_name</i> nor BY <i>user_name</i> is specified, then the specified action is logged for <i>all</i> users and objects throughout the system.</p> <p>Role and profile access privileges do not apply to specific objects. Do not use the ON keyword <i>object_name</i> option if you specify a CREATE PROFILE, CREATE ROLE, DROP PROFILE, or DROP ROLE action.</p> |
| DATABASE <i>database_name</i><br>FUNCTION <i>database_name</i>  <br><i>user_name.specific_function_name</i><br>MACRO <i>database_name</i>  <br><i>user_name.macro_name</i><br>PROCEDURE <i>database_name</i>  <br><i>user_name.procedure_name</i><br>TABLE <i>database_name</i>  <br><i>user_name.table_name</i><br>TYPE SYSUDTLIB.UDT_name<br>USER <i>database_name.user_name</i><br>VIEW <i>database_name</i>  <br><i>user_name.view_name</i> | <p>the name of the object to be logged.</p> <p>The appropriate keyword DATABASE, FUNCTION, MACRO, PROCEDURE, TABLE, TYPE, USER, or VIEW must precede each object name you specify.</p> <p>The object name is the name of a database, specific function, macro, stored procedure, table, UDT, user, or view.</p> <p>The name of a function, macro, stored procedure, table, UDT, user-defined function, or view must be qualified by the name of the database or user under which that object is defined. For TYPE, this specification is always <i>SYSUDTLIB</i>.</p>                        |

## ANSI Compliance

END LOGGING is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

None required.

## Example 1: Stopping UDT Logging On UDTYPE

This example stops logging for all of the following attempts that failed because of insufficient privileges:

- ALTER TYPE
- CREATE CAST
- CREATE ORDERING
- CREATE TRANSFORM
- CREATE TYPE
- DROP CAST
- DROP ORDERING
- DROP TRANSFORM
- DROP TYPE
- REPLACE CAST
- REPLACE ORDERING
- REPLACE TRANSFORM
- method invocation
- NEW specification
- UDT reference

```
END LOGGING DENIALS ON UDTYPE;
```

## Example 2 Stopping UDT Logging And SQL Text

This example is similar to [“Example 1: Stopping UDT Logging On UDTYPE”](#), but it also stops logging the SQL text for the failed attempts:

```
END LOGGING DENIALS WITH TEXT ON UDTYPE;
```

## Example 3 Stopping UDT Logging On UDTMETHOD

This example stops logging for all of the following request attempts that fail because of insufficient privileges:

- |                    |                  |                     |
|--------------------|------------------|---------------------|
| • ALTER METHOD     | • CREATE TYPE    | • REPLACE CAST      |
| • ALTER TYPE       | • DROP CAST      | • REPLACE ORDERING  |
| • CREATE CAST      | • DROP METHOD    | • REPLACE TRANSFORM |
| • CREATE METHOD    | • DROP ORDERING  | • method invocation |
| • CREATE ORDERING  | • DROP TRANSFORM | • NEW specification |
| • CREATE TRANSFORM | • DROP TYPE      | • UDT reference     |

```
END LOGGING ON UDTMETHOD;
```

## Related Topics

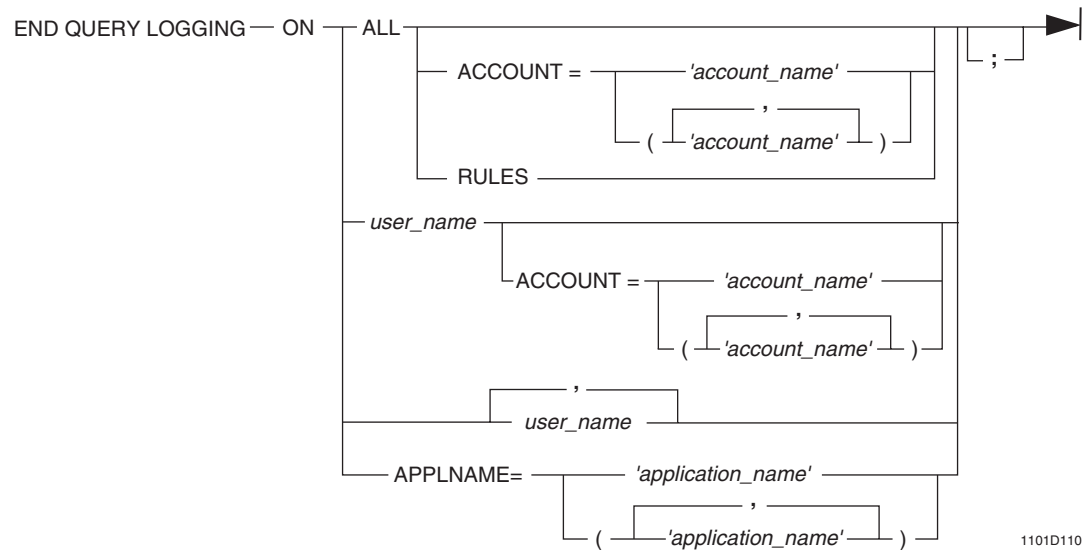
See [“BEGIN LOGGING” on page 79](#).

## END QUERY LOGGING

## Purpose

Stops the logging of SQL requests initiated by a BEGIN QUERY LOGGING request and commits the query log cache.

## Syntax



where:

| Syntax element ...                  | Specifies ...                                                                                                                                                                                                                                                                                            |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ALL ACCOUNT = <i>'account_name'</i> | to remove all rules for the specified account name set from <i>DBC.DBQLRulesTbl</i> and the rules cache, and to stop any logging that was based on that rule.<br><br>If you began query logging on a specific user:account pair, then you must also specify that user:account pair to end query logging. |
| ALL RULES                           | to remove all rules in <i>DBC.DBQLRuleTbl</i> and the rules cache, and to stop any logging that was based on those rules.                                                                                                                                                                                |
| <i>user_name</i>                    | to remove the rules for the specified user name from <i>DBC.DBQLRulesTbl</i> and the rules cache, and to stop any logging that was based on those rules.<br><br>You can optionally specify multiple accounts on which logging should be stopped for this individual user.                                |

| Syntax element ...                        | Specifies ...                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACCOUNT =<br>' <i>account_name</i> '      | to remove the rules for the specified user:account name pair set from <i>DBC.DBQLRulesTbl</i> and the rules cache, and to stop any logging that was based on those rules.<br><br>If you began query logging on a specific user:account pair, then you must also specify that user:account pair to end query logging. |
| <i>user_name</i>                          | to remove the rules for the specified user name set from <i>DBC.DBQLRulesTbl</i> and the rules cache, and to stop any logging that was based on those rules.<br><br>You cannot specify multiple user names if you also specify ACCOUNT = ' <i>account_name</i> '.                                                    |
| APPLNAME =<br>' <i>application_name</i> ' | to remove the rule for the specified application name set from <i>DBC.DBQLRulesTbl</i> and the rules cache, and to stop any logging that was based on that rule.<br><br>Teradata Database reevaluates all active sessions to determine if any other rules apply.                                                     |

## ANSI Compliance

END QUERY LOGGING is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have the EXECUTE privilege on the macro *DBQLAccessMacro* to perform END QUERY LOGGING.

### Example 1

This request removes the ALL rule from the rule cache and *DBC.DBQLRulesTbl* and ends all query logging based on the rule.

```
END QUERY LOGGING ON ALL;
```

### Example 2

This request removes the rule for *user\_1* from the rule cache and *DBC.DBQLRulesTbl* and ends all query logging based on the rule.

```
END QUERY LOGGING ON user_1;
```

### Example 3

This request removes the rules for *user\_1* and *user\_2* from the rule cache and *DBC.DBQLRulesTbl* and ends all query logging based on the rule.

```
END QUERY LOGGING ON user_1, user_2;
```

## Example 4

If you started query logging on a specific account, then you must also specify that account explicitly when you end query logging.

This request removes the rule for *user\_1* logged on through the *order entry* account from the rule cache and *DBC.DBQLRulesTbl* and ends all query logging based on the rule.

```
END QUERY LOGGING ON user_1 ACCOUNT = ('order_entry');
```

## Example 5

If you have created a set of DBQL rules and you later want to remove them all from *DBC.DBQLRuleTbl*, you can submit the following END QUERY LOGGING request. This request removes the rules from *DBC.DBQLRuleTbl* and updates all active sessions to remove any DBQL logging at the next request.

```
END QUERY LOGGING ON ALL RULES;
```

## Related Topics

See [“BEGIN QUERY LOGGING” on page 86](#).

Also see *Database Administration*.

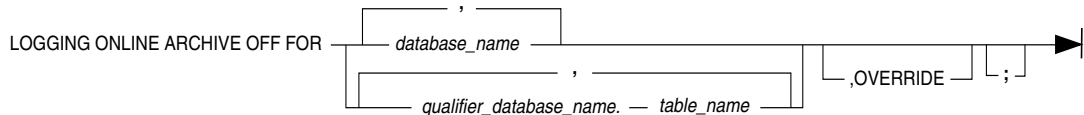
# LOGGING ONLINE ARCHIVE OFF

## Purpose

Stops the online archive logging for all tables in a specified database or for a specific set of tables, possibly in multiple databases.

Also deletes the log subtables associated with the object set being logged.

## Syntax



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where:

| Syntax Element ...                                   | Specifies ...                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i>              | <p>the name of one or more databases or users for which logging for online archive is to be stopped.</p> <p>This option stops online archive logging on all tables contained in the specified database or user.</p> <p>Note that when LOGGING ONLINE ARCHIVE OFF is specified as an SQL request, <i>database_name</i> or <i>user_name</i> must <i>not</i> be delimited by parentheses.</p> |
| <i>qualifier_database_name.</i><br><i>table_name</i> | <p>the names of the database and table for which online logging is to be stopped.</p> <p>Note that when LOGGING ONLINE ARCHIVE OFF is specified as an SQL request, <i>qualifier_database_name.table_name</i> or <i>qualifier_user_name</i> must <i>not</i> be delimited by parentheses.</p>                                                                                                |
| OVERRIDE                                             | <p>to allow online archive logging to be stopped by someone other than the user who initiated logging for online archive on the specified database or table sets.</p>                                                                                                                                                                                                                      |

While it is possible to submit either an SQL LOGGING ONLINE ARCHIVE OFF statement or a LOGGING ONLINE ARCHIVE OFF Archive/Recovery utility command within an ARCHIVE command script, the syntax for the two is slightly different. You *cannot* use the SQL syntax to submit a LOGGING ONLINE ARCHIVE OFF Archive utility command. See *Teradata Archive/Recovery Utility Reference* for details of the utility command syntax.

## ANSI Compliance

LOGGING ONLINE ARCHIVE OFF is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have either of the following to perform LOGGING ONLINE ARCHIVE OFF:

- You must own the database or table being logged.
- You must have the DUMP privilege on either of the following database objects:
  - the table being logged
  - the database being logged

You can grant the DUMP privilege either to a user or to an active role for the user.

## Example 1: Stopping Online Archive Logging of a Single Table

The following example stops online archive logging on *table1*:

```
LOGGING ONLINE ARCHIVE OFF FOR databasea.table1;
```

Note that the *database\_name.table\_name* specification is not delimited by parentheses.

## Example 2: Stopping Online Archive Logging of All Tables in a Single Database

The following example stops online archive logging on all the tables in *databasea*:

```
LOGGING ONLINE ARCHIVE OFF FOR databasea;
```

Note that the *database\_name* specification is not delimited by parentheses.

## Example 3: Stopping Online Archive Logging on Three Tables in the Same Database

The following example stops online archive logging on *table1*, *table2* and *table3*:

```
LOGGING ONLINE ARCHIVE OFF FOR  
databasea.table1,  
databasea.table2,  
databasea.table3;
```

Note that the *database\_name.table\_name* specifications are not delimited by parentheses.

## Example 4: Stopping Online Archive Logging of All Tables in Two Databases

The following example stops online archive logging on all the tables in *databasea* and *databaseb*:

```
LOGGING ONLINE ARCHIVE OFF FOR databasea, databaseb;
```

Note that the *database\_name* specifications are not delimited by parentheses.

## Related Topics

See the following topic and manual for additional information about online archive logging:

- [“LOGGING ONLINE ARCHIVE ON” on page 609](#)
- *Teradata Archive/Recovery Utility Reference*

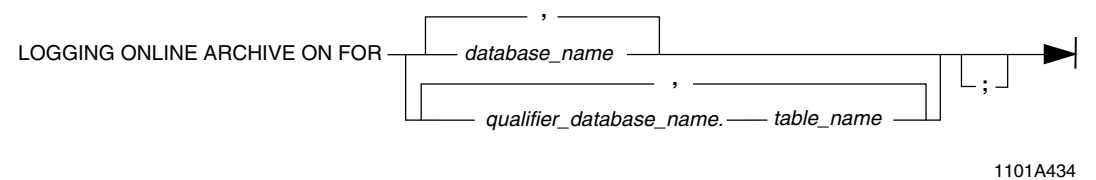


# LOGGING ONLINE ARCHIVE ON

## Purpose

Specifies the intent to perform online archive logging by creating a synchrony point for a specified list of database or table sets and to capture subsequent updates<sup>1</sup> made to the specified tables until online archive logging is turned off.

## Syntax



where:

| Syntax Element ...                                    | Specifies ...                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i>               | <p>the name of one or more databases or users to be logged for online archive.</p> <p>This option starts online archive logging on all tables in the specified database or user.</p> <p>Note that when LOGGING ONLINE ARCHIVE ON is specified as an SQL request, <i>database_name</i> or <i>user_name</i> must <i>not</i> be delimited by parentheses.</p> |
| <i>qualifier_database_name</i> .<br><i>table_name</i> | <p>the names of the database and table to be logged for online archive.</p> <p>Note that when LOGGING ONLINE ARCHIVE ON is specified as an SQL request, <i>qualifier_database_name.table_name</i> must <i>not</i> be delimited by parentheses.</p>                                                                                                         |

While it is possible to submit either an SQL LOGGING ONLINE ARCHIVE ON statement or a LOGGING ONLINE ARCHIVE ON Archive/Recovery utility command within an ARCHIVE command script, the syntax for the two is slightly different. You *cannot* use the SQL syntax to submit a LOGGING ONLINE ARCHIVE ON Archive utility command. See *Teradata Archive/Recovery Utility Reference* for details of the utility command syntax.

## ANSI Compliance

LOGGING ONLINE ARCHIVE ON is a Teradata extension to the ANSI SQL:2008 standard.

1. *Update* is used in its generic sense to refer to all delete, insert, and update operations made against a table set.

## Required Privileges

You must have either of the following to perform LOGGING ONLINE ARCHIVE ON:

- You must own the database or table being logged.
- You must have the DUMP privilege on either of the following database objects:
  - the table being logged
  - the database being logged

You can grant the DUMP privilege either to a user or to an active role for the user.

## Example 1: Starting Online Archive Logging for a Single Table

The following example starts online archive logging on *table1*.

The system places a table-level read lock on *table1* before it begins logging. The system then releases this table-level READ lock after the transaction completes.

```
LOGGING ONLINE ARCHIVE ON FOR databasea.table1;
```

Note that the *database\_name.table\_name* specification in the LOGGING ONLINE ARCHIVE ON SQL request is *not* delimited by parentheses.

## Example 2: Starting Online Archive Logging for All Tables in a Single Database

The following example start online archive logging on all the tables in *databasea*.

In this example, the system places table-level READ locks on all the tables in *databasea* before it begins logging. The system then releases the table-level READ locks after the transaction containing the LOGGING ONLINE ARCHIVE ON statement completes.

```
LOGGING ONLINE ARCHIVE ON FOR databasea;
```

Note that the *database\_name* specification in the LOGGING ONLINE ARCHIVE ON SQL request is *not* delimited by parentheses.

Until you issue a LOGGING ONLINE ARCHIVE OFF request, you cannot perform any DDL statements against database *databasea* or the tables it contains with the following exceptions:

- BEGIN LOGGING
- COLLECT STATISTICS
- COMMENT
- DELETE DATABASE

### Example 3: Starting Online Archive Logging on Three Tables in the Same Database

The following example starts online archive logging on *table1*, *table2* and *table3*.

The system places table-level READ locks on *table1*, *table2* and *table3* before it begins logging. The system then releases the table-level read locks after the transaction completes.

```
LOGGING ONLINE ARCHIVE ON FOR
  databasea.table1,
  databasea.table2,
  databasea.table3;
```

Note that the *database\_name.table\_name* specifications in the LOGGING ONLINE ARCHIVE ON SQL request are *not* delimited by parentheses.

### Example 4: Starting Online Archive Logging on All Tables in Two Databases

The following example starts online archive logging on all the tables in *databasea* and *databaseb*. The system places table-level READ locks on all the tables in *databasea* and *databaseb* before it begins logging. The system later releases the table-level READ locks after the transaction completes.

You cannot create any objects in *databasea* or *databaseb* until you issue a LOGGING ONLINE ARCHIVE OFF statement.

```
LOGGING ONLINE ARCHIVE ON FOR databasea, databaseb;
```

Note that the *database\_name* specifications are *not* delimited by parentheses in the LOGGING ONLINE ARCHIVE OFF SQL request.

### Related Topics

See the following topic and manual for additional information about online archive logging:

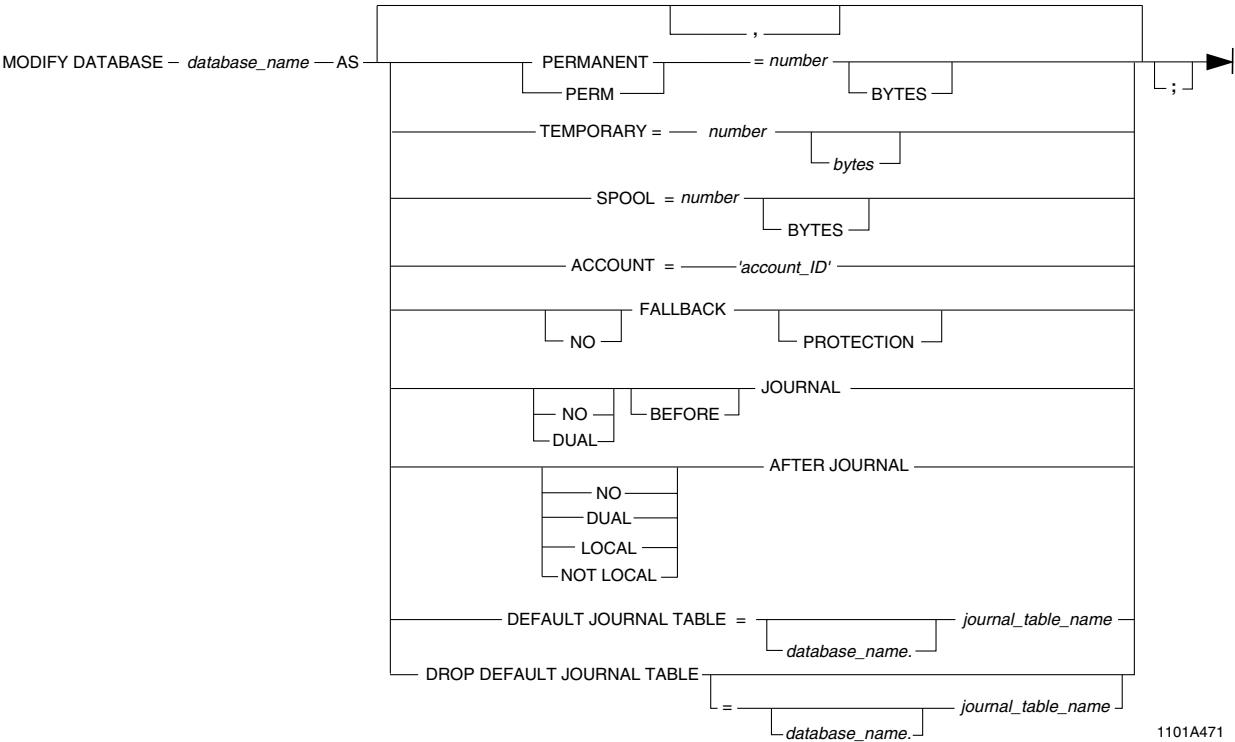
- [“LOGGING ONLINE ARCHIVE OFF” on page 606](#)
- *Teradata Archive/Recovery Utility Reference*

# MODIFY DATABASE

## Purpose

Changes the options that were specified when a database was created.

## Syntax



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where:

| Syntax Element ...   | Specifies ...                                                                                                                      |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i> | the name of the database to be modified.                                                                                           |
| AS                   | an introduction to the list of options for modifying the database.                                                                 |
| PERMANENT            | a keyword introducing the allocated fixed space.                                                                                   |
| <i>number</i>        | a new value for fixed space allocation, in bytes.<br><i>number</i> can be entered as an integer, decimal, or floating point value. |
| BYTES                | an optional unit assigned to the fixed space value.                                                                                |

| Syntax Element ...              | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TEMPORARY = <i>number</i>       | <p>how many bytes are to be allowed by default for creating global temporary tables by users within this database. Note that temporary space is reserved prior to spool space for any user defined with this characteristic.</p> <p>Disk usage for a materialized global temporary table is charged to the temporary space allocation of the user who referenced the table.</p> <p>If no default temporary space is defined for a database, then the space allocated for any materialized global temporary tables created in that database is set to the maximum temporary space allocated for its immediate owner.</p>                                                                                                                                                                                              |
| SPOOL                           | a keyword introducing the allocated spool space.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>number</i>                   | <p>the maximum number of bytes allowed for spool files.</p> <p><i>number</i> can be entered as an integer, decimal, or floating point value.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| BYTES                           | an optional unit assigned to the spool space.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| ACCOUNT                         | a keyword introducing the account identifier.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>account_ID</i>               | <p>an identifier for the account to be charged for the space used by this database.</p> <p>The value for <i>account_ID</i> can be up to 30 characters (provided they are not Japanese characters, in which case <i>account_ID</i> can be up to 30 bytes, using any of the supported character sets - see <i>SQL Fundamentals</i> for a description of Teradata Database identifiers and a list of the characters they can contain), and must be enclosed by APOSTROPHE characters.</p>                                                                                                                                                                                                                                                                                                                               |
| [NO] FALLBACK PROTECTION        | <p>a new default for duplicate copy protection of each data table subsequently created in the database. The current fallback setting for existing data tables remains unchanged.</p> <p>The FALLBACK keyword used alone implies PROTECTION.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| NO<br>DUAL<br>BEFORE<br>JOURNAL | <p>a new default for the number of before change images to be maintained for data tables subsequently created in the database.</p> <p>The NO keyword terminates any current journaling default.</p> <p>If the JOURNAL keyword is specified without NO or DUAL, single copy journaling is implied. If journaling is specified, a DUAL journal is maintained for data tables with FALLBACK protection.</p> <p>Existing images are not affected until the corresponding table is updated.</p> <p>This option can appear twice in the same statement: once to specify a BEFORE or AFTER image, and again to specify the alternate type.</p> <p>If only one type is specified, then the current default is modified only for that type.</p> <p>If both BEFORE and AFTER are specified then the two must not conflict.</p> |

| Syntax Element ...                                                                                                                                                             | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NO<br>DUAL<br>BEFORE<br>JOURNAL<br>(continued)                                                                                                                                 | <p>The JOURNAL keyword without AFTER or BEFORE indicates that both types of images are to be maintained. In this case, the current default for either or both types is modified accordingly.</p> <p>For example, if only AFTER JOURNAL is specified, the current default for before change images remains in effect.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| NO<br>DUAL<br>LOCAL<br>NOT LOCAL<br>AFTER JOURNAL                                                                                                                              | <p>the type of image to be maintained for the table; any existing images are not affected until the table is updated.</p> <p>NO, DUAL, LOCAL, or NOT LOCAL: the NO and DUAL options specify the number of after-change images to be maintained for the table.</p> <p>NOT LOCAL and LOCAL specify whether single after-image journal rows for non-fallback data tables are written on the same virtual AMP (LOCAL) as the changed data rows, or on another virtual AMP in the cluster (NOT LOCAL).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| DEFAULT JOURNAL<br>TABLE=<br>[ <i>database_name</i> .]<br><i>journal_table_name</i><br>DROP DEFAULT<br>JOURNAL<br>TABLE=[ <i>database_name</i> .]<br><i>journal_table_name</i> | <p>a redefinition for the current journal table or removes its status as the default for the database being modified.</p> <p>The DROP keyword removes the default status of the journal table currently defined as the default for the database being modified. If the journal table resides in the database being modified, DROP also deletes the table from the system.</p> <p>An error message is returned if the DROP request would delete a journal table that is being used by active data tables.</p> <p>The <i>table_name</i> or <i>journal_table_name</i> parameter is required if this clause is specified without the DROP keyword.</p> <p>If a database name is not specified, then the database being modified is assumed.</p> <p>If the database being modified does not have a journal table, the system creates <i>journal_table_name</i> by default.</p> <p>If a different database is specified, then it must already exist and <i>table_name</i> must have been defined as its default journal table.</p> <p>Specifying this option does not change the status of existing data tables in the modified database.</p> |

## ANSI Compliance

MODIFY DATABASE is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have the DROP DATABASE privilege on the referenced database.

MODIFY DATABASE cannot be used to modify users. Instead, use MODIFY USER. See [“MODIFY USER” on page 623](#) for more information.

When you perform a MODIFY DATABASE statement, the system places an exclusive lock on the database that is being modified.

If necessary, the system changes the defined PERM, SPOOL, or TEMPORARY space to the next higher value that is a multiple of the number of AMPs on the system.

You can change one or more options in the same MODIFY statement. A changed option applies to all subsequent operations that occur for the database.

If an existing option is not changed by a MODIFY statement, that option retains its previously defined value.

## Privileges Granted Automatically

If you submit a successful MODIFY DATABASE ... DEFAULT JOURNAL TABLE request, the following privileges are granted automatically to the database on the journal table:

- DROP TABLE
- INSERT

## Example 1

The following request can be used to change the permanent space allocation for the *personnel* database to 6,000,000 bytes:

```
MODIFY DATABASE Personnel AS  
PERMANENT = 6000000 BYTES;
```

## Example 2

Two MODIFY requests are needed to change the default journal table if it is contained within the database being modified.

For example, suppose the journal table *FinCopy* is contained within the *personnel* database. To change the default journal table from *FinCopy* to *Jrnl1*, the present default journal table must be dropped by entering the following request:

```
MODIFY DATABASE Personnel AS  
DROP DEFAULT JOURNAL TABLE;
```

This request removes *FinCopy* as the default and also drops it from the system.

If any existing tables use *FinCopy* as their journal table, the statement returns an error message.

### Example 3

Now that the present default journal has been dropped (see [“Example 2” on page 615](#)), this request can be used to define a new default journal table:

```
MODIFY DATABASE Personnel AS  
DEFAULT JOURNAL TABLE = Jrnl1;
```

### Example 4

If the current journal table is *not* contained within the database being modified, then you could use the following request to change the default journal table from *FinCopy* to *Jrnl1*:

```
MODIFY DATABASE Personnel AS  
DEFAULT JOURNAL TABLE = Jrnl1;
```

### Example 5

Change fallback protection and space allocation options on the *finance* database as follows.

```
MODIFY DATABASE finance AS  
PERM = 75000000,  
SPOOL = 150000000,  
NOFALLBACK,  
DROP DEFAULT JOURNAL TABLE = finance.journals;
```

### Related Topics

For more information about database definitions, see [“CREATE DATABASE” on page 130](#).

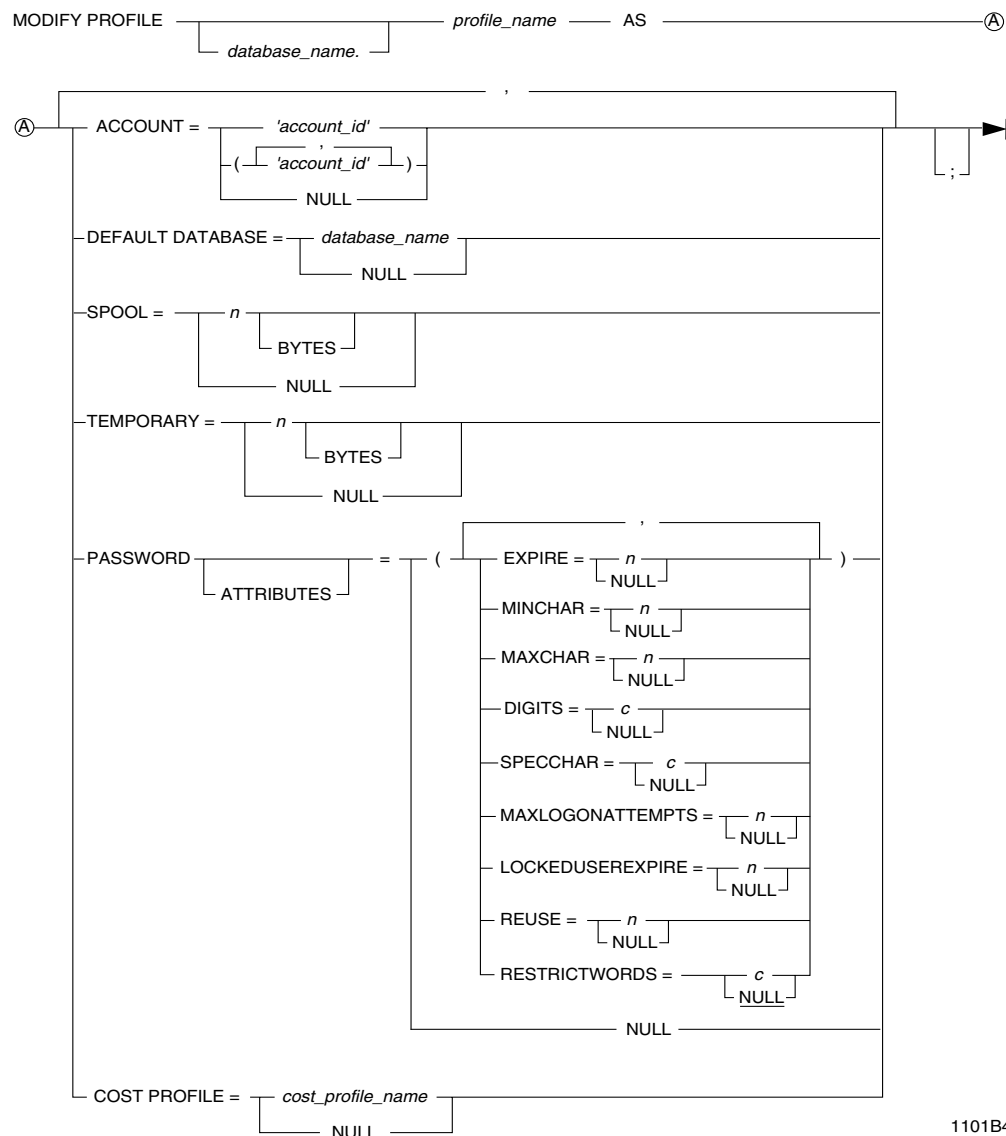


# MODIFY PROFILE

## Purpose

MODIFY PROFILE changes the system parameters for a profile.

## Syntax



where:

| Syntax Element ...                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>profile_name</i> if something other than the current database or user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <i>profile_name</i>                     | the name of the profile to be modified.<br>A profile name must be unique among profiles.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| ACCOUNT                                 | a keyword allowing you to specify the account for a user with this profile.<br>If no account is defined in the profile assigned to a user, the system uses the setting defined for the user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <i>account_id</i>                       | <p>an APOSTROPHE character-quoted identifier or a list of identifiers of the accounts to charge for the space used by users with this profile. The first identifier becomes the default account for the user.</p> <p>If <i>account_id</i> is null or is not defined in the profile assigned to a user, the system uses the setting defined for the user.</p> <p>Each <i>account_id</i> can be up to 30 characters and must be enclosed by APOSTROPHE characters. See <i>SQL Fundamentals</i> for a description of Teradata Database identifiers and a list of the characters they can contain.</p> <p>A list of <i>account_ids</i> must be separated by commas and enclosed by LEFT PARENTHESIS and RIGHT PARENTHESIS characters.</p> <p>Accounts in a profile assigned to a user override any other accounts the user might have.</p> <p>You can associate a Priority Scheduler performance group with each account ID you specify. This assignment specifies the relative service priority for the account based on the Priority Scheduler parameters specified for it by the system administrator.</p> <p>Each performance group for an account is named using the syntax <code>\$group_name\$</code>. <i>group_name</i> is limited to 16 single-byte characters (or 16 bytes for multibyte character sets). Validation of a performance group name occurs only at logon.</p> <p>When you log on, the system validates the performance group name you specify against existing performance group names. If no match is found, the system assigns one to you by default. The default is one of the following, depending on the situation:</p> <ul style="list-style-type: none"> <li>• First account string defined for the profile.</li> <li>• First account string defined for the user.</li> <li>• Performance group M if the user has no account string with a defined performance group.</li> </ul> |

| Syntax Element ...            | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>account_id</i> (continued) | <p>The following interactive mode BTEQ logon commands are valid examples of how to specify a performance group:</p> <pre>.LOGON elnino/GMK '\$L2\$&amp;D&amp;TacctPUB'</pre> <pre>.LOGON elnino/KGM '\$L&amp;D&amp;TacctPUB'</pre> <p>Performance group names, their relative levels of service, and other related parameters are defined either by default or as individually customized variables by your system administrator. For more information about performance groups and other Priority Scheduler parameters, see <i>Utilities</i>.</p>       |
| DEFAULT DATABASE              | <p>a keyword allowing you to specify the default database for a user with this profile.</p> <p>If no default database is defined in the profile assigned to a user, the system uses the setting defined for the user.</p>                                                                                                                                                                                                                                                                                                                                |
| <i>database_name</i>          | <p>the name of the default database established each time a user with this profile logs onto the Teradata Database.</p> <p><i>database_name</i> need not be an existing database. The system returns an error when a user with this profile tries to create or reference an object within a nonexistent database.</p> <p>If the default database is NULL or is not defined in the profile assigned to a user, the system uses the setting defined for the user.</p>                                                                                      |
| SPOOL                         | <p>a keyword allowing you to specify the bytes allowed for spool files.</p> <p>If no spool space is defined in the profile assigned to a user, the system uses the setting defined for the user.</p>                                                                                                                                                                                                                                                                                                                                                     |
| <i>n</i> [BYTES]              | <p>the number of bytes (<i>n</i>) allowed for spool files. The default is null, which causes the system to use the setting defined for the user.</p> <p><i>n</i> cannot exceed the spool space parameter in the profile of the creator. If no spool space is defined for that profile, then the spool space limit defined for the user setting of the creator is used.</p> <p><i>n</i> can be an INTEGER value, a DECIMAL value, or a FLOATING POINT value.</p> <p><i>n</i> refers to bytes, whether or not the optional BYTES keyword is specified.</p> |
| TEMPORARY                     | <p>a keyword allowing you to define how much space to allow for creating materialized global temporary tables.</p> <p>If no temporary space is defined in the profile assigned to a user, the system uses the setting defined for the user.</p> <p>Temporary space is reserved prior to spool space for any user defined with this characteristic.</p> <p>Disk usage for a materialized global temporary table is charged to the temporary space allocation of the user who referenced the table.</p>                                                    |

| Syntax Element ...                                             | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |             |                                                                |                                                              |                                                                |                                                |                                                                |                                                             |
|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------|----------------------------------------------------------------|--------------------------------------------------------------|----------------------------------------------------------------|------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------|
| <i>n</i> BYTES                                                 | <p>the number of bytes (<i>n</i>) to allocate for global temporary table space. The default is NULL, which causes the system to use the setting defined for the user.</p> <p><i>n</i> cannot exceed the temporary space parameter in the profile of the creator. If no temporary space limit is defined for that profile, then the temporary space limit defined for the user setting of the creator is used.</p> <p><i>n</i> can be an integer, a decimal value, or a floating point value.</p> <p><i>n</i> refers to bytes, whether or not the optional BYTES keyword is specified.</p>                 |                   |             |                                                                |                                                              |                                                                |                                                |                                                                |                                                             |
| PASSWORD<br>[ATTRIBUTES]                                       | <p>a keyword allowing you to define password security attributes. The default value is NULL for password attributes that are not defined in the profile for a user, which causes the system to use the system setting.</p> <p>Password security attributes defined in a profile take effect the next time a user logs on.</p> <p>Password formatting does not apply to multibyte client character sets on systems enabled with Japanese language support.</p>                                                                                                                                             |                   |             |                                                                |                                                              |                                                                |                                                |                                                                |                                                             |
| EXPIRE = <i>n</i>                                              | <p>the number of days to elapse before the password expires. A value of 0 for <i>n</i> indicates the password never expires.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |             |                                                                |                                                              |                                                                |                                                |                                                                |                                                             |
| MINCHAR = <i>n</i>                                             | <p>the minimum number of characters in a password string. The valid range for <i>n</i> is 1 to 30.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |             |                                                                |                                                              |                                                                |                                                |                                                                |                                                             |
| MAXCHAR = <i>n</i>                                             | <p>the maximum number of characters in a password string. The valid range for <i>n</i> is 1 to 30.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |             |                                                                |                                                              |                                                                |                                                |                                                                |                                                             |
| DIGITS = <i>c</i>                                              | <p>whether at least one digit must appear in a password string.</p> <table> <tr> <th>Value of <i>c</i></th><th>Description</th></tr> <tr> <td> <ul style="list-style-type: none"> <li>Y</li> <li>y</li> </ul> </td><td>Digits are permitted in a password string, but not required.</td></tr> <tr> <td> <ul style="list-style-type: none"> <li>N</li> <li>n</li> </ul> </td><td>Digits are not permitted in a password string.</td></tr> <tr> <td> <ul style="list-style-type: none"> <li>R</li> <li>r</li> </ul> </td><td><i>At least</i> one digit is required in a password string.</td></tr> </table> | Value of <i>c</i> | Description | <ul style="list-style-type: none"> <li>Y</li> <li>y</li> </ul> | Digits are permitted in a password string, but not required. | <ul style="list-style-type: none"> <li>N</li> <li>n</li> </ul> | Digits are not permitted in a password string. | <ul style="list-style-type: none"> <li>R</li> <li>r</li> </ul> | <i>At least</i> one digit is required in a password string. |
| Value of <i>c</i>                                              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |             |                                                                |                                                              |                                                                |                                                |                                                                |                                                             |
| <ul style="list-style-type: none"> <li>Y</li> <li>y</li> </ul> | Digits are permitted in a password string, but not required.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                   |             |                                                                |                                                              |                                                                |                                                |                                                                |                                                             |
| <ul style="list-style-type: none"> <li>N</li> <li>n</li> </ul> | Digits are not permitted in a password string.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |             |                                                                |                                                              |                                                                |                                                |                                                                |                                                             |
| <ul style="list-style-type: none"> <li>R</li> <li>r</li> </ul> | <i>At least</i> one digit is required in a password string.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |             |                                                                |                                                              |                                                                |                                                |                                                                |                                                             |

| Syntax Element ...                                                 | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |             |                                                                    |                                                                                         |                                                                    |                                                |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------|------------------------------------------------|
| SPECCHAR = <i>c</i>                                                | <p>whether user names, mixed case characters, or special characters are allowed, not required, or not allowed in a password string.</p> <p>The valid values for <i>c</i>, all of which are case insensitive, are as follows:</p> <ul style="list-style-type: none"> <li>• A or a</li> <li>• B or b</li> <li>• C or c</li> <li>• D or d</li> <li>• E or e</li> <li>• F or f</li> <li>• G or g</li> <li>• H or h</li> <li>• I or i</li> <li>• J or j</li> <li>• K or k</li> <li>• L or l</li> <li>• M or m</li> <li>• N or n</li> <li>• O or o</li> <li>• P or p</li> <li>• R or r</li> <li>• Y or y</li> </ul> <p>See the MODIFY RULE “SPECCHAR Option Rules” topic in <i>SQL Data Definition Language Detailed Topics</i> for the meanings of these characters and the password rules they implement.</p> |                            |             |                                                                    |                                                                                         |                                                                    |                                                |
| MAXLOGONATTEMPTS = <i>n</i>                                        | <p>the number of incorrect logon attempts allowed before locking the user from further attempts.</p> <p>A value of 0 for <i>n</i> indicates never to lock the user.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                            |             |                                                                    |                                                                                         |                                                                    |                                                |
| LOCKEDUSEREXPIRE = <i>n</i>                                        | <p>the number of minutes to elapse before unlocking a locked user.</p> <table border="1"> <thead> <tr> <th>Special Values of <i>n</i></th><th>Description</th></tr> </thead> <tbody> <tr> <td>0</td><td>Unlocks the user immediately.</td></tr> <tr> <td>-1</td><td>Locks the user indefinitely.</td></tr> </tbody> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Special Values of <i>n</i> | Description | 0                                                                  | Unlocks the user immediately.                                                           | -1                                                                 | Locks the user indefinitely.                   |
| Special Values of <i>n</i>                                         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |             |                                                                    |                                                                                         |                                                                    |                                                |
| 0                                                                  | Unlocks the user immediately.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |             |                                                                    |                                                                                         |                                                                    |                                                |
| -1                                                                 | Locks the user indefinitely.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                            |             |                                                                    |                                                                                         |                                                                    |                                                |
| REUSE = <i>n</i>                                                   | <p>the number of days to elapse before a password can be reused.</p> <p>A value of 0 for <i>n</i> allows the password to be reused immediately.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                            |             |                                                                    |                                                                                         |                                                                    |                                                |
| RESTRICTWORDS = <i>c</i>                                           | <p>whether certain words are restricted from use within a password string.</p> <table border="1"> <thead> <tr> <th>Value of <i>c</i></th><th>Description</th></tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> <li>• Y</li> <li>• y</li> </ul> </td><td>Any words listed in <i>DBC.PasswordRestrictions</i> cannot be used in password strings.</td></tr> <tr> <td> <ul style="list-style-type: none"> <li>• N</li> <li>• n</li> </ul> </td><td>No words are restricted from password strings.</td></tr> </tbody> </table> <p>See <i>Security Administration</i> and <i>Database Administration</i> for details.</p>                                                                                                                                                                    | Value of <i>c</i>          | Description | <ul style="list-style-type: none"> <li>• Y</li> <li>• y</li> </ul> | Any words listed in <i>DBC.PasswordRestrictions</i> cannot be used in password strings. | <ul style="list-style-type: none"> <li>• N</li> <li>• n</li> </ul> | No words are restricted from password strings. |
| Value of <i>c</i>                                                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            |             |                                                                    |                                                                                         |                                                                    |                                                |
| <ul style="list-style-type: none"> <li>• Y</li> <li>• y</li> </ul> | Any words listed in <i>DBC.PasswordRestrictions</i> cannot be used in password strings.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                            |             |                                                                    |                                                                                         |                                                                    |                                                |
| <ul style="list-style-type: none"> <li>• N</li> <li>• n</li> </ul> | No words are restricted from password strings.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |             |                                                                    |                                                                                         |                                                                    |                                                |
| COST PROFILE =<br><i>cost_profile_name</i>                         | <p>the cost profile to be associated with <i>profile_name</i>.</p> <p>The default is NULL, meaning use the default system profile.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |             |                                                                    |                                                                                         |                                                                    |                                                |

ANSI Compliance

MODIFY PROFILE is a Teradata extension to the ANSI SQL:2008 standard.

Required Privileges

To use MODIFY PROFILE, you must have the DROP PROFILE privilege.

New users do not implicitly have the DROP PROFILE privilege. User *DBC* or a user who has the DROP PROFILE privilege WITH GRANT OPTION can grant this privilege to another user.

Example

Assume user *anderson* has a spool setting of 500,000 bytes and user *brewster* has a spool setting of 800,000 bytes.

User *anderson* can create a profile named *finance* with a spool setting of 500,000 bytes:

```
CREATE PROFILE finance AS
SPOOL = 500000;
```

User *anderson* can assign this profile to user *brewster*, effectively reducing the spool limit from 800,000 to 500,000 bytes:

```
MODIFY USER brewster AS
PROFILE = finance;
```

If the owner of *anderson* later increases the spool allotment to 1,000,000, *anderson* can also increase the *finance* profile spool setting up to 1,000,000 bytes. All users assigned that profile, including *brewster*, automatically get 1,000,000 bytes of spool space.

```
MODIFY PROFILE finance AS
SPOOL = 1000000;
```

If the owner of *anderson* later decreases the spool allotment back to 500,000 bytes, the *finance* profile and the allotment for *brewster* are not affected.

Related Topics

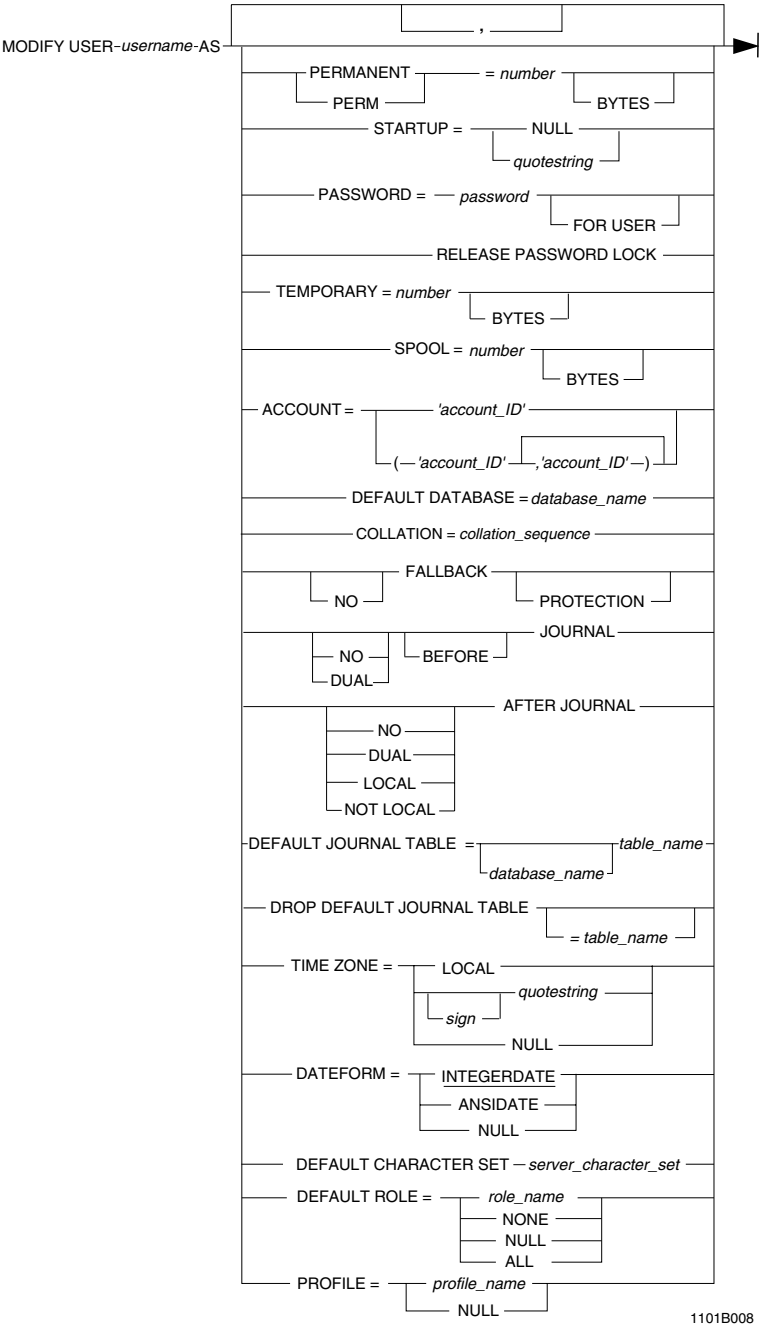
| FOR more information on ...          | SEE ...                                                                                                                                           |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| assigning profiles to users          | <ul style="list-style-type: none"><li>• <a href="#">“CREATE USER” on page 524.</a></li><li>• <a href="#">“MODIFY USER” on page 623.</a></li></ul> |
| obtaining the DROP PROFILE privilege | <a href="#">“GRANT (SQL Form)” topic in SQL Data Control Language.</a>                                                                            |
| system-level password attributes     | <a href="#">Security Administration.</a>                                                                                                          |

# MODIFY USER

## Purpose

Changes the options that were specified when a user was created.

## Syntax



where:

| Syntax Element ...                 | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |             |      |                                                            |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------|------|------------------------------------------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>user_name</i>                   | the name of the user to be modified.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |             |      |                                                            |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| PERMANENT = <i>number</i><br>BYTES | <p>a new value, in bytes, for permanent space allowed for the specified user.</p> <p><i>number</i> can be entered as an integer, decimal, or floating point value.</p> <p>BYTES is a noise keyword that redundantly specifies the unit for the amount of permanent space allowed.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |             |      |                                                            |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| STARTUP =                          | <p>a keyword introducing the startup options.</p> <table> <tr> <th>Option</th><th>Description</th></tr> <tr> <td>NULL</td><td>any existing startup string for the user is to be deleted.</td></tr> <tr> <td><i>quotestring</i></td><td> <p>a replacement for the user startup string, which consists of one or more SQL statements that are performed when the user logs onto the Teradata Database.</p> <p>A startup <i>quotestring</i> can be up to 255 characters, must be terminated by a SEMICOLON character, and enclosed by APOSTROPHE characters.</p> <p>A startup Kanji <i>quotestring</i> can be up to 255 bytes, must be terminated by a SEMICOLON character, and enclosed by APOSTROPHE characters.</p> <p>The USING modifier is not supported, and if a DDL statement is used, no other statement is allowed in the string.</p> </td></tr> </table> | Option | Description | NULL | any existing startup string for the user is to be deleted. | <i>quotestring</i> | <p>a replacement for the user startup string, which consists of one or more SQL statements that are performed when the user logs onto the Teradata Database.</p> <p>A startup <i>quotestring</i> can be up to 255 characters, must be terminated by a SEMICOLON character, and enclosed by APOSTROPHE characters.</p> <p>A startup Kanji <i>quotestring</i> can be up to 255 bytes, must be terminated by a SEMICOLON character, and enclosed by APOSTROPHE characters.</p> <p>The USING modifier is not supported, and if a DDL statement is used, no other statement is allowed in the string.</p> |
| Option                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |             |      |                                                            |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| NULL                               | any existing startup string for the user is to be deleted.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |             |      |                                                            |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <i>quotestring</i>                 | <p>a replacement for the user startup string, which consists of one or more SQL statements that are performed when the user logs onto the Teradata Database.</p> <p>A startup <i>quotestring</i> can be up to 255 characters, must be terminated by a SEMICOLON character, and enclosed by APOSTROPHE characters.</p> <p>A startup Kanji <i>quotestring</i> can be up to 255 bytes, must be terminated by a SEMICOLON character, and enclosed by APOSTROPHE characters.</p> <p>The USING modifier is not supported, and if a DDL statement is used, no other statement is allowed in the string.</p>                                                                                                                                                                                                                                                             |        |             |      |                                                            |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| PASSWORD =                         | <p>a new password for the user being modified. A password is a reserved word and can contain up to 30 characters.</p> <p>See <i>SQL Fundamentals</i> for a description of Teradata Database identifiers and a list of the characters they can contain.</p> <p>If the name is Japanese, see the formula in <i>International Character Set Support</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |             |      |                                                            |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |



| Syntax Element ...                                                                                                                   | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                      |                               |   |                                                                                                                                                                                 |     |                                                                                                                                                                                                                                                                     |
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| FOR USER                                                                                                                             | <p>an optional specification to remove the existing password immediately and set the password expiration date to zero, depending on the value of the <i>Expire</i> option in the profile assigned to the user</p> <p>If user is not assigned a profile or if the <i>Expire</i> option in the assigned profile is not set, then the expiration date is set to the value of the <i>ExpirePassword</i> column specified in <i>DBC.SysSecDefaults</i> as shown in the following table:</p> <table> <tr> <th>IF the <i>Expire</i> value in the user profile or the value for <i>ExpirePassword</i> in <i>DBC.SysSecDefaults</i> is this value ...</th><th>THEN the current password ...</th></tr> <tr> <td>0</td><td> <p>expires immediately and the new temporary password becomes valid indefinitely.</p> <p>This is a potential security breach and you should ensure that it does not happen.</p> </td></tr> <tr> <td>&gt; 0</td><td> <p>expires immediately and the new temporary password becomes valid.</p> <p>The value for <i>ExpirePassword</i> is reset to 0.</p> <p>The new temporary password expires at first logon and a new, permanent password must be created by the user at that time.</p> </td></tr> </table> <p>The password attribute settings in a user profile override the corresponding system-level password settings.</p> <p>For more information about <i>DBC.SysSecDefaults</i> and <i>ExpirePassword</i>, see <i>Security Administration</i> and <i>Data Dictionary</i>. For more information about profiles, see <a href="#">“CREATE ROLE” on page 379</a>.</p> | IF the <i>Expire</i> value in the user profile or the value for <i>ExpirePassword</i> in <i>DBC.SysSecDefaults</i> is this value ... | THEN the current password ... | 0 | <p>expires immediately and the new temporary password becomes valid indefinitely.</p> <p>This is a potential security breach and you should ensure that it does not happen.</p> | > 0 | <p>expires immediately and the new temporary password becomes valid.</p> <p>The value for <i>ExpirePassword</i> is reset to 0.</p> <p>The new temporary password expires at first logon and a new, permanent password must be created by the user at that time.</p> |
| IF the <i>Expire</i> value in the user profile or the value for <i>ExpirePassword</i> in <i>DBC.SysSecDefaults</i> is this value ... | THEN the current password ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                      |                               |   |                                                                                                                                                                                 |     |                                                                                                                                                                                                                                                                     |
| 0                                                                                                                                    | <p>expires immediately and the new temporary password becomes valid indefinitely.</p> <p>This is a potential security breach and you should ensure that it does not happen.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                      |                               |   |                                                                                                                                                                                 |     |                                                                                                                                                                                                                                                                     |
| > 0                                                                                                                                  | <p>expires immediately and the new temporary password becomes valid.</p> <p>The value for <i>ExpirePassword</i> is reset to 0.</p> <p>The new temporary password expires at first logon and a new, permanent password must be created by the user at that time.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                      |                               |   |                                                                                                                                                                                 |     |                                                                                                                                                                                                                                                                     |
| RELEASE PASSWORD LOCK                                                                                                                | <p>keywords to release a user lock.</p> <p>A user row in <i>DBC.Dbase</i> becomes locked if the number of successive erroneous logon attempts reaches the site-specified threshold.</p> <p>The user row remains locked to logon attempts until the site-defined time has passed, or until a <i>MODIFY USER</i> statement is submitted to release the lock on the user.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                      |                               |   |                                                                                                                                                                                 |     |                                                                                                                                                                                                                                                                     |
| TEMPORARY = <i>number</i><br>[BYTES]                                                                                                 | <p>how many bytes are to be allowed for creating materialized global temporary tables by this user. Temporary space is reserved prior to spool space for any user defined with this characteristic.</p> <p>Disk usage for a materialized global temporary table is charged to the user who referenced the table.</p> <p>BYTES is a noise keyword that redundantly specifies the unit for the amount of temporary space allowed.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                      |                               |   |                                                                                                                                                                                 |     |                                                                                                                                                                                                                                                                     |
| SPOOL = <i>number</i><br>[BYTES]                                                                                                     | <p>a new value for the maximum space allowed for spool files, in bytes. <i>number</i> can be entered as an integer, decimal, or floating point value.</p> <p>BYTES is a noise keyword that redundantly specifies the unit for the amount of spool space allowed.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                      |                               |   |                                                                                                                                                                                 |     |                                                                                                                                                                                                                                                                     |

| Syntax Element ...                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |                            |       |                                                                                                                                                                          |        |                                                                              |               |                                                                                                                                                                                      |      |                                                                     |              |                                                                                                                                                                                                                                                                                                                                |
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| ACCOUNT = <i>account_id</i>             | <p>a replacement for one or more account identifiers (quotestring) associated with the user. The quotestring can be up to 30 characters and must be delimited by APOSTROPHE characters. See <i>SQL Fundamentals</i> for a description of Teradata Database identifiers and a list of the characters they can contain.</p> <p>Japanese character <i>account_IDs</i> can be up to 30 bytes long.</p> <p>A list of <i>account_IDs</i> must be separated by COMMA characters and enclosed by LEFT PARENTHESIS and RIGHT PARENTHESIS characters.</p> <p>The first <i>account_id</i> in the list becomes the new default <i>account_id</i> for the user.</p> <p>Because users can inherit performance groups with inherited default account IDs from their parent user or database, it is important that you either associate a Priority Scheduler performance group with a user explicitly or ensure that its parent user or database is defined in such a way that its children inherit an appropriate set of performance groups.</p>                                                                                                                                                                                                                                                                                                                                    |                  |                            |       |                                                                                                                                                                          |        |                                                                              |               |                                                                                                                                                                                      |      |                                                                     |              |                                                                                                                                                                                                                                                                                                                                |
| DEFAULT DATABASE = <i>database_name</i> | a new name for the default database that is established each time the user logs on.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  |                            |       |                                                                                                                                                                          |        |                                                                              |               |                                                                                                                                                                                      |      |                                                                     |              |                                                                                                                                                                                                                                                                                                                                |
| COLLATION = <i>collation_sequence</i>   | <p>the collation option that redefines the user default collation.</p> <p>See <i>SQL Fundamentals</i> for more information about collation options.</p> <p>The valid collation sequences are defined in the following table:</p> <table> <tr> <th>This keyword ...</th><th>Defines this collation ...</th></tr> <tr> <td>ASCII</td><td> <p>HOST</p> <p>The collation is ASCII for configurations other than an IBM channel-attached host. ASCII here refers to the Teradata extension to the ASCII standard.</p> </td></tr> <tr> <td>EBCDIC</td><td> <p>HOST</p> <p>The collation is EBCDIC for an IBM channel-attached host.</p> </td></tr> <tr> <td>MULTINATIONAL</td><td> <p>One of the European (diacritical) or Japanese language (Kanji) sort sequences (see the MODIFY USER “Collation” topic in <i>SQL Data Definition Language Detailed Topics</i>).</p> </td></tr> <tr> <td>HOST</td><td> <p>that of the logon client system.</p> <p>This is the default.</p> </td></tr> <tr> <td>CHARSET_COLL</td><td> <p>HOST</p> <p>The collation is binary in the order of the current client character set.</p> <p>Strings are compared character-by-character and padded with the pad character for the character data type where necessary.</p> <p>When not CASE SPECIFIC, lowercase characters are mapped to their uppercase counterparts.</p> </td></tr> </table> | This keyword ... | Defines this collation ... | ASCII | <p>HOST</p> <p>The collation is ASCII for configurations other than an IBM channel-attached host. ASCII here refers to the Teradata extension to the ASCII standard.</p> | EBCDIC | <p>HOST</p> <p>The collation is EBCDIC for an IBM channel-attached host.</p> | MULTINATIONAL | <p>One of the European (diacritical) or Japanese language (Kanji) sort sequences (see the MODIFY USER “Collation” topic in <i>SQL Data Definition Language Detailed Topics</i>).</p> | HOST | <p>that of the logon client system.</p> <p>This is the default.</p> | CHARSET_COLL | <p>HOST</p> <p>The collation is binary in the order of the current client character set.</p> <p>Strings are compared character-by-character and padded with the pad character for the character data type where necessary.</p> <p>When not CASE SPECIFIC, lowercase characters are mapped to their uppercase counterparts.</p> |
| This keyword ...                        | Defines this collation ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |                            |       |                                                                                                                                                                          |        |                                                                              |               |                                                                                                                                                                                      |      |                                                                     |              |                                                                                                                                                                                                                                                                                                                                |
| ASCII                                   | <p>HOST</p> <p>The collation is ASCII for configurations other than an IBM channel-attached host. ASCII here refers to the Teradata extension to the ASCII standard.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                  |                            |       |                                                                                                                                                                          |        |                                                                              |               |                                                                                                                                                                                      |      |                                                                     |              |                                                                                                                                                                                                                                                                                                                                |
| EBCDIC                                  | <p>HOST</p> <p>The collation is EBCDIC for an IBM channel-attached host.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                  |                            |       |                                                                                                                                                                          |        |                                                                              |               |                                                                                                                                                                                      |      |                                                                     |              |                                                                                                                                                                                                                                                                                                                                |
| MULTINATIONAL                           | <p>One of the European (diacritical) or Japanese language (Kanji) sort sequences (see the MODIFY USER “Collation” topic in <i>SQL Data Definition Language Detailed Topics</i>).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  |                            |       |                                                                                                                                                                          |        |                                                                              |               |                                                                                                                                                                                      |      |                                                                     |              |                                                                                                                                                                                                                                                                                                                                |
| HOST                                    | <p>that of the logon client system.</p> <p>This is the default.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  |                            |       |                                                                                                                                                                          |        |                                                                              |               |                                                                                                                                                                                      |      |                                                                     |              |                                                                                                                                                                                                                                                                                                                                |
| CHARSET_COLL                            | <p>HOST</p> <p>The collation is binary in the order of the current client character set.</p> <p>Strings are compared character-by-character and padded with the pad character for the character data type where necessary.</p> <p>When not CASE SPECIFIC, lowercase characters are mapped to their uppercase counterparts.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  |                            |       |                                                                                                                                                                          |        |                                                                              |               |                                                                                                                                                                                      |      |                                                                     |              |                                                                                                                                                                                                                                                                                                                                |

| Syntax Element ...                                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| COLLATION =<br><i>collation_sequence</i><br>(continued) | This keyword ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Defines this collation ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                                         | JIS_COLL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p>Japanese Industrial Standards (JIS).</p> <p>The collation sequence is as follows.</p> <ol style="list-style-type: none"> <li>1 Characters and symbols from the JIS X 0201 standard (in JIX X 0201 order)</li> <li>2 Ideographs, characters, and symbols from the JIS X 0208 standard (in JIS X 0208 order)</li> <li>3 Ideographs, characters, and symbols from the JIS 0212 standard (in JIS X 0212 order)</li> <li>4 IBM Kanji ideographs not present in JIS X 0208 and JIS X 0212 (in KanjiEBCDIC order)</li> <li>5 User-defined ideographs (in U+ order)</li> <li>6 Any remaining characters in UNICODE (in U+ order)</li> </ol> <p>Treatment of KANJISJIS, GRAPHIC, and LATIN character types is as if the data were first converted to UNICODE and then the appropriate JIS_COLL ordering is applied.</p> |
| NO<br>FALLBACK<br>PROTECTION                            | <p>a new default for duplicate copy protection of each data table subsequently created in the database. The current fallback setting for existing data tables remains unchanged.</p> <p>The FALLBACK keyword used alone implies PROTECTION.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| NO<br>DUAL<br>BEFORE<br>JOURNAL                         | <p>a new default for the number of before change images to be maintained for data tables subsequently created in the database.</p> <p>The NO keyword terminates any current journaling default.</p> <p>If the JOURNAL keyword is specified without NO or DUAL, single copy journaling is implied. If journaling is specified, a DUAL journal is maintained for data tables with FALLBACK protection.</p> <p>Existing images are not affected until the corresponding table is updated.</p> <p>This option can appear twice in the same statement: once to specify a BEFORE or AFTER image, and again to specify the alternate type.</p> <p>If only one type is specified, then the current default is modified only for that type.</p> <p>If both BEFORE and AFTER are specified then the two must not conflict.</p> <p>The JOURNAL keyword without AFTER or BEFORE indicates that both types of images are to be maintained. In this case, the current default for either or both types is modified accordingly.</p> <p>For example, if only AFTER JOURNAL is specified, the current default for before change images remains in effect.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| NO<br>DUAL<br>LOCAL<br>NOT LOCAL<br>AFTER JOURNAL       | <p>a change to the type of image to be maintained for the table; any existing images are not affected until the table is updated.</p> <p>NO, DUAL, LOCAL, or NOT LOCAL: the NO and DUAL options specify the number of after-change images to be maintained for the table.</p> <p>NOT LOCAL and LOCAL specify whether single after-image journal rows for non-fallback data tables are written on the same virtual AMP (LOCAL) as the changed data rows, or on another virtual AMP in the cluster (NOT LOCAL).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

| Syntax Element ...                                                       | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |             |       |                                                                                                                                                                                                                                                                                                                                   |                          |                                                                                                                                   |      |                                               |
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| DEFAULT JOURNAL<br>TABLE=<br><i>database_name</i> .<br><i>table_name</i> | a redefinition of the current journal table or removes its status as the default for the database being modified.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |             |       |                                                                                                                                                                                                                                                                                                                                   |                          |                                                                                                                                   |      |                                               |
| DROP DEFAULT<br>JOURNAL TABLE =<br><i>table_name</i>                     | <p>removal of the default status of the journal table currently defined as the default for the database being modified.</p> <p>If the journal table resides in the database being modified, DROP also deletes the table from the system. An error message is returned if the DROP request would delete a journal table that is being used by active data tables.</p> <p>The <i>table_name</i> parameter is required if this clause is specified without the DROP keyword.</p> <p>If a database is not specified, then the database being modified is assumed.</p> <p>If the database being modified does not have a journal table, <i>table_name</i> is created.</p> <p>If a different database is specified, then it must already exist and <i>table_name</i> must have been defined as its default journal table.</p> <p>Specifying this option does not change the status of existing data tables in the modified database.</p> |        |             |       |                                                                                                                                                                                                                                                                                                                                   |                          |                                                                                                                                   |      |                                               |
| TIME ZONE =                                                              | <p>the default time zone displacement for the user.</p> <p>Valid options are listed in the following table:</p> <table> <tr> <th>Option</th><th>Description</th></tr> <tr> <td>LOCAL</td><td> <p>Changes the value for TIME ZONE to that defined for the system default.</p> <p>Note that this is a persistent setting. If the system-defined default TIME ZONE should change, the value defined for the user remains at the value defined for it when the user was created. To change the value, you must use MODIFY USER.</p> </td></tr> <tr> <td><math>\pm</math> <i>quotestring</i></td><td> <p>Signed value that sets a non-system-default interval offset for converting the user TIME ZONE.</p> <p>The format is hh:mm.</p> </td></tr> <tr> <td>NULL</td><td>No default TIME ZONE is defined for the user.</td></tr> </table>                                                                                               | Option | Description | LOCAL | <p>Changes the value for TIME ZONE to that defined for the system default.</p> <p>Note that this is a persistent setting. If the system-defined default TIME ZONE should change, the value defined for the user remains at the value defined for it when the user was created. To change the value, you must use MODIFY USER.</p> | $\pm$ <i>quotestring</i> | <p>Signed value that sets a non-system-default interval offset for converting the user TIME ZONE.</p> <p>The format is hh:mm.</p> | NULL | No default TIME ZONE is defined for the user. |
| Option                                                                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |             |       |                                                                                                                                                                                                                                                                                                                                   |                          |                                                                                                                                   |      |                                               |
| LOCAL                                                                    | <p>Changes the value for TIME ZONE to that defined for the system default.</p> <p>Note that this is a persistent setting. If the system-defined default TIME ZONE should change, the value defined for the user remains at the value defined for it when the user was created. To change the value, you must use MODIFY USER.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |             |       |                                                                                                                                                                                                                                                                                                                                   |                          |                                                                                                                                   |      |                                               |
| $\pm$ <i>quotestring</i>                                                 | <p>Signed value that sets a non-system-default interval offset for converting the user TIME ZONE.</p> <p>The format is hh:mm.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |             |       |                                                                                                                                                                                                                                                                                                                                   |                          |                                                                                                                                   |      |                                               |
| NULL                                                                     | No default TIME ZONE is defined for the user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |             |       |                                                                                                                                                                                                                                                                                                                                   |                          |                                                                                                                                   |      |                                               |

| Syntax Element ...                                                       | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                          |                                                                |                               |                                                                                                                                                                                                                                                                                                                                                                                                                        |                                              |                                                                                                                                                                                                    |                                 |                                                                                                                                                                                                                                                                |
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| DATEFORM =                                                               | <p>the default format for importing and exporting DATE values for the user.</p> <p>For further information, see <i>SQL Data Types and Literals</i>.</p> <p>Valid options are listed in the following table:</p> <table> <tr> <th>Option</th><th>Description</th></tr> <tr> <td>INTEGERDATE</td><td> <p>Sets the DATEFORM option to import and export DATE values as encoded integers.</p> <p>INTEGERDATE results in a default DATE format in field mode of 'YY/MM/DD' for date columns created and for date constants in character form. You can use the <code>tdlocaledef</code> utility to change the 'YY/MM/DD' default DATE format. For details, see <i>Utilities</i>.</p> <p>INTEGERDATE is the DATEFORM default.</p> </td></tr> <tr> <td>ANSIDATE</td><td> <p>Sets the DATEFORM option to import and export DATE values as CHARACTER(10).</p> <p>Results in a 'YYYY-MM-DD' date format for date columns created and for date constants in character form.</p> </td></tr> <tr> <td>NULL</td><td> <p>Sets DATEFORM null.</p> <p>When DATEFORM is null, the default format for a date in field mode, and the default format for importing and exporting DATE values, is the same as the system default defined by the DATEFORM flag in the DBSControl record.</p> </td></tr> </table> | Option                                                                   | Description                                                    | INTEGERDATE                   | <p>Sets the DATEFORM option to import and export DATE values as encoded integers.</p> <p>INTEGERDATE results in a default DATE format in field mode of 'YY/MM/DD' for date columns created and for date constants in character form. You can use the <code>tdlocaledef</code> utility to change the 'YY/MM/DD' default DATE format. For details, see <i>Utilities</i>.</p> <p>INTEGERDATE is the DATEFORM default.</p> | ANSIDATE                                     | <p>Sets the DATEFORM option to import and export DATE values as CHARACTER(10).</p> <p>Results in a 'YYYY-MM-DD' date format for date columns created and for date constants in character form.</p> | NULL                            | <p>Sets DATEFORM null.</p> <p>When DATEFORM is null, the default format for a date in field mode, and the default format for importing and exporting DATE values, is the same as the system default defined by the DATEFORM flag in the DBSControl record.</p> |
| Option                                                                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                          |                                                                |                               |                                                                                                                                                                                                                                                                                                                                                                                                                        |                                              |                                                                                                                                                                                                    |                                 |                                                                                                                                                                                                                                                                |
| INTEGERDATE                                                              | <p>Sets the DATEFORM option to import and export DATE values as encoded integers.</p> <p>INTEGERDATE results in a default DATE format in field mode of 'YY/MM/DD' for date columns created and for date constants in character form. You can use the <code>tdlocaledef</code> utility to change the 'YY/MM/DD' default DATE format. For details, see <i>Utilities</i>.</p> <p>INTEGERDATE is the DATEFORM default.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                          |                                                                |                               |                                                                                                                                                                                                                                                                                                                                                                                                                        |                                              |                                                                                                                                                                                                    |                                 |                                                                                                                                                                                                                                                                |
| ANSIDATE                                                                 | <p>Sets the DATEFORM option to import and export DATE values as CHARACTER(10).</p> <p>Results in a 'YYYY-MM-DD' date format for date columns created and for date constants in character form.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                          |                                                                |                               |                                                                                                                                                                                                                                                                                                                                                                                                                        |                                              |                                                                                                                                                                                                    |                                 |                                                                                                                                                                                                                                                                |
| NULL                                                                     | <p>Sets DATEFORM null.</p> <p>When DATEFORM is null, the default format for a date in field mode, and the default format for importing and exporting DATE values, is the same as the system default defined by the DATEFORM flag in the DBSControl record.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                          |                                                                |                               |                                                                                                                                                                                                                                                                                                                                                                                                                        |                                              |                                                                                                                                                                                                    |                                 |                                                                                                                                                                                                                                                                |
| DEFAULT CHARACTER<br>SET =<br><i>server_character_set</i>                | <p>the user default for character data type.</p> <p>All changes affect only those columns created after the user definition has been modified. Columns created previously by this user retain their original type.</p> <p>If no user default character type is defined, then one is assigned automatically according to the following rules:</p> <table> <tr> <th>WHEN no user default character type is defined for this type of site ...</th><th>The definition defaults to this <i>character_data_type</i> ...</th></tr> <tr> <td>U.S. and European (all users)</td><td>LATIN</td></tr> <tr> <td>Japanese (all users except user <i>DBC</i>)</td><td>UNICODE</td></tr> <tr> <td>Japanese (user <i>DBC</i> only)</td><td>KANJI1</td></tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | WHEN no user default character type is defined for this type of site ... | The definition defaults to this <i>character_data_type</i> ... | U.S. and European (all users) | LATIN                                                                                                                                                                                                                                                                                                                                                                                                                  | Japanese (all users except user <i>DBC</i> ) | UNICODE                                                                                                                                                                                            | Japanese (user <i>DBC</i> only) | KANJI1                                                                                                                                                                                                                                                         |
| WHEN no user default character type is defined for this type of site ... | The definition defaults to this <i>character_data_type</i> ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                          |                                                                |                               |                                                                                                                                                                                                                                                                                                                                                                                                                        |                                              |                                                                                                                                                                                                    |                                 |                                                                                                                                                                                                                                                                |
| U.S. and European (all users)                                            | LATIN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                          |                                                                |                               |                                                                                                                                                                                                                                                                                                                                                                                                                        |                                              |                                                                                                                                                                                                    |                                 |                                                                                                                                                                                                                                                                |
| Japanese (all users except user <i>DBC</i> )                             | UNICODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                          |                                                                |                               |                                                                                                                                                                                                                                                                                                                                                                                                                        |                                              |                                                                                                                                                                                                    |                                 |                                                                                                                                                                                                                                                                |
| Japanese (user <i>DBC</i> only)                                          | KANJI1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                          |                                                                |                               |                                                                                                                                                                                                                                                                                                                                                                                                                        |                                              |                                                                                                                                                                                                    |                                 |                                                                                                                                                                                                                                                                |

| Syntax Element ...                                                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |             |                     |                                                                                   |         |                                           |         |                                                             |                                                                                                         |                                                             |        |                                                                                                                                                    |
|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------|---------------------|-----------------------------------------------------------------------------------|---------|-------------------------------------------|---------|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| DEFAULT CHARACTER<br>SET =<br><i>character_data_type</i><br>(continued) | <p>Valid options are listed in the following table:</p> <table> <tr> <th>Option</th><th>Description</th></tr> <tr> <td>LATIN</td><td>fixed 8-bit Latin.</td></tr> <tr> <td>UNICODE</td><td>fixed 16-bit UNICODE.</td></tr> <tr> <td>GRAPHIC</td><td>fixed 16-bit UNICODE as defined by IBM Corporation for DB2.</td></tr> <tr> <td>KANJISJIS</td><td>mixed single and multibyte characters defined by KanjiSJIS.</td></tr> <tr> <td>KANJI1</td><td>mixed single and multibyte characters defined by KanjiEBCDIC, KanjiShift-JIS, or KanjiEUC, depending on the current character set for the session.</td></tr> </table> | Option | Description | LATIN               | fixed 8-bit Latin.                                                                | UNICODE | fixed 16-bit UNICODE.                     | GRAPHIC | fixed 16-bit UNICODE as defined by IBM Corporation for DB2. | KANJISJIS                                                                                               | mixed single and multibyte characters defined by KanjiSJIS. | KANJI1 | mixed single and multibyte characters defined by KanjiEBCDIC, KanjiShift-JIS, or KanjiEUC, depending on the current character set for the session. |
| Option                                                                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |             |                     |                                                                                   |         |                                           |         |                                                             |                                                                                                         |                                                             |        |                                                                                                                                                    |
| LATIN                                                                   | fixed 8-bit Latin.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |             |                     |                                                                                   |         |                                           |         |                                                             |                                                                                                         |                                                             |        |                                                                                                                                                    |
| UNICODE                                                                 | fixed 16-bit UNICODE.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |             |                     |                                                                                   |         |                                           |         |                                                             |                                                                                                         |                                                             |        |                                                                                                                                                    |
| GRAPHIC                                                                 | fixed 16-bit UNICODE as defined by IBM Corporation for DB2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |             |                     |                                                                                   |         |                                           |         |                                                             |                                                                                                         |                                                             |        |                                                                                                                                                    |
| KANJISJIS                                                               | mixed single and multibyte characters defined by KanjiSJIS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |             |                     |                                                                                   |         |                                           |         |                                                             |                                                                                                         |                                                             |        |                                                                                                                                                    |
| KANJI1                                                                  | mixed single and multibyte characters defined by KanjiEBCDIC, KanjiShift-JIS, or KanjiEUC, depending on the current character set for the session.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |             |                     |                                                                                   |         |                                           |         |                                                             |                                                                                                         |                                                             |        |                                                                                                                                                    |
| DEFAULT ROLE =                                                          | <p>the default role for the user.</p> <p>Valid options appear in the following table:</p> <table> <tr> <th>Option</th><th>Description</th></tr> <tr> <td><i>role_name</i></td><td>Changes the value for the default role assigned to the user to <i>role_name</i>.</td></tr> <tr> <td>NULL</td><td rowspan="2">Do not assign a default role to the user.</td></tr> <tr> <td>NONE</td></tr> <tr> <td>ALL</td><td>Changes the default role assigned to the user to all roles directly and indirectly granted to the user.</td></tr> </table>                                                                               | Option | Description | <i>role_name</i>    | Changes the value for the default role assigned to the user to <i>role_name</i> . | NULL    | Do not assign a default role to the user. | NONE    | ALL                                                         | Changes the default role assigned to the user to all roles directly and indirectly granted to the user. |                                                             |        |                                                                                                                                                    |
| Option                                                                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |             |                     |                                                                                   |         |                                           |         |                                                             |                                                                                                         |                                                             |        |                                                                                                                                                    |
| <i>role_name</i>                                                        | Changes the value for the default role assigned to the user to <i>role_name</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |             |                     |                                                                                   |         |                                           |         |                                                             |                                                                                                         |                                                             |        |                                                                                                                                                    |
| NULL                                                                    | Do not assign a default role to the user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |             |                     |                                                                                   |         |                                           |         |                                                             |                                                                                                         |                                                             |        |                                                                                                                                                    |
| NONE                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |             |                     |                                                                                   |         |                                           |         |                                                             |                                                                                                         |                                                             |        |                                                                                                                                                    |
| ALL                                                                     | Changes the default role assigned to the user to all roles directly and indirectly granted to the user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |             |                     |                                                                                   |         |                                           |         |                                                             |                                                                                                         |                                                             |        |                                                                                                                                                    |
| PROFILE =                                                               | <p>the profile for the user.</p> <p>Valid options appear in the following table:</p> <table> <tr> <th>Option</th><th>Description</th></tr> <tr> <td><i>profile_name</i></td><td>Changes the value for the profile assigned to the user to <i>profile_name</i>.</td></tr> <tr> <td>NULL</td><td>Do not assign a profile to the user.</td></tr> </table>                                                                                                                                                                                                                                                                   | Option | Description | <i>profile_name</i> | Changes the value for the profile assigned to the user to <i>profile_name</i> .   | NULL    | Do not assign a profile to the user.      |         |                                                             |                                                                                                         |                                                             |        |                                                                                                                                                    |
| Option                                                                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |             |                     |                                                                                   |         |                                           |         |                                                             |                                                                                                         |                                                             |        |                                                                                                                                                    |
| <i>profile_name</i>                                                     | Changes the value for the profile assigned to the user to <i>profile_name</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |             |                     |                                                                                   |         |                                           |         |                                                             |                                                                                                         |                                                             |        |                                                                                                                                                    |
| NULL                                                                    | Do not assign a profile to the user.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |             |                     |                                                                                   |         |                                           |         |                                                             |                                                                                                         |                                                             |        |                                                                                                                                                    |

## ANSI Compliance

MODIFY USER is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

| IF you are ...              | THEN you must have the DROP USER privilege on ...                                                                                                                                                                                                                 |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| not the user being modified | the referenced user.                                                                                                                                                                                                                                              |
| the user being modified     | yourself if you are changing any of the following parameters: <ul style="list-style-type: none"><li>• PERMANENT</li><li>• SPOOL</li><li>• ACCOUNT</li><li>• PROFILE<sup>1</sup></li></ul> You need not have DROP USER on yourself to change any other parameters. |

1. To enter a MODIFY USER statement that assigns a profile, you must have the DROP PROFILE privilege.

You cannot use MODIFY USER to modify a database (see [“MODIFY DATABASE” on page 612](#)).

## Privileges Granted Automatically

If you submit a successful MODIFY USER ... DEFAULT JOURNAL TABLE request, the following privileges are granted automatically to the user on the journal table:

- DROP TABLE
- INSERT

### Example 1

The following request can be used to change the permanent space allocation for user *Peterson*:

```
MODIFY USER Peterson AS
PERMANENT = 6000000 BYTES;
```

### Example 2

The following request can be used to change user the default database and password for *Chin*:

```
MODIFY USER Chin AS
DEFAULT DATABASE = personnel,
PASSWORD = nitram;
```

### Example 3

Two MODIFY requests are needed to change the default journal table if it resides in the user being modified.

For example, suppose the journal table *FinCopy* resides in user *Jones*. To change the default journal table from *FinCopy* to *Jrnl1*, the present default journal table must be dropped and then a new journal table must be created.

The first request removes *FinCopy* as the default and drops it from the system. If there are any existing tables that use it as their journal table, the request returns an error.

```
MODIFY USER Jones AS  
DROP DEFAULT JOURNAL TABLE;
```

When the current journal table has been dropped, the second request creates a new default journal table:

```
MODIFY USER Jones AS  
DEFAULT JOURNAL TABLE = Jrnl1;
```

### Example 4

If the current journal table does not reside in the hierarchy beneath the user being modified, the following request could be used to change the default journal table from *FinCopy* to *Jrnl1*:

```
MODIFY USER Peterson AS  
DEFAULT JOURNAL TABLE = Jrnl1;
```

### Example 5

As noted in [“Required Privileges” on page 631](#), you do not need access privileges to change your own PASSWORD, STARTUP, FALLBACK, or DEFAULT DATABASE definitions.

Otherwise, the user submitting a MODIFY statement must have the DROP privilege on the user being modified.

By way of example, although Marks is not the creator of his own space and does not own himself, he can submit a MODIFY USER request to change his password, modify his startup string, or redirect his default database. Marks can resize *finance*, as well.

Change password and other options on user *marks*:

```
MODIFY USER marks AS  
PASSWORD = design,  
SPOOL = 1500000,  
STARTUP = 'EXEC paystat;',  
DEFAULT DATABASE = payroll;
```



## Example 6

The following request creates a profile called *human\_resources* that defines spool space and default database system parameters:

```
CREATE PROFILE human_resources AS  
SPOOL = 1500000,  
DEFAULT DATABASE = personnel;
```

The following request assigns the *human\_resources* profile to user *ortega*:

```
MODIFY USER ortega AS  
PROFILE = human_resources;
```

## Related Topics

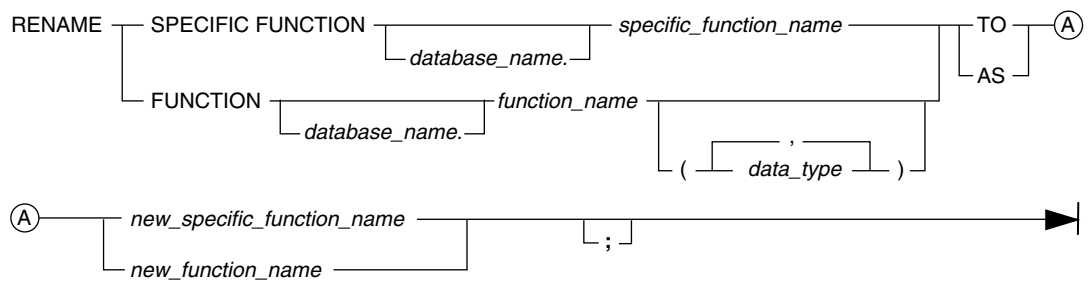
For more information about user definitions, see [“CREATE USER” on page 524](#).

## RENAME FUNCTION

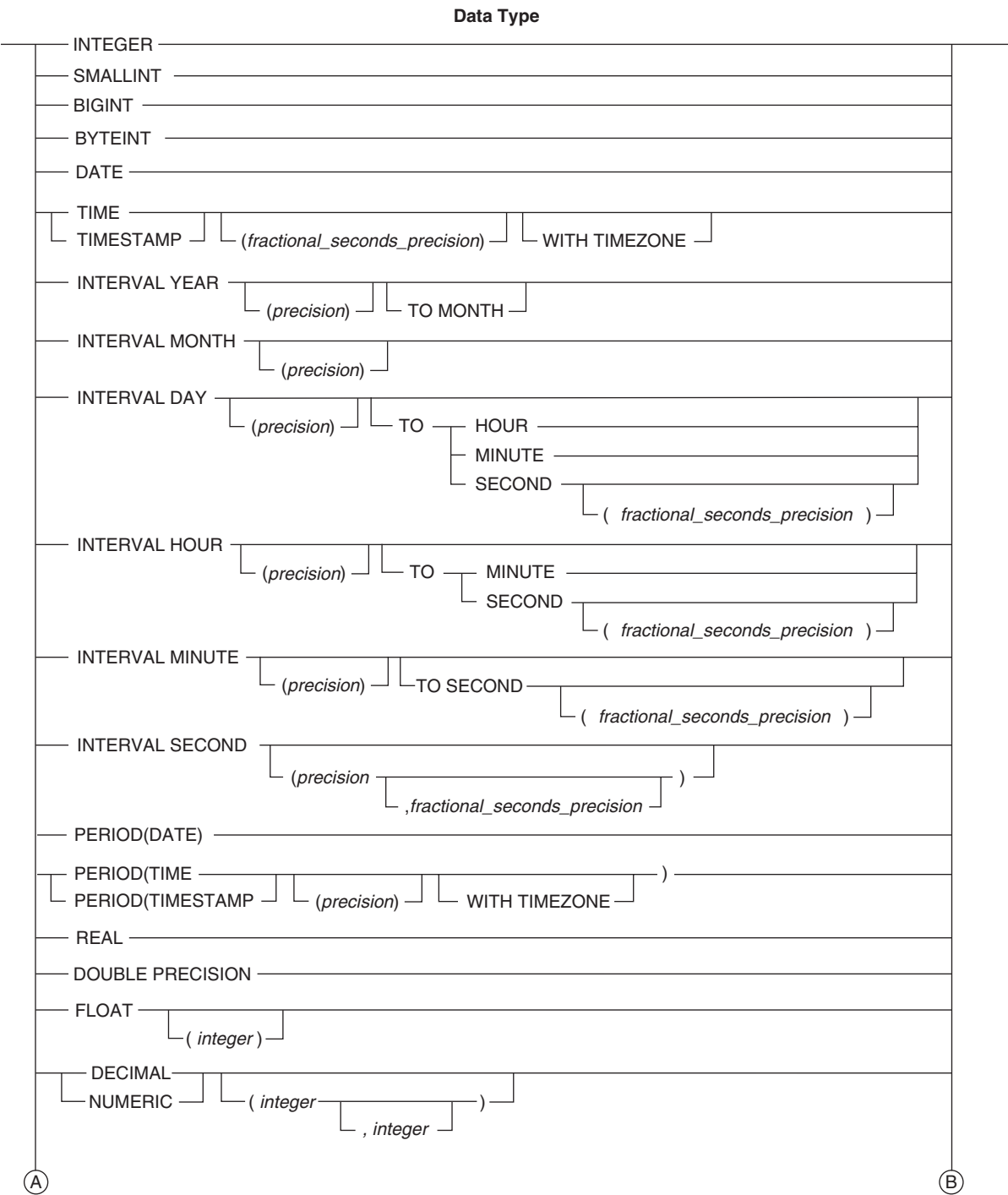
### Purpose

Renames either the overloaded calling function name or specific function name for a function.

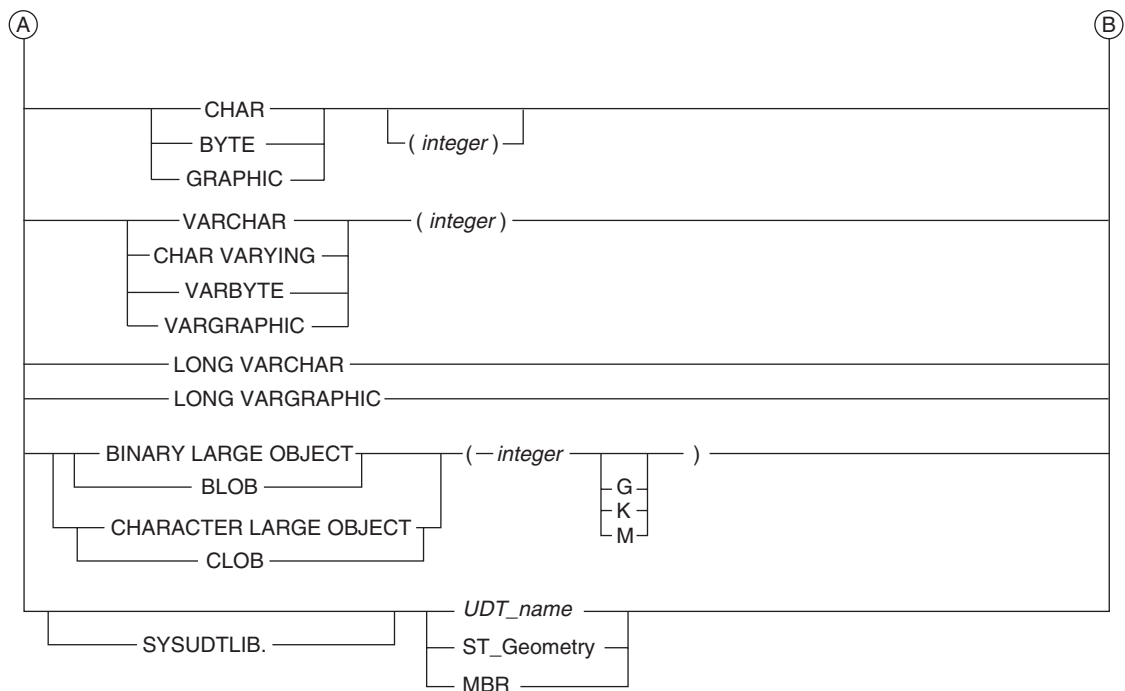
### Syntax



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where:

| Syntax element ...                      | Specifies ...                                                                                                                                                                                              |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SPECIFIC FUNCTION                       | that the specific function name of the function is to be renamed.                                                                                                                                          |
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>specific_function_name</i> if something other than the current database or user.                                                                                    |
| <i>specific_function_name</i>           | the existing specific function name to be changed.<br>If you specify <i>specific_function_name</i> , then you must also specify <i>new_specific_function_name</i> , not <i>new_function_name</i> .         |
| FUNCTION                                | that the overloaded calling name of the function is to be renamed.                                                                                                                                         |
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>function_name</i> if something other than the current database or user.                                                                                             |
| <i>function_name</i>                    | the existing overloaded calling name of the function to be changed.<br>If you specify <i>function_name</i> , then you must also specify <i>new_function_name</i> , not <i>new_specific_function_name</i> . |
| <i>data_type</i>                        | the data type specifications required to uniquely identify an overloaded function to be renamed.                                                                                                           |
| <i>new_specific_function_name</i>       | the new specific function name for the function.                                                                                                                                                           |
| <i>new_function_name</i>                | the new function name for the function.                                                                                                                                                                    |

## ANSI Compliance

RENAME FUNCTION is an extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have both of the following privileges to rename a function:

- DROP FUNCTION on the function or its containing database.
- CREATE FUNCTION on the database that contains the function.

## Example 1

This example renames the specific name for a function:

```
RENAME SPECIFIC FUNCTION Match_Text TO Scan_Text;
```

## Example 2

This example renames the overloaded calling name for a function:

```
RENAME FUNCTION Imagine_numbers(FLOAT, FLOAT) TO Imaginary;
```

## Related Topics

For more information about user-defined functions, see the following statements:

- [“ALTER FUNCTION” on page 16](#)
- [“CREATE FUNCTION/ REPLACE FUNCTION” on page 138](#)
- [“CREATE FUNCTION \(Table Form\)” on page 161](#)
- [“CREATE GLOBAL TEMPORARY TRACE TABLE” on page 186](#)
- [“DROP FUNCTION” on page 562](#)
- [“SET SESSION FUNCTION TRACE” on page 676](#)
- [“HELP FUNCTION” on page 715](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)

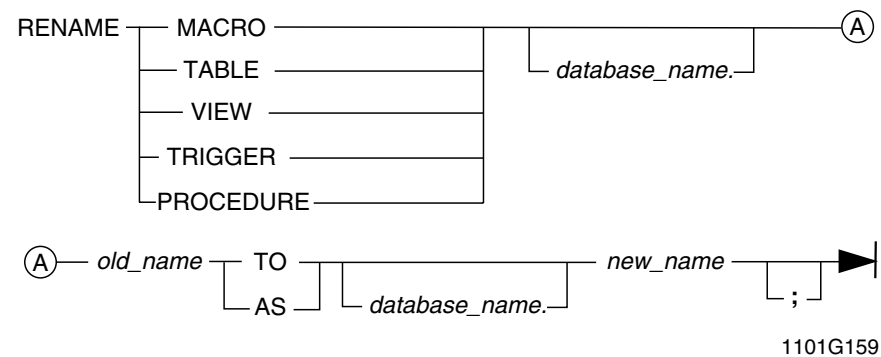
Also see *SQL External Routine Programming*.

# RENAME MACRO/ RENAME PROCEDURE/ RENAME TABLE/ RENAME TRIGGER/ RENAME VIEW

## Purpose

Renames an existing macro, stored procedure, table, trigger, or view.

## Syntax



where:

| Syntax Element ...                      | Specifies ...                                                                                                                                                                                                               |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | the optional name of the containing database or user for the object to be renamed if other than the current database or user.<br><br>You cannot use this statement to change the database or user qualifier for the object. |
| <i>old_name</i>                         | the existing name for the macro, stored procedure, table, trigger, or view.                                                                                                                                                 |
| TO<br>AS                                | keywords introducing the new name for the macro, stored procedure, table, trigger, or view.                                                                                                                                 |
| <i>database_name</i>   <i>user_name</i> | the optional name of the containing database or user for the renamed object if other than the current database or user.                                                                                                     |
| <i>new_name</i>                         | the new name for the macro, stored procedure, table, trigger, or view.                                                                                                                                                      |

## ANSI Compliance

RENAME MACRO, RENAME PROCEDURE, RENAME TABLE, and RENAME VIEW are Teradata extensions to the ANSI SQL:2008 standard.

RENAME TRIGGER is ANSI SQL:2008-compliant.

## Required Privileges

You must have DROP privileges on the macro, stored procedure, table, trigger, or view to be renamed, and the appropriate CREATE privileges on the containing database.

## Example 1

The following statement renames the *employee* table:

```
RENAME TABLE Employee TO Emp;
```

## Example 2

The following statement renames the Employee table if the current default database setting for the user is something other than *personnel*:

```
RENAME TABLE Personnel.Employee TO Personnel.Emp;
```

## Related Topics

For more information about tables, triggers, and views, see the following topics:

- [“CREATE GLOBAL TEMPORARY TRACE TABLE” on page 186](#)
- [“CREATE RECURSIVE VIEW/ REPLACE RECURSIVE VIEW” on page 354](#)
- [“CREATE TABLE” on page 382](#)
- [“CREATE TABLE \(Queue Table Form\)” on page 462](#)
- [“CREATE TRIGGER/ REPLACE TRIGGER” on page 489](#)
- [“CREATE VIEW/ REPLACE VIEW” on page 535](#)
- [“DROP MACRO/ DROP PROCEDURE/ DROP TABLE/ DROP TRIGGER/ DROP VIEW” on page 574](#)

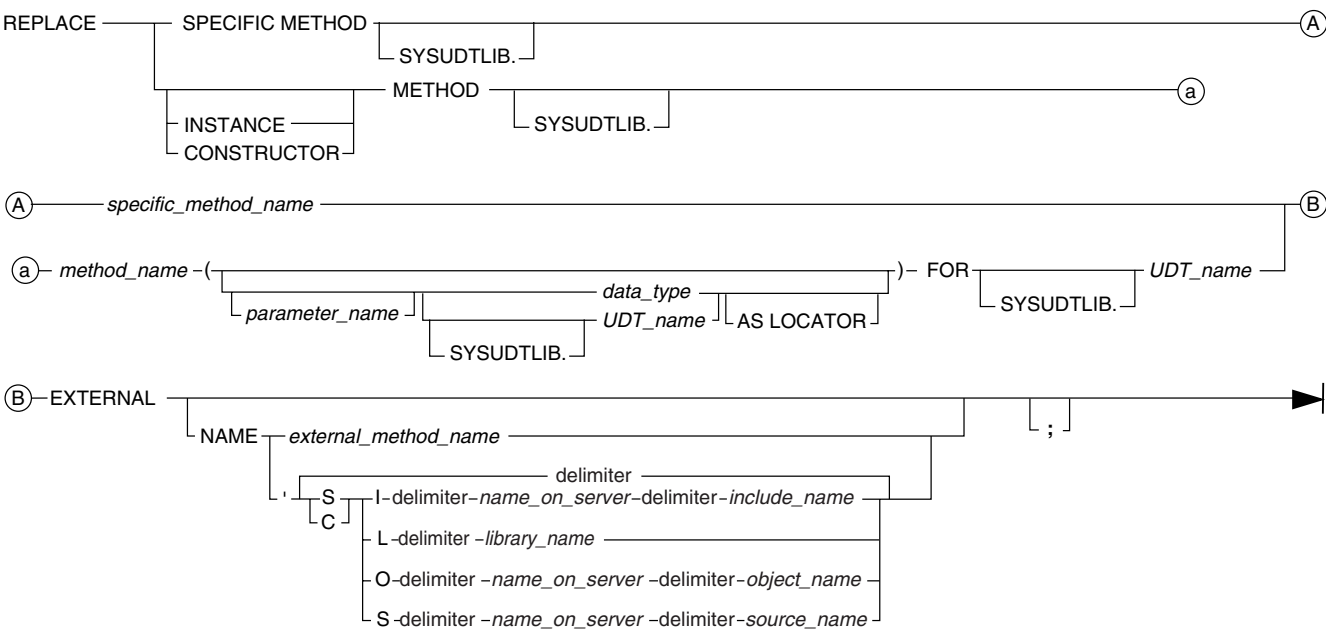
# REPLACE METHOD

## Purpose

Corrects errors in the definition of a method by replacing the existing method definition.

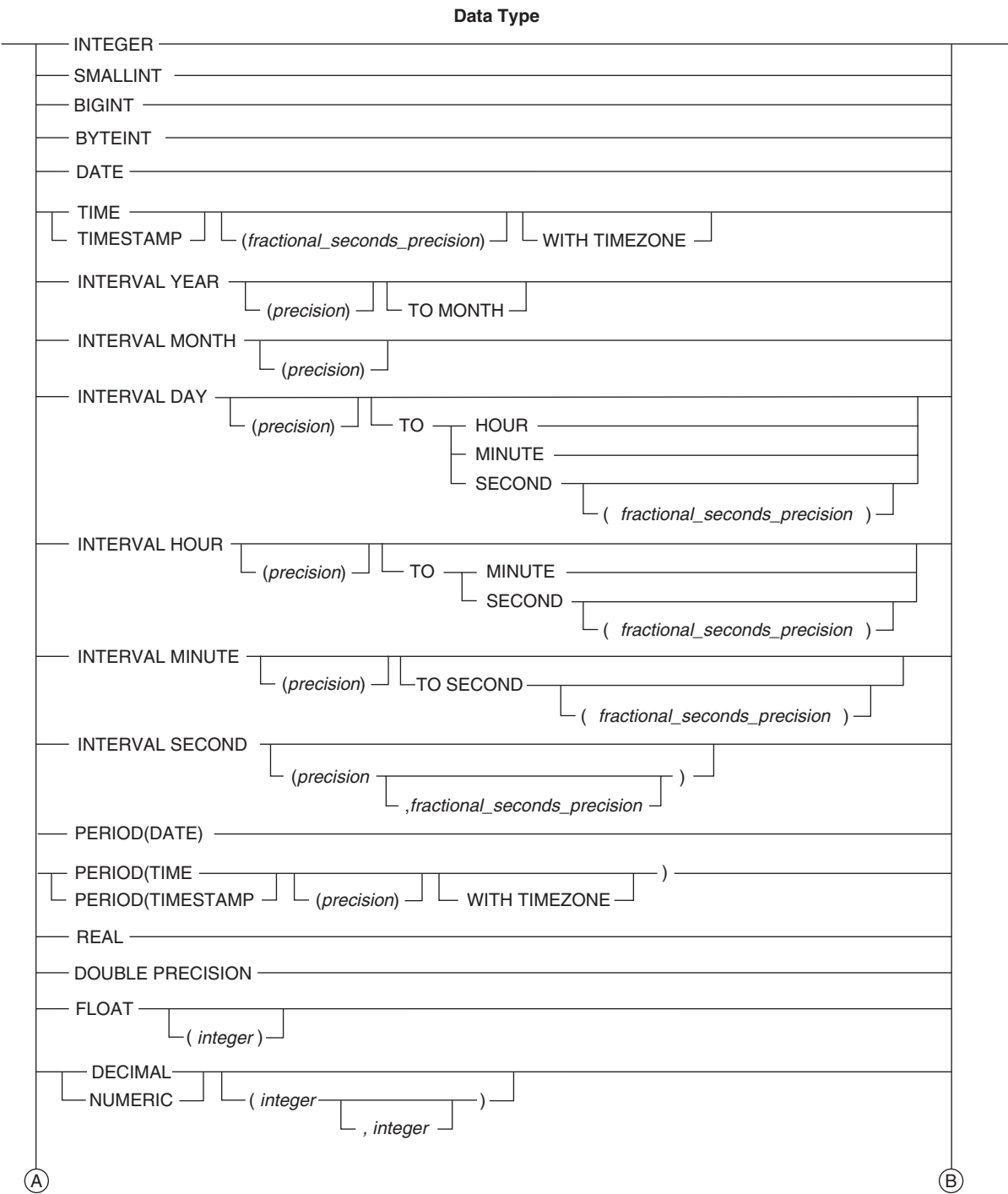
If a body has not already been defined for the specified method name, and if the UDT the method is associated with has already been created, creates a new method body for it.

## Syntax

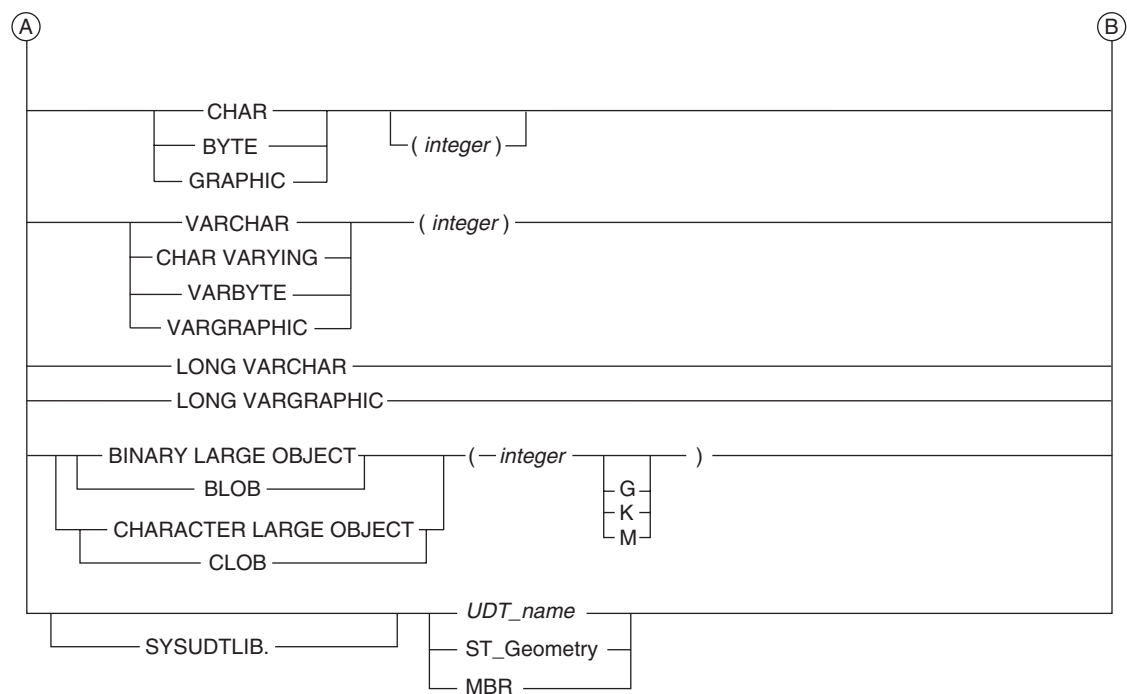


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where:

| Syntax element ...                                                    | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SPECIFIC METHOD</b><br>[SYSUDTLIB.]<br><i>specific_method_name</i> | <p>the specific name for the method.</p> <p>This clause is mandatory for overloaded <i>method_names</i>, but otherwise optional and can only be specified once per method definition.</p> <p>Unlike <i>method_name</i> (see “METHOD [SYSUDTLIB.] <i>method_name</i>” later in this table), <i>specific_method_name</i> must be unique within SYSUDTLIB.</p> <p>This name is stored in DBC.TVM as the name of the UDM database object (see the CREATE FUNCTION “Function Identifiers” and “External Body Reference Clause” topics in <i>SQL Data Definition Language Detailed Topics</i>).</p> <p>See the CREATE FUNCTION “Specific Function Name Clause” topic in <i>SQL Data Definition Language Detailed Topics</i>.</p> |
| <b>INSTANCE</b>                                                       | <p>that the object is an instance method.</p> <p>See the CREATE METHOD “About Methods” topic in <i>SQL Data Definition Language Detailed Topics</i> for information about instance methods.</p> <p>INSTANCE is the default.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>CONSTRUCTOR</b>                                                    | <p>that the object is a constructor method.</p> <p>See the CREATE METHOD “About Methods” topic in <i>SQL Data Definition Language Detailed Topics</i> for information about constructor methods.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

| Syntax element ...                                            | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| METHOD<br>[SYSUDTLIB.]<br><i>method_name</i>                  | <p>the calling name for the method.</p> <p><i>method_name</i> must be unique within the SYSUDTLIB database. You cannot give a method the same name as an existing method or any other database object contained within the SYSUDTLIB database. See the CREATE METHOD “Naming Conventions: Avoiding Name Clashes Among UDFs, UDMs, and UDTs” topic in <i>SQL Data Definition Language Detailed Topics</i> for details.</p> <p><i>method_name</i> must match the spelling and case of its C/C++ method name exactly if you do not specify a <i>specific_method_name</i> or <i>external_method_name</i>. This applies only to the definition of the method, not to its use.</p> <p>Parameter data types and number of parameters are used to distinguish among different methods within the same class that have the same <i>method_name</i>.</p> <p>See <i>SQL External Routine Programming</i> for further information about function overloading.</p> <p>See the following topics from <a href="#">“CREATE FUNCTION/ REPLACE FUNCTION” on page 138</a> for information that is equally applicable to methods:</p> <ul style="list-style-type: none"> <li>• “Function Identifiers”</li> <li>• “Function Name”</li> <li>• “Function Calling Argument”</li> <li>• “Function Name Overloading”</li> <li>• “Parameter Names and Data Types”</li> </ul> |
| [ <i>parameter_name</i> ]<br><i>data_type</i> [AS<br>LOCATOR] | <p>a parenthetical comma-separated list of data types and optional parameter names for the variables to be passed to the function.</p> <p>The maximum number of parameters a method accepts is 128.</p> <p>BLOB and CLOB types must be represented by a locator (see <i>SQL Data Manipulation Language</i> for a description of locators). The Teradata Database does not support in-memory LOB parameters: an AS LOCATOR phrase must be specified for each LOB parameter and return value.</p> <p>Note, however, that whenever a LOB that requires data type conversion is passed to a UDM, the LOB must be materialized for the conversion to take place.</p> <p>You must specify opening and closing parentheses even if no parameters are to be passed to the function.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

| Syntax element ...                                                                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>[<i>parameter_name</i>]<br/> <i>data_type</i> [AS<br/> LOCATOR]<br/> (continued)</p> | <p>If you specify one parameter name, then you must specify names for all the parameters passed to the function.</p> <p>If you do not specify parameter names, the system assigns unique names to them in the form P1, P2, ..., P<i>n</i>. These names are used in the COMMENT statement (see <a href="#">“COMMENT (Comment Placing Form)” on page 112</a>) and displayed in the report produced by the HELP METHOD statement (see <a href="#">“HELP METHOD” on page 735</a>), and appear in the text of error messages.</p> <p>The data type associated with each parameter is the type of the parameter or returned value. All Teradata Database predefined data types and UDTs are valid. If you specify a UDT, then the current user of the method must have one of the following privilege sets:</p> <ul style="list-style-type: none"> <li>• UDTMETHOD, UDTTYPE, or UDTUSAGE on the <i>SYSUDTLIB</i> database.</li> <li>• UDTUSAGE on the specified UDT.</li> </ul> <p>Character data can also specify a CHARACTER SET clause.</p> <p>For data types that take a length or size specification, like BYTE, CHARACTER, DECIMAL, VARCHAR, and so on, the size of the parameter indicates the largest number of bytes that can be passed (see the CREATE FUNCTION “Parameter Names and Data Types” in <i>SQL Data Definition Language Detailed Topics</i>).</p> |
| <p>FOR [<i>SYSUDTLIB.</i>]<br/> <i>UDT_name</i></p>                                     | <p>the name of the UDT to which this method applies.</p> <p>Do <i>not</i> specify this clause for a specific method.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p>EXTERNAL</p>                                                                         | <p>the introduction to the mandatory external method body reference clause.</p> <p>This clause can specify two different things:</p> <ul style="list-style-type: none"> <li>• The keyword EXTERNAL only.</li> <li>• The keywords EXTERNAL NAME plus an external method name (with optional Parameter Style specification)</li> </ul> <p>See the CREATE FUNCTION “External Body Reference Clause” topic in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <p>NAME<br/> <i>external_method_name</i>]</p>                                           | <p>the entry point for the method object. This name must be unique within the <i>SYSUDTLIB</i> database. See the CREATE METHOD “Naming Conventions: Avoiding Name Clashes Among UDFs, UDMs, and UDTs” topic in <i>SQL Data Definition Language Detailed Topics</i> for details.</p> <p>Case is significant and must match the C or C++ method name.</p> <p>See CREATE FUNCTION “External Name Clause” topic in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

| Syntax element ...                     | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |                                                                    |   |                                                                                                                                                                                                            |   |                                                                                                                                                                                                            |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|--------------------------------------------------------------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NAME<br><i>external_string_literal</i> | <p>a string that specifies the source and object components needed to build the method.</p> <p>Depending on the initial code in the sequence, the string specifies either the C/C++ object name for the method or an encoded name or path for the components needed to create the method.</p> <p>The following table briefly documents the codes used to specify component locations:</p> <table><tr><th>IF you specify this code ...</th><th>THEN the source or object code for the method is stored on the ...</th></tr><tr><td>C</td><td><p>client and the string that follows is the path to its location.</p><p>See the CREATE FUNCTION “Client-Server UDF Code Specification” topic in <i>SQL Data Definition Language Detailed Topics</i>.</p></td></tr><tr><td>S</td><td><p>server and the string that follows is the path to its location.</p><p>See the CREATE FUNCTION “Client-Server UDF Code Specification” topic in <i>SQL Data Definition Language Detailed Topics</i>.</p></td></tr></table> | IF you specify this code ... | THEN the source or object code for the method is stored on the ... | C | <p>client and the string that follows is the path to its location.</p> <p>See the CREATE FUNCTION “Client-Server UDF Code Specification” topic in <i>SQL Data Definition Language Detailed Topics</i>.</p> | S | <p>server and the string that follows is the path to its location.</p> <p>See the CREATE FUNCTION “Client-Server UDF Code Specification” topic in <i>SQL Data Definition Language Detailed Topics</i>.</p> |
| IF you specify this code ...           | THEN the source or object code for the method is stored on the ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                              |                                                                    |   |                                                                                                                                                                                                            |   |                                                                                                                                                                                                            |
| C                                      | <p>client and the string that follows is the path to its location.</p> <p>See the CREATE FUNCTION “Client-Server UDF Code Specification” topic in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                              |                                                                    |   |                                                                                                                                                                                                            |   |                                                                                                                                                                                                            |
| S                                      | <p>server and the string that follows is the path to its location.</p> <p>See the CREATE FUNCTION “Client-Server UDF Code Specification” topic in <i>SQL Data Definition Language Detailed Topics</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                              |                                                                    |   |                                                                                                                                                                                                            |   |                                                                                                                                                                                                            |

| Syntax element ...                                    | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           |        |         |                                                                                                                                                                     |         |                                                                                                                                                      |        |                                                                                                                                                                        |        |                                                                                                                                                                        |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NAME<br><i>external_string_literal</i><br>(continued) | <p>The following table briefly documents the path specifications for the external method. The character ; represents an arbitrary user-defined delimiter.</p> <p>You must use the same delimiter throughout the string specification.</p> <table><tr><th>File Type</th><th>Syntax</th></tr><tr><td>Include</td><td><i>I;name_on_server;include_name</i><br/><br/>See the CREATE FUNCTION “Include Name Clause” topic in <i>SQL Data Definition Language Detailed Topics</i> for details.</td></tr><tr><td>Library</td><td><i>L;library_name</i><br/><br/>See the CREATE FUNCTION “Library Name Clause” topic in <i>SQL Data Definition Language Detailed Topics</i> for details.</td></tr><tr><td>Object</td><td><i>O;name_on_server;object_name</i><br/><br/>See the CREATE FUNCTION “Object File Name Clause” topic in <i>SQL Data Definition Language Detailed Topics</i> for details.</td></tr><tr><td>Source</td><td><i>S;name_on_server;source_name</i><br/><br/>See the CREATE FUNCTION “Source File Name Clause” topic in <i>SQL Data Definition Language Detailed Topics</i> for details.</td></tr></table> | File Type | Syntax | Include | <i>I;name_on_server;include_name</i><br><br>See the CREATE FUNCTION “Include Name Clause” topic in <i>SQL Data Definition Language Detailed Topics</i> for details. | Library | <i>L;library_name</i><br><br>See the CREATE FUNCTION “Library Name Clause” topic in <i>SQL Data Definition Language Detailed Topics</i> for details. | Object | <i>O;name_on_server;object_name</i><br><br>See the CREATE FUNCTION “Object File Name Clause” topic in <i>SQL Data Definition Language Detailed Topics</i> for details. | Source | <i>S;name_on_server;source_name</i><br><br>See the CREATE FUNCTION “Source File Name Clause” topic in <i>SQL Data Definition Language Detailed Topics</i> for details. |
| File Type                                             | Syntax                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |        |         |                                                                                                                                                                     |         |                                                                                                                                                      |        |                                                                                                                                                                        |        |                                                                                                                                                                        |
| Include                                               | <i>I;name_on_server;include_name</i><br><br>See the CREATE FUNCTION “Include Name Clause” topic in <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           |        |         |                                                                                                                                                                     |         |                                                                                                                                                      |        |                                                                                                                                                                        |        |                                                                                                                                                                        |
| Library                                               | <i>L;library_name</i><br><br>See the CREATE FUNCTION “Library Name Clause” topic in <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |        |         |                                                                                                                                                                     |         |                                                                                                                                                      |        |                                                                                                                                                                        |        |                                                                                                                                                                        |
| Object                                                | <i>O;name_on_server;object_name</i><br><br>See the CREATE FUNCTION “Object File Name Clause” topic in <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |        |         |                                                                                                                                                                     |         |                                                                                                                                                      |        |                                                                                                                                                                        |        |                                                                                                                                                                        |
| Source                                                | <i>S;name_on_server;source_name</i><br><br>See the CREATE FUNCTION “Source File Name Clause” topic in <i>SQL Data Definition Language Detailed Topics</i> for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |        |         |                                                                                                                                                                     |         |                                                                                                                                                      |        |                                                                                                                                                                        |        |                                                                                                                                                                        |
| EXTERNAL SECURITY                                     | <p>keywords introducing the external security clause.</p> <p>This clause is mandatory for external UDMs that perform operating system I/O operations.</p> <p>If you do not specify an external security clause, but the UDM being defined performs OS I/O, then the results of that I/O are unpredictable. The most likely outcome is crashing the database, and perhaps crashing the entire system.</p> <p>See <a href="#">“CREATE AUTHORIZATION REPLACE AUTHORIZATION” on page 113</a> for information about external security.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |        |         |                                                                                                                                                                     |         |                                                                                                                                                      |        |                                                                                                                                                                        |        |                                                                                                                                                                        |

| Syntax element ...                   | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|-------------------------------|-----------------------------------------------------------------------------------------|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DEFINER                              | <p>that the UDM runs in the client user context of the associated security authorization object created for this purpose, which is contained within the same database as the method, SYSUDTLIB.</p> <table border="1"> <thead> <tr> <th>IF you ...</th><th>THEN ...</th></tr> </thead> <tbody> <tr> <td>specify an authorization name</td><td>an authorization object with that name must be defined before you can run the function.</td></tr> <tr> <td>do not specify an authorization name</td><td> <p>you must define a default DEFINER authorization object.</p> <p>The default authorization object must be defined before a user can run the function.</p> </td></tr> </tbody> </table> <p>The system reports a warning if the specified authorization name does not exist at the time the UDM is created, stating that no authorization name exists.</p> <p>See <a href="#">“CREATE AUTHORIZATION REPLACE AUTHORIZATION” on page 113.</a></p> | IF you ... | THEN ... | specify an authorization name | an authorization object with that name must be defined before you can run the function. | do not specify an authorization name | <p>you must define a default DEFINER authorization object.</p> <p>The default authorization object must be defined before a user can run the function.</p> |
| IF you ...                           | THEN ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |
| specify an authorization name        | an authorization object with that name must be defined before you can run the function.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |
| do not specify an authorization name | <p>you must define a default DEFINER authorization object.</p> <p>The default authorization object must be defined before a user can run the function.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |
| <i>authorization_name</i>            | <p>an optional authorization name.</p> <p>The specified authorization object must already be defined (see <a href="#">“CREATE AUTHORIZATION REPLACE AUTHORIZATION” on page 113</a> for further information) or the system reports an error.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |
| INVOKER                              | <p>that the method runs in the OS user context with the associated default authorization object that exists for this purpose.</p> <p>See <a href="#">“CREATE AUTHORIZATION REPLACE AUTHORIZATION” on page 113.</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |          |                               |                                                                                         |                                      |                                                                                                                                                            |

## ANSI Compliance

REPLACE METHOD is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have the UDTMETHOD privilege on the SYSUDTLIB database to replace a method.

## How REPLACE METHOD And CREATE METHOD Differ

You can perform CREATE METHOD only once to declare the body definition for a method. If you try to use CREATE METHOD a second time to define the body for an existing method, the statement aborts and the system returns an error to the requestor.

Instead of using CREATE METHOD to redefine the method body, you must use REPLACE METHOD. REPLACE METHOD can be performed multiple times to replace the body definition for a method.

## Example

The following example replaces the existing method with the specific method name *polygon\_mbr* with a new definition.

```
REPLACE SPECIFIC METHOD SYSUDTLIB.polygon_mbr  
EXTERNAL 'CO!C:\sys\spatial.lib!CO!C:\udt_lib\polymbr.obj!F!toUS'
```

## Related Topics

See the documentation for the following statements for additional information about UDTs:

- [“ALTER FUNCTION” on page 16](#)
- [“ALTER METHOD” on page 19](#)
- [“ALTER TYPE” on page 71](#)
- [“CREATE CAST/ REPLACE CAST” on page 125](#)
- [“CREATE FUNCTION/ REPLACE FUNCTION” on page 138](#)
- [“CREATE METHOD” on page 259](#)
- [“CREATE ORDERING/ REPLACE ORDERING” on page 272](#)
- [“CREATE TRANSFORM/ REPLACE TRANSFORM” on page 484](#)
- [“CREATE TYPE \(Distinct Form\)” on page 507](#)
- [“CREATE TYPE \(Structured Form\)” on page 515](#)
- [“DROP FUNCTION” on page 562](#)
- [“DROP ORDERING” on page 577](#)
- [“DROP TRANSFORM” on page 591](#)
- [“DROP TYPE” on page 592](#)
- [“RENAME FUNCTION” on page 634](#)
- [“HELP CAST” on page 693](#)
- [“HELP FUNCTION” on page 715](#)
- [“HELP METHOD” on page 735](#)
- [“HELP TRANSFORM” on page 775](#)
- [“HELP TYPE” on page 779](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)

See *SQL Data Control Language* for information about the UDTTYPE, UDTMETHOD, UDTUSAGE, and EXECUTE FUNCTION privileges, particularly as described for “GRANT (SQL Form)”, and especially the topics “UDT-Related Privileges” and “EXECUTE FUNCTION Privilege.”

Also see *SQL External Routine Programming* for information about how to write user-defined external routines.

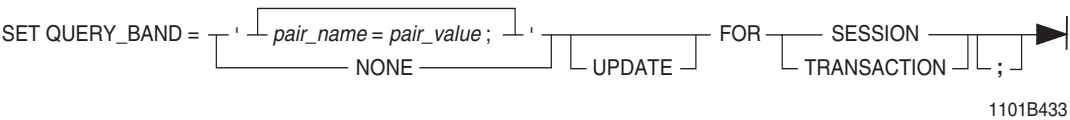


# SET QUERY\_BAND

## Purpose

Sets or removes a query band set for the current session or transaction.

## Syntax



where:

| Syntax Element ... | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| pair_name          | <p>the name component of a query band specification.</p> <p>pair_name cannot contain any of the following characters:</p> <ul style="list-style-type: none"><li>EQUALS SIGN (=)</li><li>SEMICOLON (;)</li><li>a null</li></ul> <p>Pair names can be from 1 to 128 VARCHAR UNICODE characters in length.</p> <p>See <i>SQL Data Definition Language Detailed Topics</i> for a complete list of reserved query band names.</p> <p>If an APOSTROPHE character is embedded within a pair name, then you must type it twice. Otherwise, the system treats it as a pair_name=pair_value string terminator.</p> <p>The only limit on the number of pair_name=pair_value pairs is the limit on the length of the string, which is 2,048 UNICODE characters.</p> |
| pair_value         | <p>the value component of a query band specification.</p> <p>pair_value cannot contain any of the following characters:</p> <ul style="list-style-type: none"><li>EQUALS SIGN (=)</li><li>SEMICOLON (;)</li><li>a null</li></ul> <p>Pair values can be from 0 to 256 VARCHAR UNICODE characters in length.</p> <p>If an APOSTROPHE character is embedded within a pair value, then you must type it twice. Otherwise, the system treats it as a pair_name=pair_value string terminator.</p> <p>The only limit on the number of pair_name=pair_value pairs is the limit on the length of the string, which is 2,048 UNICODE characters.</p>                                                                                                              |

| Syntax Element ...                              | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |          |                                          |                        |                                                 |                               |
|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|------------------------------------------|------------------------|-------------------------------------------------|-------------------------------|
| NONE                                            | <p>that the previously specified query band is to be removed for the current session or transaction.</p> <p>You cannot specify both the NONE option and the UPDATE option within the same request.</p> <p>An APOSTROPHE-enclosed null string is equivalent to NONE.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |          |                                          |                        |                                                 |                               |
| UPDATE                                          | <p>to update the current query band name:value pairs as follows:</p> <table><tr><th>IF the query band name ...</th><th>THEN ...</th></tr><tr><td>matches a name in the current query band</td><td>the value is replaced.</td></tr><tr><td>does not match a name in the current query band</td><td>the name:value pair is added.</td></tr></table> <p>The only way to <i>remove</i> a name:value pair from a query band is to replace the entire query band.</p> <p>If an update causes the new query band to exceed the maximum allowable length, the request aborts and returns an error to the requestor.</p> <p>Note that a name can be set to a zero-length string by specifying <code>`name=;`</code>.</p> <p>If you do not specify UPDATE, then the entire current query band is replaced by the new query band.</p> <p>You cannot specify both the NONE option and the UPDATE option within the same request.</p> | IF the query band name ... | THEN ... | matches a name in the current query band | the value is replaced. | does not match a name in the current query band | the name:value pair is added. |
| IF the query band name ...                      | THEN ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                            |          |                                          |                        |                                                 |                               |
| matches a name in the current query band        | the value is replaced.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                            |          |                                          |                        |                                                 |                               |
| does not match a name in the current query band | the name:value pair is added.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |          |                                          |                        |                                                 |                               |
| SESSION                                         | <p>that the query band set specified by the set of name:value pairs applies to the current session.</p> <p>The query band for a session is stored in <code>DBC.SessionTbl</code>. The system recovers the current session query band after a system reset.</p> <p>Teradata Database populates additional columns in <code>DBC.SessionTbl</code> for a trusted session. The system uses the session proxy columns to recover a trusted session after a system reset.</p> <p>You can set a session query band concurrently with an existing transaction query band.</p>                                                                                                                                                                                                                                                                                                                                                    |                            |          |                                          |                        |                                                 |                               |
| TRANSACTION                                     | <p>that the query band set specified by the set of name:value pairs applies to the current transaction.</p> <p>The query band for a transaction is not stored. The system discards it when its transaction commits, rolls back, or aborts.</p> <p>You can set a transaction query band concurrently with an existing session query band.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |          |                                          |                        |                                                 |                               |

## ANSI Compliance

SET QUERY\_BAND is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

None.

### Example 1: Setting a Query Band For a Session

The following example sets a query band with two name:value pairs for the session:

```
SET QUERY_BAND = 'org=Finance;report=Fin123;' FOR SESSION;
```

The pairs in the query band string are *org=Finance* and *report=Fin123*.

### Example 2: Removing a Query Band From a Session

The following example removes the query band for the session:

```
SET QUERY_BAND = NONE FOR SESSION;
```

The following request is equivalent:

```
SET QUERY_BAND = '' FOR SESSION;
```

### Example 3: Setting a Query Band for the Current Transaction

The following example sets a query band with two name:value pairs for the current transaction:

```
SET QUERY_BAND = 'Document=XY1234;Universe=East;' FOR TRANSACTION;
```

The pairs in the query band string are *Document=XY1234* and *Universe=East*.

### Example 4: Removing a Query Band From the Current Transaction

The following example removes the query band for the current transaction:

```
SET QUERY_BAND = NONE FOR TRANSACTION;
```

The following request is equivalent:

```
SET QUERY_BAND = '' FOR TRANSACTION;
```

### Example 5: Retrieving the Query Band of a Session Using the MonitorQueryBand UDF

The following example uses the Teradata-provided scalar UDF *MonitorQueryBand* to retrieve the query band for the session.

```
SELECT MonitorQueryBand(1, 103, 16383);
*** Query completed. One row found. One column returned.
*** Total elapsed time was 5 seconds.
```

```
MonitorQueryBand(1, 103, 16383)
-----
=T> job=x1; =S> org=Finance;report=Fin123;
```

## Example 6: Using SET QUERY\_BAND ... FOR TRANSACTION As a Parameterized JDBC Request

The following example shows how you can specify the SET QUERY\_BAND ... FOR TRANSACTION statement as a parameterized JDBC request:

```
public static void main(String args[])
{
    // Creation of URL to be passed to the JDBC driver
    String url = "jdbc:teradata://borg";

    // Strings representing a prepared statement
    // and its parameter values
    String ssetqbpn = "SET QUERY_BAND = ? FOR TRANSACTION;";
    String txnqb = "cat=asta;tree=palm;flower=rose;";
    ...
    PreparedStatement pstmt = con.prepareStatement(ssetqbpn);
    // Set parameter values indicated by ? (dynamic update)
    pstmt.setString(1, txnqb);
}
```

## Example 7: Making a Proxy User Connection

The following examples make a proxy user connection for a session and for a transaction, respectively:

```
SET QUERY_BAND='PROXYUSER=fred'
FOR SESSION;

SET QUERY_BAND='PROXYUSER=fred'
FOR TRANSACTION;
```

## Example 8: Setting the Role for a Trusted Session Using a PROXYROLE name:value Pair

The following example set shows how to change the proxy role in a proxy session using SET QUERY\_BAND requests. All of the examples in this set are run in Teradata session mode.

The following example uses the PROXYROLE name:value pair in a query band to set the proxy role in a trusted session to a specific role.

```
SET QUERY_BAND='PROXYUSER=fred;PROXYROLE=administration;'
FOR SESSION;
```

The following example uses the PROXYROLE name:value pair in a query band to change the proxy role in a trusted session that is set by a session query band.

```
SET QUERY_BAND='PROXYUSER=cluser1;PROXYROLE=role1;' FOR SESSION;
BEGIN TRANSACTION;
SET QUERY_BAND='PROXYROLE=role2;' FOR TRANSACTION;
SELECT *
FROM table;
END TRANSACTION;
```

The following example shows that the PROXYROLE value in a query band can be changed multiple times in a transaction.

```
BEGIN TRANSACTION;
SET QUERY_BAND='PROXYUSER=cluser1;PROXYROLE=role1;' FOR TRANSACTION;
SELECT *
FROM table;
SET QUERY_BAND='PROXYUSER=cluser1;PROXYROLE=role2;' FOR TRANSACTION;
SELECT *
FROM table2;
END TRANSACTION;
```

The following example also uses the PROXYROLE name:value pair in a query band to change the proxy role in a trusted session that is set by a session query band.

```
SET QUERY_BAND='PROXYUSER=cluser1;PROXYROLE=role1;' FOR SESSION;
SELECT *
FROM table;
SET QUERY_BAND='PROXYUSER=cluser1;PROXYROLE=role2;' FOR SESSION;
SELECT *
FROM table2;
```

The following example fails because it attempts to change the role for a transaction trusted session using a session-based query band.

```
BEGIN TRANSACTION;
SET QUERY_BAND='PROXYUSER=cluser1;PROXYROLE=role1;' FOR TRANSACTION;
SELECT *
FROM table;
SET QUERY_BAND='PROXYROLE=role2;' FOR SESSION;
END TRANSACTION;
```

## Example 9: Initiating a Trusted Session Using a Transaction Query Band

Using the transaction query band, you can change the proxy user within an explicit Teradata session mode transaction. In this example, proxy user bob initially has the INSERT privilege on *bobs\_table*, but then that query band is replaced within the transaction with a new query band that enables proxy user joe to have the INSERT privilege on *joes\_table*.

At first glance this example seems trivial, but the capability it demonstrates is very useful for use with Java applets.

```
BEGIN TRANSACTION;
SET QUERY_BAND = 'PROXYUSER=bob;' FOR TRANSACTION;
INSERT INTO bobs_table VALUES(1, 2, 3);
SET QUERY_BAND = 'PROXYUSER=joe;' FOR TRANSACTION;
INSERT INTO joes_table VALUES(a, b, c);
END TRANSACTION;
```

## Example 10: Setting a Query Band for the Current Transaction for a Multistatement Request in a Trusted Session

If PROXYUSER and PROXYROLE are set in a query band, the system enforces the privileges for the trusted session to validate the privileges of the individual statements in the multistatement request.

In this example, proxy user *pxyuser3* must have the SELECT privilege on *taba*, *tabb*, and *tabc*.

```
SET QUERY_BAND = 'PROXYUSER=pxyuser3;' FOR TRANSACTION
;SELECT * FROM qbuser.taba
;SELECT * FROM qbuser.tabb
;SELECT * FROM qbuser.tabc;
```

## Example 11: Query Band UPDATE Examples

The following example uses the UPDATE option to add the name:value pairs *city:san diego* and *state:california*:

```
SET QUERY_BAND = 'city=san diego;' UPDATE FOR SESSION;

GETQUERYBAND()
-----
=S> city=san diego;

SET QUERY_BAND = 'state=california;' UPDATE FOR SESSION;

GETQUERYBAND()
-----
=S> state=california;city=san diego;
```

The following example uses UPDATE to change the value of the name:value pair *city:san diego* to *city:fresno*:

```
SET QUERY_BAND = 'city=Fresno;' UPDATE FOR SESSION;

GETQUERYBAND()
-----
=S> 'city=Fresno;state=california;
```

The following example replaces the entire query band by *not* specifying the UPDATE option:

```
SET QUERY_BAND = 'ID=k31293; Job=payroll;' FOR SESSION;

GETQUERYBAND()
-----
=S> ID=k31293;Job=payroll;
```

## Related Topics

For additional information about query bands, see the following topics and manuals:

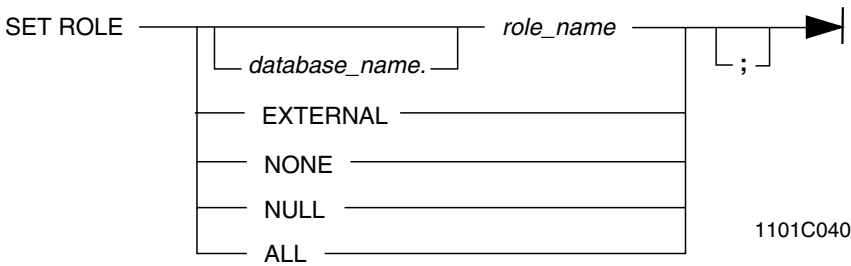
- [“DROP USER” on page 594](#)
- [“SET ROLE” on page 656](#)
- [“SET SESSION” on page 659](#)
- “GRANT (SQL Form)” in *SQL Data Control Language*
- “GRANT CONNECT THROUGH” in *SQL Data Control Language*
- “REVOKE (SQL Form)” in *SQL Data Control Language*
- “REVOKE CONNECT THROUGH” in *SQL Data Control Language*
- “CURRENT\_ROLE” in *SQL Functions, Operators, Expressions, and Predicates*
- “CURRENT\_USER” in *SQL Functions, Operators, Expressions, and Predicates*
- *SQL Data Control Language*
- *Database Administration*
- *Security Administration*
- *SQL Data Definition Language Detailed Topics*
- *Workload Management API: PM/API and Open API*
- *Teradata Dynamic Workload Manager User Guide*
- *SQL Stored Procedures and Embedded SQL*
- *Teradata Call-Level Interface Version 2 Reference for Channel-Attached Systems*
- *Teradata Call-Level Interface Version 2 Reference for Network-Attached Systems*
- *Teradata JDBC Driver User Guide*
- *Teradata MultiLoad Reference*
- *Teradata Parallel Transporter User Guide*
- *Teradata Parallel Transporter Operator Programmer Guide*
- *Teradata Parallel Transporter Reference*

# SET ROLE

## Purpose

SET ROLE sets the current role for a session. It does not distinguish between directory- and database-managed roles.

## Syntax



where:

| Syntax Element ...   | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i> | the containing database for <i>role_name</i> if something other than the current database.                                                                                                                                                                                                                                                                                                                                            |
| <i>role_name</i>     | <p>the name of the role to set as the current role for a session.</p> <p>You can use the SET ROLE <i>role_name</i> syntax to enable an externally-assigned role plus any of its nested database roles within a session while disabling all other roles.</p> <p>You might want to enforce this for performance reasons if rights validation based on the maximum of 15 external roles does not meet your service level agreements.</p> |
| EXTERNAL             | <p>that an external role is to be made the current role for the session.</p> <p>If the user has not been assigned to an external role in the directory, the statement aborts and returns an error to the requestor.</p>                                                                                                                                                                                                               |
| NONE                 | to disable the current role, whether directory- or database-assigned, for a session.                                                                                                                                                                                                                                                                                                                                                  |
| NULL                 | that the null role is to be made current for the session.                                                                                                                                                                                                                                                                                                                                                                             |
| ALL                  | that all the roles that have been directly and indirectly granted to a user, whether directory- or database-assigned, become current and active.                                                                                                                                                                                                                                                                                      |



## ANSI Compliance

SET ROLE is ANSI SQL:2008-compliant, except for the NULL, EXTERNAL, and ALL options, which are Teradata extensions.

## Required Privileges

| IF you specify ...          | THEN ...                                                                                         |
|-----------------------------|--------------------------------------------------------------------------------------------------|
| SET ROLE NONE;              | no privilege is needed to disable the current role for a session.                                |
| SET ROLE NULL;              |                                                                                                  |
| SET ROLE <i>role_name</i> ; | the role must already be granted to you.                                                         |
| SET ROLE ALL;               | no privilege is needed and you are not required to have any roles granted to you.                |
| SET ROLE EXTERNAL           | the role must already be assigned to you in the directory (see <i>Security Administration</i> ). |

### Example 1: Changing the Current Role

The following statement changes the current role for a session to administration:

```
SET ROLE administration;
```

### Example 2: Disabling the Current Role

The following statements disable the current role for a session:

```
SET ROLE NONE;
```

```
SET ROLE NULL;
```

### Example 3: Enabling All Roles

The following statement specifies that all roles and their nested database roles that have been granted to the user become current and active for a session:

```
SET ROLE ALL;
```

### Example 4: Enabling the EXTERNAL Role

The following statement resets the current set of roles for the session to its initial set of directory-assigned roles:

```
SET ROLE EXTERNAL;
```

## Related Topics

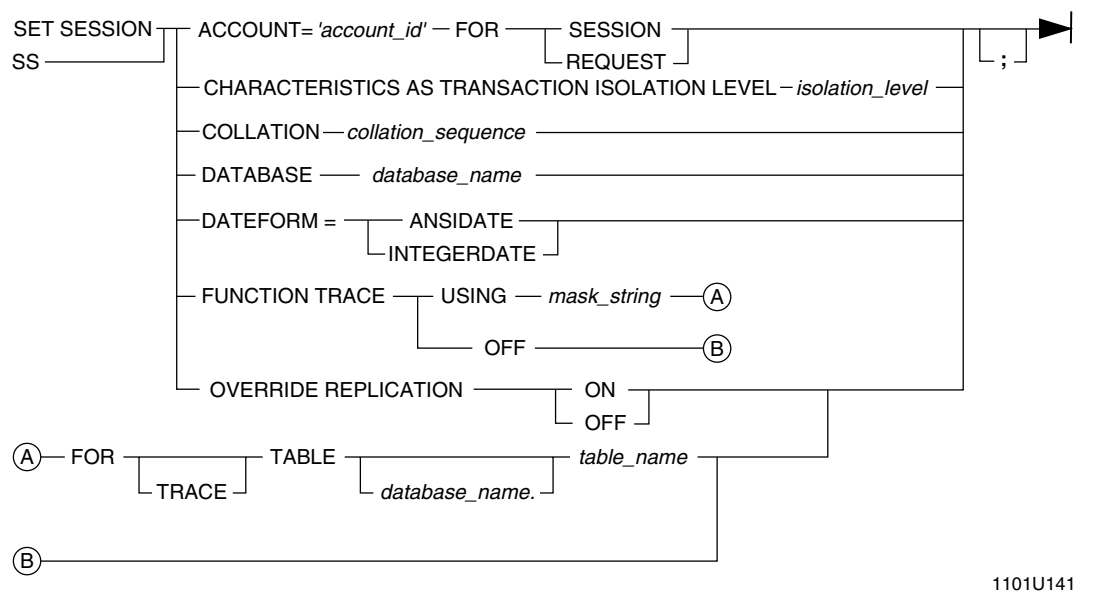
| FOR more information on ...                      | SEE ...                                                                                                                                           |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| creating roles                                   | <a href="#">“CREATE ROLE” on page 379.</a>                                                                                                        |
| granting privileges on database objects to roles | “GRANT (SQL Form)” topic in <i>SQL Data Control Language</i> .                                                                                    |
| granting roles to users and other roles          | “GRANT (Role Form)” topic in <i>SQL Data Control Language</i> .                                                                                   |
| assigning default roles to users                 | <ul style="list-style-type: none"><li>• <a href="#">“CREATE USER” on page 524.</a></li><li>• <a href="#">“MODIFY USER” on page 623.</a></li></ul> |
| external roles                                   | <ul style="list-style-type: none"><li>• <i>Security Administration</i></li><li>• <i>Database Administration</i></li></ul>                         |

# SET SESSION

## Purpose

Overrides the collation sequence, account priority, DateForm, default database, function trace, or replication services controls currently in effect for the session.

## Syntax



where:

| Syntax Element ... | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACCOUNT            | that the current account priorities are to be changed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>account_id</i>  | <p>the account and its new performance group code prefix for the current session or request. This must be one of the accounts defined originally for the logged-on user.</p> <p>You cannot use SQL to change the account performance group for any other user. To change account performance groups for other users, you must use the parallel PMPC statement SET SESSION ACCOUNT.</p> <p>You can only downgrade priorities.</p> <p>See <i>Utilities</i> and <i>Database Administration</i> for discussions of performance groups and priorities.</p> |
| SESSION            | that the performance group is to be changed for the remainder of the session.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| Syntax Element ...                             | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |             |    |                                                                                                                 |                  |    |                                                                                                                |              |
|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------|----|-----------------------------------------------------------------------------------------------------------------|------------------|----|----------------------------------------------------------------------------------------------------------------|--------------|
| REQUEST                                        | <p>that the performance group code prefix is to be changed for the next request only (next being defined as the first request performed after the current SET SESSION ACCOUNT performs).</p> <p>After that, the previous performance group declaration resumes.</p> <p>The specified performance group is kept in volatile memory, not in <i>DBC.SessionTbl</i>, so a subsequent transparent system crash and recovery effectively voids this statement. To be sure the request performs correctly, set SET CRASH to NOWAIT_TELL or verify the result.</p>                                                       |        |             |    |                                                                                                                 |                  |    |                                                                                                                |              |
| CHARACTERISTICS AS TRANSACTION ISOLATION LEVEL | that the current session transaction isolation level is to be changed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |             |    |                                                                                                                 |                  |    |                                                                                                                |              |
| <i>isolation_level</i>                         | <p>the default transaction isolation level in force for the current session.</p> <p>The valid transaction isolation level options are the following:</p> <table> <tr> <th>Option</th><th>Description</th></tr> <tr> <td>RU</td><td rowspan="2">Sets the read-only locking severity for the current session to ACCESS.<br/>RU and READ UNCOMMITTED are synonyms.</td></tr> <tr> <td>READ UNCOMMITTED</td></tr> <tr> <td>SR</td><td rowspan="2">Sets the read-only locking severity for the current session back to READ.<br/>SR and SERIALIZABLE are synonyms.</td></tr> <tr> <td>SERIALIZABLE</td></tr> </table> | Option | Description | RU | Sets the read-only locking severity for the current session to ACCESS.<br>RU and READ UNCOMMITTED are synonyms. | READ UNCOMMITTED | SR | Sets the read-only locking severity for the current session back to READ.<br>SR and SERIALIZABLE are synonyms. | SERIALIZABLE |
| Option                                         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |             |    |                                                                                                                 |                  |    |                                                                                                                |              |
| RU                                             | Sets the read-only locking severity for the current session to ACCESS.<br>RU and READ UNCOMMITTED are synonyms.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |             |    |                                                                                                                 |                  |    |                                                                                                                |              |
| READ UNCOMMITTED                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |             |    |                                                                                                                 |                  |    |                                                                                                                |              |
| SR                                             | Sets the read-only locking severity for the current session back to READ.<br>SR and SERIALIZABLE are synonyms.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |             |    |                                                                                                                 |                  |    |                                                                                                                |              |
| SERIALIZABLE                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |             |    |                                                                                                                 |                  |    |                                                                                                                |              |
| COLLATION                                      | that the collation sequence in effect for the session is to be changed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |             |    |                                                                                                                 |                  |    |                                                                                                                |              |

| Syntax Element ...                       | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                          |                                                                                  |       |       |        |        |               |                                                      |              |                                                            |          |                                                                                      |      |                                                                                                                     |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|----------------------------------------------------------------------------------|-------|-------|--------|--------|---------------|------------------------------------------------------|--------------|------------------------------------------------------------|----------|--------------------------------------------------------------------------------------|------|---------------------------------------------------------------------------------------------------------------------|
| <i>collation_sequence</i>                | <p>the name of the collation sequence to be established for the session.</p> <table> <tr> <th>This collation sequence name keyword ...</th><th>Specifies that comparison and sort operations are to use this collation type ...</th></tr> <tr> <td>ASCII</td><td>ASCII</td></tr> <tr> <td>EBCDIC</td><td>EBCDIC</td></tr> <tr> <td>MULTINATIONAL</td><td>European (diacritical) character or Kanji character.</td></tr> <tr> <td>CHARSET_COLL</td><td>binary ordering based on the current client character set.</td></tr> <tr> <td>JIS_COLL</td><td>logical ordering of characters based on the Japanese Industrial Standards collation.</td></tr> <tr> <td>HOST</td><td>EBCDIC for IBM channel-attached clients.<br/>ASCII for all other clients.<br/>This is the default collation sequence.</td></tr> </table> | This collation sequence name keyword ... | Specifies that comparison and sort operations are to use this collation type ... | ASCII | ASCII | EBCDIC | EBCDIC | MULTINATIONAL | European (diacritical) character or Kanji character. | CHARSET_COLL | binary ordering based on the current client character set. | JIS_COLL | logical ordering of characters based on the Japanese Industrial Standards collation. | HOST | EBCDIC for IBM channel-attached clients.<br>ASCII for all other clients.<br>This is the default collation sequence. |
| This collation sequence name keyword ... | Specifies that comparison and sort operations are to use this collation type ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                          |                                                                                  |       |       |        |        |               |                                                      |              |                                                            |          |                                                                                      |      |                                                                                                                     |
| ASCII                                    | ASCII                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                          |                                                                                  |       |       |        |        |               |                                                      |              |                                                            |          |                                                                                      |      |                                                                                                                     |
| EBCDIC                                   | EBCDIC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                          |                                                                                  |       |       |        |        |               |                                                      |              |                                                            |          |                                                                                      |      |                                                                                                                     |
| MULTINATIONAL                            | European (diacritical) character or Kanji character.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                          |                                                                                  |       |       |        |        |               |                                                      |              |                                                            |          |                                                                                      |      |                                                                                                                     |
| CHARSET_COLL                             | binary ordering based on the current client character set.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                          |                                                                                  |       |       |        |        |               |                                                      |              |                                                            |          |                                                                                      |      |                                                                                                                     |
| JIS_COLL                                 | logical ordering of characters based on the Japanese Industrial Standards collation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                          |                                                                                  |       |       |        |        |               |                                                      |              |                                                            |          |                                                                                      |      |                                                                                                                     |
| HOST                                     | EBCDIC for IBM channel-attached clients.<br>ASCII for all other clients.<br>This is the default collation sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                          |                                                                                  |       |       |        |        |               |                                                      |              |                                                            |          |                                                                                      |      |                                                                                                                     |
| DATABASE                                 | that the current default database is to be changed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                          |                                                                                  |       |       |        |        |               |                                                      |              |                                                            |          |                                                                                      |      |                                                                                                                     |
| <i>database_name</i>                     | the name of the new default database for the remainder of the current session.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                                                                                  |       |       |        |        |               |                                                      |              |                                                            |          |                                                                                      |      |                                                                                                                     |
| DATEFORM                                 | the default format for a date in field mode, and the default format for importing and exporting DATE values, for the session.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                          |                                                                                  |       |       |        |        |               |                                                      |              |                                                            |          |                                                                                      |      |                                                                                                                     |
| ANSIDATE                                 | <p>the DATEFORM option to import and export DATE values as CHARACTER(10) formatted as 'YYYY-MM-DD'.</p> <p>ANSIDATE results in a 'YYYY-MM-DD' date format in field mode for date columns created and for date constants in character form.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                                                                                  |       |       |        |        |               |                                                      |              |                                                            |          |                                                                                      |      |                                                                                                                     |
| INTEGERDATE                              | <p>the DATEFORM option to import and export DATE values as encoded integers.</p> <p>When the session DATEFORM is INTEGERDATE, the default DATE format in field mode is 'YY/MM/DD' for date columns created and date constants in character form. You can use the <code>tdlocaledef</code> utility to change the 'YY/MM/DD' default DATE format. For details, see <i>Utilities</i>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                             |                                          |                                                                                  |       |       |        |        |               |                                                      |              |                                                            |          |                                                                                      |      |                                                                                                                     |
| FUNCTION TRACE                           | that user-defined function tracing is to be enabled or disabled for the current session.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                          |                                                                                  |       |       |        |        |               |                                                      |              |                                                            |          |                                                                                      |      |                                                                                                                     |

| Syntax Element ...      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>mask_string</i>      | <p>an arbitrary character string to be interpreted by any UDF performed by the current session.</p> <p>The string is limited to 256 logical characters in the character set defined for the user.<sup>1</sup></p> <p>UDFs convert this string to the default character data type in effect when the function was created, not the default character data type defined for the user for the session.</p> <p>See <a href="#">“CREATE USER” on page 524</a> for more information about defining default character data types for users.</p> |
| <i>database_name</i>    | <p>the name of the database in which <i>table_name</i> is contained.</p> <p>The database name is only required when the table is stored outside the current default database for the session.</p>                                                                                                                                                                                                                                                                                                                                        |
| <i>table_name</i>       | <p>the name of a global temporary trace table into which function trace data is to be written.</p> <p>See the SET SESSION FUNCTION TRACE “Function Trace Output Table” topic in <i>SQL Data Definition Language Detailed Topics</i> and <a href="#">“CREATE GLOBAL TEMPORARY TRACE TABLE” on page 186</a> for further information.</p>                                                                                                                                                                                                   |
| OFF                     | that currently active UDF tracing should be disabled for the current session.                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| OVERRIDE<br>REPLICATION | that either the normal replication services controls for the current session are to be overridden or that they are to be reestablished after they have been overridden.                                                                                                                                                                                                                                                                                                                                                                  |
| ON                      | normal replication services controls are to be overridden for the duration of the current session or until you submit a successful SET SESSION OVERRIDE REPLICATION OFF statement to the system.                                                                                                                                                                                                                                                                                                                                         |
| OFF                     | override of normal replication services is to be turned off for the current session.                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

1. This means, for example, that the string has a maximum length of 256 bytes if the UDF was created under a Latin character data type, but has a maximum length of 512 bytes if created under a UNICODE character data type.

All necessary conversions are done by the system. If, for example, a UDF was created with UNICODE, but is called by a user with a session character set of Latin, the trace string is translated to Latin before it is passed to the UDF.

If a preconversion trace string contains characters that have no equivalent in the target character set, the system returns an error.

See *SQL External Routine Programming* for more information.

## ANSI Compliance

Most of the SET SESSION statements are Teradata extensions to the ANSI SQL:2008 standard. The following table documents which of them are compliant with the ANSI SQL standard and which are Teradata extensions:

| SET SESSION Statement                          | ANSI SQL:2008 Compliant? |
|------------------------------------------------|--------------------------|
| ACCOUNT                                        | No                       |
| CHARACTERISTICS AS TRANSACTION ISOLATION LEVEL | Yes                      |
| COLLATION                                      | No                       |
| DATABASE                                       | No                       |
| DATEFORM                                       | No                       |
| FUNCTION TRACE                                 | No                       |
| OVERRIDE REPLICATION                           | No                       |

## Required Privileges

None.

## Related Topics

For additional information about the SET SESSION options, including individual syntax diagrams and examples, see the documentation for the following statements:

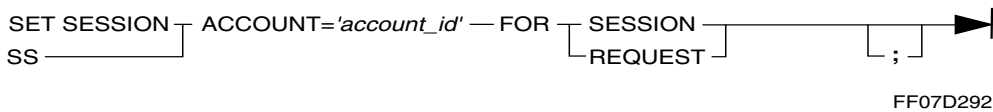
- [“SET SESSION ACCOUNT” on page 664](#)
- [“SET SESSION CHARACTERISTICS AS TRANSACTION ISOLATION LEVEL” on page 667](#)
- [“SET SESSION COLLATION” on page 670](#)
- [“SET SESSION DATABASE” on page 673](#)
- [“SET SESSION DATEFORM” on page 674](#)
- [“SET SESSION FUNCTION TRACE” on page 676](#)
- [“SET SESSION OVERRIDE REPLICATION” on page 678](#)

# SET SESSION ACCOUNT

## Purpose

Dynamically changes your account or account priorities for the duration of a session or for one SQL request only.

## Syntax



FF07D292

where:

| Syntax Element ... | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>account_id</i>  | <p>the account and its new performance group code prefix for the current session or request. This must be one of the accounts defined originally for the logged-on user.</p> <p>You cannot use SQL to change the account performance group for any other user. To change account performance groups for other users, use the Performance Manager command SET SESSION ACCOUNT (see <i>Workload Management API: PM/API and Open API</i> for additional information).</p> <p>See <i>Database Administration</i> for a discussion of performance groups and priorities.</p> <p>See <a href="#">“CREATE USER” on page 524</a> for a description of how to create user rows in <i>DBC.Accounts</i>.</p> |
| SESSION            | <p>that the performance group is to be changed for the remainder of the session.</p> <p>Note that you cannot undo this request within the current session. To revoke a session-level account priority change, you must log off the session, then log back on, at which point the system assigns your user default priority.</p>                                                                                                                                                                                                                                                                                                                                                                   |
| REQUEST            | <p>that the performance group code prefix is to be changed for the next request only (<i>next</i> being defined as the first request this user performs after the current SET SESSION ACCOUNT request).</p> <p>After that, the previous performance group declaration resumes.</p>                                                                                                                                                                                                                                                                                                                                                                                                                |

## ANSI Compliance

SET SESSION ACCOUNT is a Teradata extension to the ANSI-2008 SQL standard.

## Required Privileges

You must be assigned the account you are switching to in the *DBC.Accounts* table.



## Examples

The example set for SET SESSION ACCOUNT use the following account strings as logon definitions for the performance groups of the three accounts Sales, Development, and Marketing:

- `$HSales`  
An appropriately defined user logged on using this account string cannot change its request priority to anything less than High.
- `$MMarketing` or `$MMarketing`  
An appropriately defined user logged on using either of these account strings cannot change its request priority to anything less than Medium, but can change from Medium to High or from High to Medium.
- `$HDevelopment`, `$MDevelopment`, or `$LDevelopment`  
An appropriately defined user logged on using any of these account strings can change its request priority to any valid definition.

The following table illustrates the defined priorities, permitted priority changes, and forbidden priority changes for the accounts used in the examples:

| Account     | Defined Priority                                                                                                             | Priority Definition  | Permitted Priority Changes <sup>1</sup>                                                                      | Forbidden Priority Changes |
|-------------|------------------------------------------------------------------------------------------------------------------------------|----------------------|--------------------------------------------------------------------------------------------------------------|----------------------------|
| Sales       | <code>\$H</code>                                                                                                             | High only            | None                                                                                                         | <code>&lt; \$H</code>      |
| Marketing   | <ul style="list-style-type: none"> <li>• <code>\$H</code></li> <li>• <code>\$M</code></li> </ul>                             | High or Medium only  | <ul style="list-style-type: none"> <li>• <code>\$H → \$M</code></li> <li>• <code>\$M → \$H</code></li> </ul> | <code>&lt; \$M</code>      |
| Development | <ul style="list-style-type: none"> <li>• <code>\$H</code></li> <li>• <code>\$M</code></li> <li>• <code>\$L</code></li> </ul> | High, Medium, or Low | All                                                                                                          | None                       |

1. Depending on how a given user is defined in *DBC.Accounts*.

### Example 1

You want to change the performance group for the Sales account for the remainder of the current session as follows.

Change the priority for account Sales from `$H` (high priority) to `$L` (low priority).

```
SET SESSION ACCOUNT = '$LSales' FOR SESSION;
```

The request fails because the priority for Sales can only be `$H`.

## Example 2

You want to change the performance group for account *Sales* from \$H (high priority) to \$M (medium priority) for the duration of the current session.

```
SET SESSION ACCOUNT = '$MSales' FOR SESSION;
```

This request also fails because the priority for Sales can *only* be \$H.

## Example 3

You could also change the performance group for the *Marketing* account for the duration of the current session from \$M to \$H, for example:

```
SET SESSION ACCOUNT = '$HMarketing' FOR SESSION;
```

This request is successful because you can change the priority for *Marketing* to \$H.

## Example 4

Suppose another user has a business-critical query that must be performed immediately, but the account it originates from, *Marketing*, has a lower priority (\$M) than your logged on account, *Development*, which has a priority of \$H. You change your performance group code prefix to \$L (low priority) in order to lower your own priority and bump the business-critical query up higher in the execution queue.

Assume that the logged on accounts and priorities are these:

- \$HDevelopment
- \$MMarketing

You can change the priority from \$H to \$L for the *Development* account as follows.

```
SET SESSION ACCOUNT = '$LDevelopment' FOR SESSION;
```

This action permits the business-critical query to run sooner than it otherwise would have. The priority change is only effective for the duration of the current session: it does not persist after the session ends.

## Example 5

You have a relatively low priority, but resource-intensive query that should not steal CPU cycles from more important jobs. The logged on performance group code prefix is \$H for *Development*, the account from which you must run the query.

To change the priority for your resource-intensive query, perform the following request:

```
SET SESSION ACCOUNT = '$LDevelopment' FOR REQUEST;
```

Then run your query immediately following the SET SESSION ACCOUNT request. Your priority returns to its normal defined value and your remaining queries take the priority assigned for the account they run from as soon as the query completes.

## Related Topics

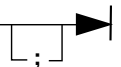
For more information about Teradata Database accounts, see *Database Administration*.

# SET SESSION CHARACTERISTICS AS TRANSACTION ISOLATION LEVEL

## Purpose

Changes the default transaction isolation level read-only semantics for the current session.

## Syntax

SET SESSION CHARACTERISTICS AS TRANSACTION ISOLATION LEVEL *isolation\_level* 

1101A315

where:

| Syntax element ...     | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |             |    |                                                                                                                 |                  |    |                                                                                                                |              |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------|----|-----------------------------------------------------------------------------------------------------------------|------------------|----|----------------------------------------------------------------------------------------------------------------|--------------|
| <i>isolation_level</i> | <p>the default transaction isolation level in force for the current session.</p> <p>The valid transaction isolation level options are the following:</p> <table> <tr> <th>Option</th><th>Description</th></tr> <tr> <td>RU</td><td rowspan="2">Sets the read-only locking severity for the current session to ACCESS.<br/>RU and READ UNCOMMITTED are synonyms.</td></tr> <tr> <td>READ UNCOMMITTED</td></tr> <tr> <td>SR</td><td rowspan="2">Sets the read-only locking severity for the current session back to READ.<br/>SR and SERIALIZABLE are synonyms.</td></tr> <tr> <td>SERIALIZABLE</td></tr> </table> <p>Note that isolation levels affect locking severities, <i>not</i> locking levels (see <i>SQL Request and Transaction Processing</i> for descriptions of locking severities and locking levels).</p> | Option | Description | RU | Sets the read-only locking severity for the current session to ACCESS.<br>RU and READ UNCOMMITTED are synonyms. | READ UNCOMMITTED | SR | Sets the read-only locking severity for the current session back to READ.<br>SR and SERIALIZABLE are synonyms. | SERIALIZABLE |
| Option                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |             |    |                                                                                                                 |                  |    |                                                                                                                |              |
| RU                     | Sets the read-only locking severity for the current session to ACCESS.<br>RU and READ UNCOMMITTED are synonyms.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |             |    |                                                                                                                 |                  |    |                                                                                                                |              |
| READ UNCOMMITTED       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |             |    |                                                                                                                 |                  |    |                                                                                                                |              |
| SR                     | Sets the read-only locking severity for the current session back to READ.<br>SR and SERIALIZABLE are synonyms.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        |             |    |                                                                                                                 |                  |    |                                                                                                                |              |
| SERIALIZABLE           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |             |    |                                                                                                                 |                  |    |                                                                                                                |              |

## ANSI Compliance

SET SESSION CHARACTERISTICS AS TRANSACTION ISOLATION LEVEL is ANSI SQL:2008-compliant.<sup>1</sup>

## Required Privileges

None.

1. ANSI SQL does *not* support the abbreviations RU and SR. They are Teradata extensions.

### Example 1: Setting the Default Session Isolation Level To READ UNCOMMITTED

The following equivalent requests set the isolation level for the current session to READ UNCOMMITTED:

```
SET SESSION CHARACTERISTICS AS TRANSACTION ISOLATION LEVEL RU;  
  
SET SESSION CHARACTERISTICS AS TRANSACTION ISOLATION LEVEL READ  
UNCOMMITTED;
```

### Example 2: Setting the Default Session Isolation Level Back To SERIALIZABLE

The following equivalent requests set the isolation level for the current session back to SERIALIZABLE:

```
SET SESSION CHARACTERISTICS AS TRANSACTION ISOLATION LEVEL SR;  
  
SET SESSION CHARACTERISTICS AS TRANSACTION ISOLATION LEVEL  
SERIALIZABLE;
```

### Example 3: Failure Conditions

Note that both syntax and resolver errors return Failure responses for this statement in Teradata mode.

The following request returns a Failure response because SU is not a valid isolation level:

```
SET SESSION CHARACTERISTICS AS TRANSACTION ISOLATION LEVEL SU;  
  
*** Failure 3706 Syntax error: expecting isolation level.
```

The following Teradata session mode transaction returns a Failure response because SET SESSION CHARACTERISTICS AS TRANSACTION ISOLATION LEVEL is a DDL statement, but it is not the last request in the transaction, and in an explicit transaction, the only statements that are valid following a DDL statement are END TRANSACTION, ABORT/ROLLBACK, or a NULL statement:

```
SET SESSION CHARACTERISTICS AS TRANSACTION ISOLATION LEVEL SR;  
SELECT *  
FROM table_1;  
  
*** Failure 3932 Only an ET or null statement is legal after a DDL  
Statement.
```

Note that in ANSI session mode, these requests would return an Error rather than a Failure. The system would then roll the erring request back.

You can correct this transaction in three different ways:

- Run the SET SESSION CHARACTERISTICS AS TRANSACTION ISOLATION LEVEL statement as a single-statement request in Teradata session mode as an implicit transaction.
- Commit or roll back the containing explicit Teradata session mode transaction immediately after issuing the SET SESSION CHARACTERISTICS AS TRANSACTION ISOLATION LEVEL statement with one of the following:
  - END TRANSACTION statement.
  - ABORT or ROLLBACK statement.
- Commit or roll back the containing ANSI session mode transaction immediately after issuing the SET SESSION CHARACTERISTICS AS TRANSACTION ISOLATION LEVEL statement with one of the following:
  - COMMIT statement.
  - ABORT or ROLLBACK statement.

## Related Topics

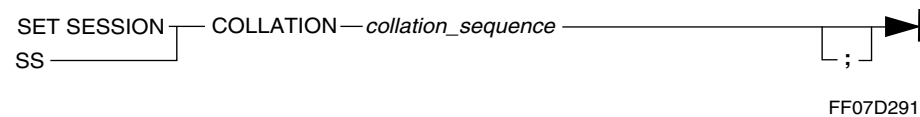
See the description of transaction isolation levels in *SQL Request and Transaction Processing* for further information about transaction isolation.

# SET SESSION COLLATION

## Purpose

Changes the collation sequence for the current session.

## Syntax



where:

| Syntax Element ...                       | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                          |                                                                                  |       |       |        |        |               |                                                      |              |                                                            |          |                                                                                      |      |                                                                                                                     |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|----------------------------------------------------------------------------------|-------|-------|--------|--------|---------------|------------------------------------------------------|--------------|------------------------------------------------------------|----------|--------------------------------------------------------------------------------------|------|---------------------------------------------------------------------------------------------------------------------|
| collation_sequence                       | the name of the collation sequence to be established for the session. <table><tr><th>This collation sequence name keyword ...</th><th>Specifies that comparison and sort operations are to use this collation type ...</th></tr><tr><td>ASCII</td><td>ASCII</td></tr><tr><td>EBCDIC</td><td>EBCDIC</td></tr><tr><td>MULTINATIONAL</td><td>European (diacritical) character or Kanji character.</td></tr><tr><td>CHARSET_COLL</td><td>binary ordering based on the current client character set.</td></tr><tr><td>JIS_COLL</td><td>logical ordering of characters based on the Japanese Industrial Standards collation.</td></tr><tr><td>HOST</td><td>EBCDIC for IBM channel-attached clients.<br/>ASCII for all other clients.<br/>This is the default collation sequence.</td></tr></table> | This collation sequence name keyword ... | Specifies that comparison and sort operations are to use this collation type ... | ASCII | ASCII | EBCDIC | EBCDIC | MULTINATIONAL | European (diacritical) character or Kanji character. | CHARSET_COLL | binary ordering based on the current client character set. | JIS_COLL | logical ordering of characters based on the Japanese Industrial Standards collation. | HOST | EBCDIC for IBM channel-attached clients.<br>ASCII for all other clients.<br>This is the default collation sequence. |
| This collation sequence name keyword ... | Specifies that comparison and sort operations are to use this collation type ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                          |                                                                                  |       |       |        |        |               |                                                      |              |                                                            |          |                                                                                      |      |                                                                                                                     |
| ASCII                                    | ASCII                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                          |                                                                                  |       |       |        |        |               |                                                      |              |                                                            |          |                                                                                      |      |                                                                                                                     |
| EBCDIC                                   | EBCDIC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                          |                                                                                  |       |       |        |        |               |                                                      |              |                                                            |          |                                                                                      |      |                                                                                                                     |
| MULTINATIONAL                            | European (diacritical) character or Kanji character.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                          |                                                                                  |       |       |        |        |               |                                                      |              |                                                            |          |                                                                                      |      |                                                                                                                     |
| CHARSET_COLL                             | binary ordering based on the current client character set.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                          |                                                                                  |       |       |        |        |               |                                                      |              |                                                            |          |                                                                                      |      |                                                                                                                     |
| JIS_COLL                                 | logical ordering of characters based on the Japanese Industrial Standards collation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                          |                                                                                  |       |       |        |        |               |                                                      |              |                                                            |          |                                                                                      |      |                                                                                                                     |
| HOST                                     | EBCDIC for IBM channel-attached clients.<br>ASCII for all other clients.<br>This is the default collation sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                          |                                                                                  |       |       |        |        |               |                                                      |              |                                                            |          |                                                                                      |      |                                                                                                                     |

## ANSI Compliance

SET SESSION COLLATION is a Teradata extension to the ANSI-2008 SQL standard.

## Example 1

A session can be set to ASCII collation as follows:

```
SET SESSION COLLATION ASCII;
```

## Example 2

Assuming that *JobRept* contains alphanumeric data, a SELECT that requests a sorted return, as follows:

```
SELECT EmpNo, JobId
FROM JobRept
ORDER BY JobId;
```

This request produces the following report, sorting *JobId* in ascending order:

| EmpNo | JobId    |
|-------|----------|
| ----- | -----    |
| 10201 | 1001-AP2 |
| 10201 | 1032-AR3 |
| 10201 | 1031-AR2 |
| 10004 | ENG-0002 |
| 10016 | ENG-0002 |
| 10004 | ENG-0003 |
| 10003 | OE1-0001 |
| 10001 | PAY-0002 |

## Example 3

If the same session from “[Example 2](#)” on page 671 is then set to EBCDIC collation as follows:

```
SET SESSION COLLATION EBCDIC;
```

The same SQL request produces the following report, sorting *JobId* in the ascending order defined for EBCDIC:

| EmpNo | JobId    |
|-------|----------|
| ----- | -----    |
| 10004 | ENG-000  |
| 10016 | ENG-0002 |
| 10004 | ENG-0003 |
| 10003 | OE1-0001 |
| 10001 | PAY-0002 |
| 10201 | 1001-AP2 |
| 10201 | 1032-AR3 |
| 10201 | 1031-AR2 |

Example 4

If the descending option is specified for the query in “Example 3” on page 671 in place of the default sort direction, which is ascending, the following report is produced, sorting *JobId* in descending EBCDIC order:

```
SELECT EmpNo, JobId
FROM JobRept
ORDER BY JobId DESC;
```

| EmpNo | JobId    |
|-------|----------|
| ----- | -----    |
| 10201 | 1031-AR2 |
| 10201 | 1032-AR3 |
| 10201 | 1001-AP2 |
| 10001 | PAY-0002 |
| 10003 | OE1-0001 |
| 10004 | ENG-0003 |
| 10004 | ENG-0002 |
| 10016 | ENG-0002 |

Related Topics

For more information about character collation, see *International Character Set Support*.

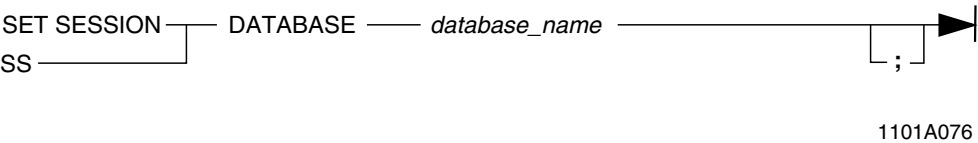


# SET SESSION DATABASE

## Purpose

Changes the default database for the session.

## Syntax



where:

| Syntax Element ...   | Sets the default DATE format for the session to ...   |
|----------------------|-------------------------------------------------------|
| <i>database_name</i> | the name of the new default database for the session. |

## ANSI Compliance

SET SESSION DATABASE is a Teradata extension to the ANSI-2008 SQL standard.

## Example

Assume your default database is *personnel*. The following example shows how to change the default database to *accounting* for the current session:

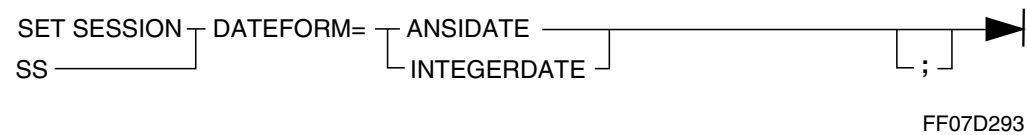
```
SET SESSION DATABASE accounting;
```

# SET SESSION DATEFORM

## Purpose

Changes the default DATE format in field mode, and the default format for importing and exporting DATE values for the session.

## Syntax



where:

| Syntax Element ... | Sets the default DATE format for the session to ...                                                                                                                                                                                                                                                                                                                     |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ANSIDATE           | CHARACTER(10) formatted as 'YYYY-MM-DD' for importing and exporting DATE values.<br><br>ANSIDATE results in a 'YYYY-MM-DD' date format for date columns created and for date constants in character form.                                                                                                                                                               |
| INTEGERDATE        | encoded integers for importing and exporting DATE values.<br><br>When the session DATEFORM is INTEGERDATE, the default DATE format in field mode is 'YY/MM/DD' for date columns created and date constants in character form.<br><br>You can use the <code>tdlocaledef</code> utility to change the 'YY/MM/DD' default DATE format. For details, see <i>Utilities</i> . |

## ANSI Compliance

SET SESSION DATEFORM is a Teradata extension to the ANSI-2008 SQL standard.

## Example 1

You need to change the DATEFORM setting for the current session from ANSI session mode to Teradata session mode so you can run a legacy application that does not support ANSI dates. To do this, you can run the following SET SESSION DATEFORM statement:

```
SET SESSION DATEFORM = INTEGERDATE;
```

## Example 2

After you finish running the job in [“Example 1” on page 675](#), you need to change the DATEFORM setting back to ANSIDATE. To do this, you can run the following SET SESSION DATEFORM statement:

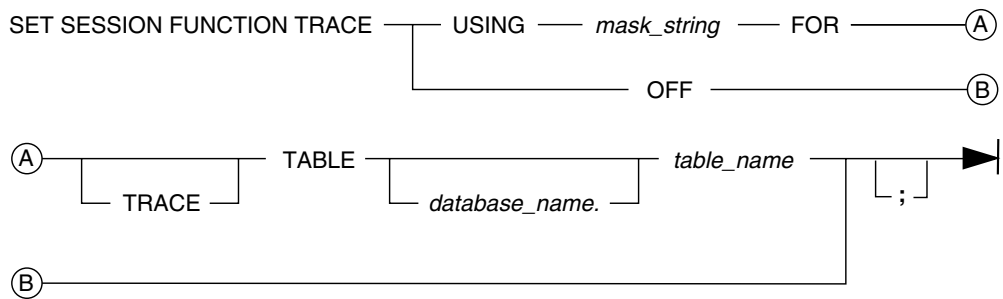
```
SET SESSION DATEFORM = ANSIDATE;
```

# SET SESSION FUNCTION TRACE

## Purpose

Enables function trace output for debugging user-defined functions and external stored procedures.

## Syntax



1101A099

where:

| Syntax element ...                      | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| USING                                   | that output tracing is enabled for all user-defined functions or external stored procedures the current user performs in subsequent DML statements in the current session.<br><br>The UDF trace output is written to the materialized global temporary trace table defined by <i>table_name</i> .                                                                                                                                                                                                                                                                                      |
| <i>mask_string</i>                      | an arbitrary character string to be interpreted by any UDF performed in the current session.<br><br>The string is limited to 256 characters in the character set defined for the user. UDFs convert this string to the default character data type in effect when the function was created, not the default character data type defined for the user for the session.<br><br>If you specify OFF, the option to output anything for a function is turned off. See <a href="#">“CREATE USER” on page 524</a> for more information about defining default character data types for users. |
| TRACE                                   | a noise keyword that can be useful to clarify that the referenced table is a global temporary trace table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <i>database_name</i>   <i>user_name</i> | the name of the containing database or user for <i>table_name</i> .<br><br>The database name is only required when the table is contained in a database other than the current default database for the session.                                                                                                                                                                                                                                                                                                                                                                       |

| Syntax element ... | Specifies ...                                                                                                                                                                                                                                                                                                                   |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>table_name</i>  | the name of a global temporary trace table into which function trace data is to be written.<br><br>See the SET SESSION FUNCTION TRACE “Function Trace Output Table” topic in <i>SQL Data Definition Language Detailed Topics</i> and <a href="#">“CREATE GLOBAL TEMPORARY TRACE TABLE” on page 186</a> for further information. |
| OFF                | that currently active UDF tracing should disabled for the current user in the current session.                                                                                                                                                                                                                                  |

## ANSI Compliance

SET SESSION FUNCTION TRACE is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

None.

## Example

The following example enables function trace processing for the current session, writing the trace data into the global temporary trace table named *UDF\_Diagnostics*:

```
SET SESSION FUNCTION TRACE USING 'Diag,3'
FOR TABLE UDF_Diagnostics;
```

## Related Topics

See the following statements for more information about user-defined functions and using global temporary tables to capture trace information:

- [“ALTER FUNCTION” on page 16](#)
- [“CREATE FUNCTION/ REPLACE FUNCTION” on page 138](#)
- [“CREATE GLOBAL TEMPORARY TRACE TABLE” on page 186](#)
- [“CREATE PROCEDURE \(External Form\)/ REPLACE PROCEDURE \(External Form\)” on page 276](#)
- [“DROP FUNCTION” on page 562](#)

Also see the following UDF-related statements:

- [“HELP FUNCTION” on page 715](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)

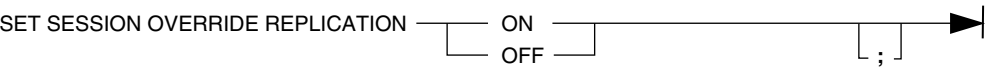
For more information about best practices for coding UDFs and external stored procedures, see *SQL External Routine Programming*.

# SET SESSION OVERRIDE REPLICATION

## Purpose

Overrides the normal replication services controls for the current session or reestablishes them after they have been overridden.

## Syntax



1101A238

where:

| Syntax element ... | Specifies that the ...                                                                                                                                                                           |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ON                 | normal replication services controls are to be overridden for the duration of the current session or until you submit a successful SET SESSION OVERRIDE REPLICATION OFF statement to the system. |
| OFF                | override of normal replication services is to be turned off for the current session.                                                                                                             |

## ANSI Compliance

SET SESSION OVERRIDE REPLICATION is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have the REPLCONTROL privilege to override the existing replication controls for the session.

## Example 1: Setting Override On for the Current Session

The following example sets override on for the current session:

```
SET SESSION OVERRIDE REPLICATION ON;
```

## Example 2: Setting Override Off for the Current Session

The following example sets override off for the current session:

```
SET SESSION OVERRIDE REPLICATION OFF;
```

## Related Topics

See the following resources for further information about replication services:

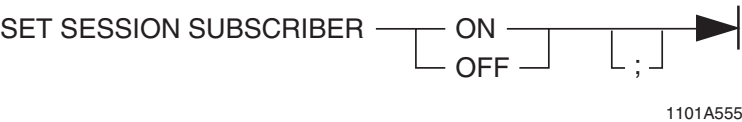
- [“ALTER REPLICATION GROUP” on page 30](#)
- [“CREATE REPLICATION GROUP” on page 371](#)
- [“DROP REPLICATION GROUP” on page 580](#)
- [“HELP REPLICATION GROUP” on page 740](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)
- *Teradata Replication Solutions*

# SET SESSION SUBSCRIBER

## Purpose

Overrides the normal behavior of several SQL actions in the current session for replication purposes.

## Syntax



where:

| Syntax element ... | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OFF                | to disable the suppression of the normal SQL actions activated by a SET SESSION SUBSCRIBER ON request.                                                                                                                                                                                                                                                                                                      |
| ON                 | <div>to suppress the normal behavior of the following SQL actions:</div> <ul style="list-style-type: none"><li>Triggered actions invoked by SQL requests in the current session.</li><li>Automatic generation of values for identity columns created with the GENERATED ALWAYS attribute.</li></ul> <div>This permits the values for all identity columns to be overridden with user-supplied values.</div> |

## ANSI Compliance

SET SESSION SUBSCRIBER is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have the REPLCONTROL privilege to override the subscriber session attribute.

## Privileges Granted Automatically

None.



### Example 1

The following request sets SUBSCRIBER overrides on for the session.

```
SET SESSION SUBSCRIBER ON;
```

### Example 2

The following request disables SUBSCRIBER overrides that had previously been set for the session.

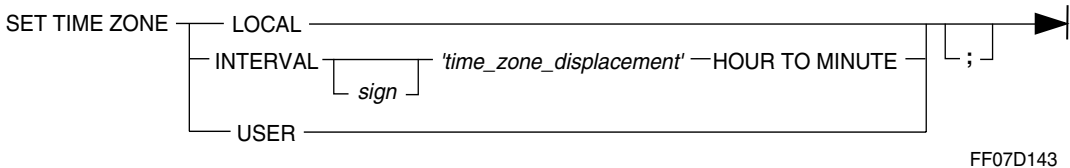
```
SET SESSION SUBSCRIBER OFF;
```

# SET TIME ZONE

## Purpose

Changes the default time zone displacement value for a session.

## Syntax



where:

| Syntax Element ...              | Specifies ...                                                                                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LOCAL                           | to change the time zone offset for the session to the system default.                                                                                                                                                                      |
| INTERVAL HOUR TO MINUTE         | to change the time zone offset (based on the 24-hour UTC clock) for the session to an explicit (and optionally signed) time value. The value of the offset is defined by <i>time_zone_displacement</i> .                                   |
| <i>sign</i>                     | a negative time displacement, represented by a MINUS (-) character.<br>The default sign for the quotestring is positive.                                                                                                                   |
| <i>'time_zone_displacement'</i> | the time zone interval offset required to convert the local or system-defined time to UTC (Coordinated Universal Time).<br>The format is hh:mm.                                                                                            |
| USER                            | change the time zone offset for the session back to the defined user default from whatever it had been changed to.<br><br>If no default is defined for the user, then the value for the time zone offset is changed to the system default. |

## ANSI Compliance

SET TIME ZONE is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

None.

## CHAPTER 9 SQL HELP and SHOW Statements

---

Teradata Database SQL provides several powerful statements for system administrators, database and security administrators, and application programmers.

These statements fall into three categories:

- Help about database object definitions
- Help about SQL statement and utility command syntax
- Summaries of database object definition statement text

This chapter documents the syntax for, and provides examples of, the HELP and SHOW DDL statements:

Information about how to optimize the performance of your database from a database design perspective can be found in the following manuals:

- *Database Design*
- *Performance Management*

Experienced SQL users can also see simplified HELP and SHOW statement descriptions in *SQL Quick Reference*.

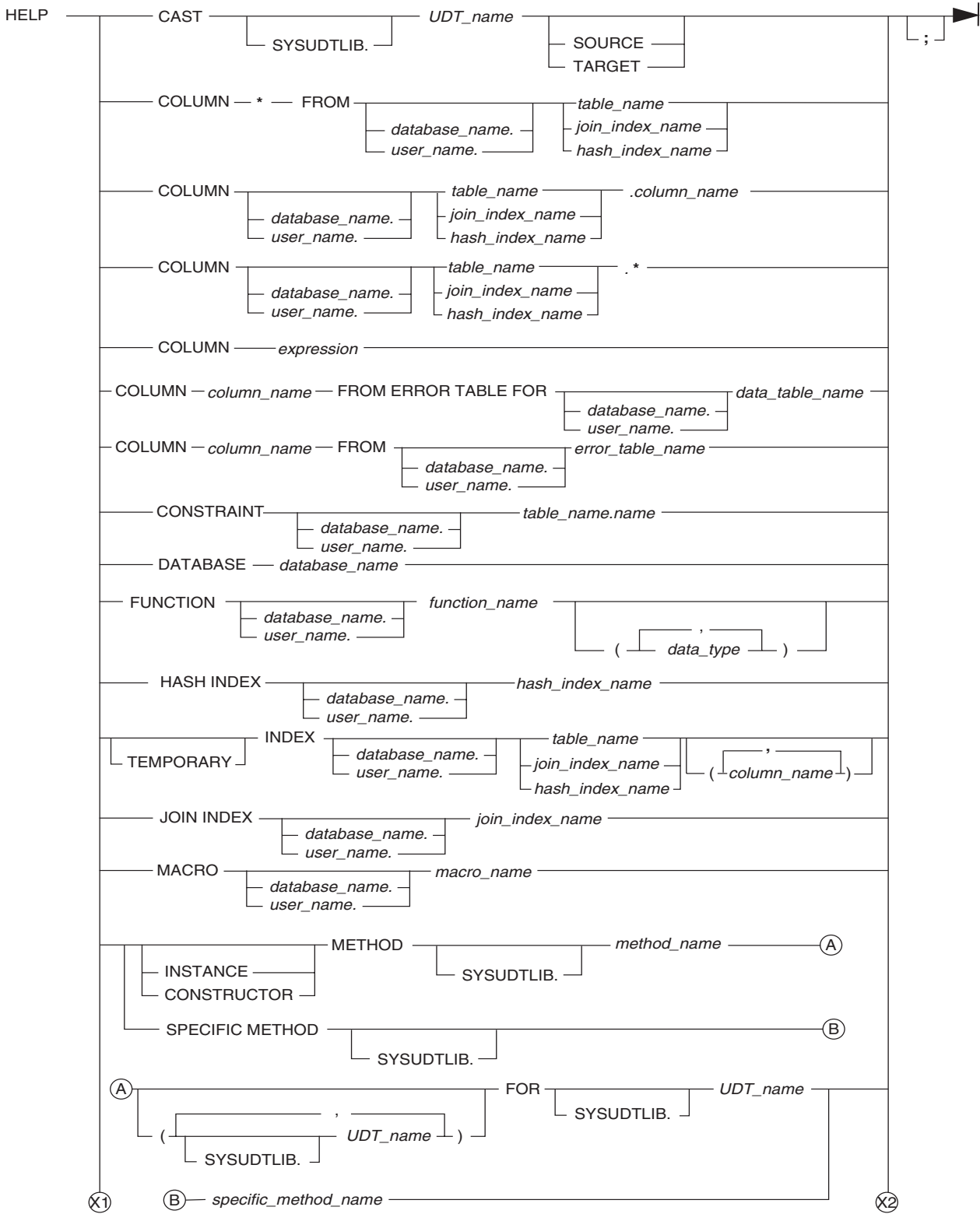
# HELP

## Purpose

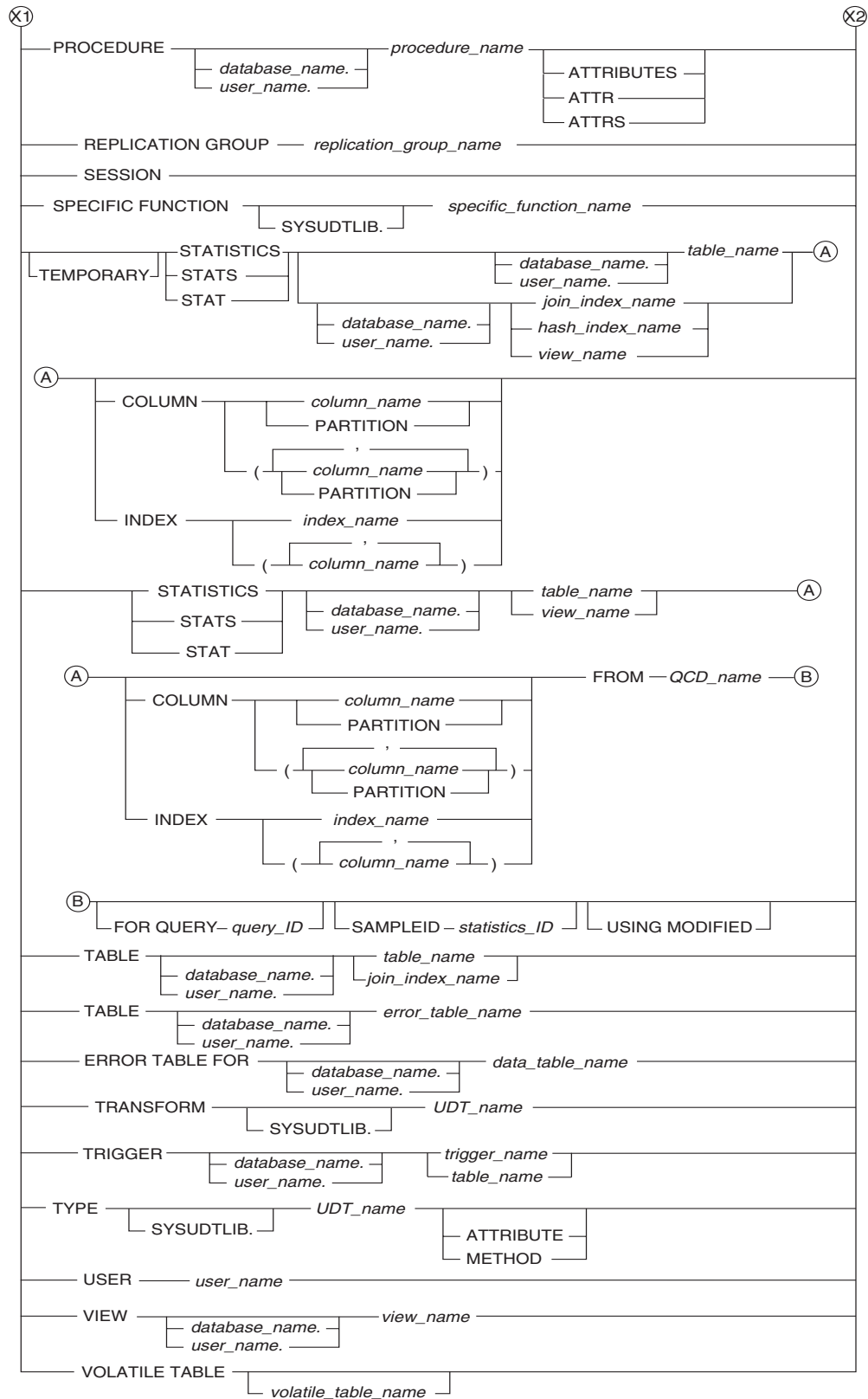
Reports information from the data dictionary, including data about the following items:

- The specified user-defined function, database, user, table, volatile table, error table, view, macro, stored procedure, constraint, cast, method, replication group, session, transform, trigger, hash index, join index, or secondary index.
- All or specified columns of a table or view.
- Any statistics collected for the specified table, hash index, or join index.
- The attributes of the current session.
- Attribute and format details for each parameter of a stored procedure.

Syntax



1101C387



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where:

| Syntax Element...                       | Specifies ...                                                                                                                                                    |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SYSUDTLIB                               | the name of the containing database for <i>UDT_name</i> .                                                                                                        |
| SOURCE                                  | to report all cast operations that have the specified data type as their source data type.<br>If you specify neither SOURCE nor TARGET, then both are reported.  |
| TARGET                                  | to report all cast operations that have the specified data type as their target data type.<br>If you specify neither SOURCE nor TARGET, then both are reported.  |
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>table_name</i> , <i>join_index_name</i> , or <i>hash_index_name</i> if something other than the current database or user. |
| <i>table_name</i>                       | the name of the table for which help is requested.                                                                                                               |
| <i>join_index_name</i>                  | the name of the join index for which help is requested.                                                                                                          |
| <i>hash_index_name</i>                  | the name of the hash index for which help is requested.                                                                                                          |
| <i>table_name.name</i>                  | a fully qualified constraint name.                                                                                                                               |
| <i>column_name</i>                      | the name of the column for which help is requested.                                                                                                              |
| *                                       | that help is needed for all columns in a table.                                                                                                                  |
| <i>expression</i>                       | an expression for which the data type is requested.                                                                                                              |
| <i>data_table_name</i>                  | the name of the data table associated with the error table for which help information is requested.                                                              |
| <i>error_table_name</i>                 | the name of the error table for which help information is requested.                                                                                             |
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>table_name.name</i> if something other than the current database or user.                                                 |
| <i>table_name.name</i>                  | the qualified column name for which constraint help information is requested.                                                                                    |
| <i>database_name</i>                    | the name of the database for which help information is requested.                                                                                                |
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>function_name</i> if something other than the current database or user.                                                   |
| <i>function_name</i>                    | the name of the user-defined function for which help information is requested.                                                                                   |
| <i>data_type</i>                        | the data type parameter set that uniquely identify an overloaded function name.                                                                                  |
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>hash_index_name</i> if something other than the current database or user.                                                 |
| <i>hash_index_name</i>                  | the name of the hash index for which help information is requested.                                                                                              |

| Syntax Element...                                | Specifies ...                                                                                                                                                                                |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TEMPORARY                                        | that the index for which help is needed is defined on a global temporary table.                                                                                                              |
| <i>database_name</i>   <i>user_name</i>          | the containing database or user for <i>table_name</i> , <i>join_index_name</i> , or <i>hash_index_name</i> if something other than the current database or user.                             |
| <i>table_name</i>                                | the name of the table on which a report of all primary and secondary indexes is requested.                                                                                                   |
| <i>join_index_name</i>                           | the name of the join index on which a report of all primary and secondary indexes is requested.                                                                                              |
| <i>hash_index_name</i>                           | the name of the hash index on which a report of all primary indexes is requested.                                                                                                            |
| <i>column_name</i>                               | a column for which an index or index list is desired.<br>Use this syntax to exclude primary, secondary, join, and hash indexes defined on columns for which you are not interested.          |
| <i>database_name</i>   <i>user_name</i>          | the containing database or user for <i>join_index_name</i> if something other than the current database or user.                                                                             |
| <i>join_index_name</i>                           | the name of a join index for which help information is requested.                                                                                                                            |
| <i>database_name</i>   <i>user_name</i>          | the containing database or user for <i>macro_name</i> if something other than the current database or user.                                                                                  |
| <i>macro_name</i>                                | the name of the macro for which help information is requested.                                                                                                                               |
| INSTANCE                                         | to return parameter information for the instance method named <i>method_name</i> .<br>If you do not specify INSTANCE or CONSTRUCTOR, then INSTANCE is assumed by default.                    |
| CONSTRUCTOR                                      | to return parameter information for the constructor method named <i>method_name</i> .<br>If you do not specify INSTANCE or CONSTRUCTOR, then INSTANCE is assumed by default.                 |
| SYSUDTLIB                                        | the containing database for <i>method_name</i> .                                                                                                                                             |
| <i>method_name</i>                               | the name of the method for which help is requested.                                                                                                                                          |
| SYSUDTLIB                                        | the containing database for <i>UDT_name</i> .                                                                                                                                                |
| <i>UDT_name</i><br><i>user_defined_type_name</i> | the name of the UDT with which the specified method is associated.<br>Note that you do not specify a FOR <i>UDT_name</i> clause for a method if you have identified it by its SPECIFIC name. |
| SYSUDTLIB                                        | the containing database for <i>specific_method_name</i> .                                                                                                                                    |
| <i>specific_method_name</i>                      | the name of the specific method for which help is requested.                                                                                                                                 |
| <i>database_name</i>   <i>user_name</i>          | the containing database or user for <i>index_name</i> if something other than the current database or user.                                                                                  |



| Syntax Element...                       | Specifies ...                                                                                                                                                                                                              |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>procedure_name</i> if something other than the current database or user.                                                                                                            |
| <i>procedure_name</i>                   | the name of the stored procedure for which help information is requested.                                                                                                                                                  |
| ATTRIBUTES                              | a keyword indicating that the stored procedure creation-time attributes from the column SPObjCodeRows in <i>DBC.TVM</i> are to be displayed rather than the attribute and format information for the procedure parameters. |
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>replication_group_name</i> if something other than the current database or user.                                                                                                    |
| <i>replication_group_name</i>           | the name of the replication group for which help information is requested.                                                                                                                                                 |
| SESSION                                 | that help information is requested for the current session.                                                                                                                                                                |
| UDTLIB.                                 | the containing database for <i>specific_function_name</i> .                                                                                                                                                                |
| <i>specific_function_name</i>           | the specific name of the user-defined function for which help information is requested.                                                                                                                                    |
| TEMPORARY                               | the optimizer statistics help information is requested for a global temporary table.                                                                                                                                       |
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>table_name</i> if something other than the current database or user.                                                                                                                |
| <i>table_name</i>                       | the name of the table for which optimizer statistics help information is requested.                                                                                                                                        |
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>join_index_name</i> if something other than the current database or user.                                                                                                           |
| <i>join_index_name</i>                  | the name of the join index for which optimizer statistics help information is requested.                                                                                                                                   |
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>hash_index_name</i> if something other than the current database or user.                                                                                                           |
| <i>hash_index_name</i>                  | the name of the hash index for which optimizer statistics help information is requested.                                                                                                                                   |
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>view_name</i> if something other than the current database or user.                                                                                                                 |
| <i>view_name</i>                        | the name of the view for which optimizer statistics help information is requested.                                                                                                                                         |
| COLUMN<br><i>column_expression</i>      | a column expression on which optimizer statistics have been collected.                                                                                                                                                     |
| COLUMN PARTITION                        | optimizer statistics help information is requested for a PARTITION column from <i>table_name</i> or <i>join_index_name</i> .<br>Hash indexes and views cannot have partitioned primary indexes.                            |

| Syntax Element...                       | Specifies ...                                                                                                                         |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| INDEX <i>index_name</i>                 | the name of the index for which optimizer statistics help information is requested.                                                   |
| INDEX <i>column_name</i>                | the name of an indexed column for which optimizer statistics help information is requested.                                           |
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>table_name</i> or <i>view_name</i> if something other than the current database or user.       |
| <i>table_name</i>                       | the name of the table for which QCD statistics information is requested.                                                              |
| <i>view_name</i>                        | the name of the view for which QCD statistics information is requested.                                                               |
| COLUMN <i>column_expression</i>         | a column expression on which QCD statistics have been collected.                                                                      |
| COLUMN PARTITION                        | QCD statistics help information is requested for a PARTITION column from <i>table_name</i> or <i>view_name</i> .                      |
| INDEX <i>index_name</i>                 | the name of the index for which QCD statistics help information is requested.                                                         |
| INDEX <i>column_name</i>                | the name of an indexed column for which QCD statistics help information is requested.                                                 |
| <i>QCD_name</i>                         | the name of the QCD database or user containing the <i>TableStatistics</i> table from which statistics are to be retrieved.           |
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>table_name</i> or <i>join_index_name</i> if something other than the current database or user. |
| <i>table_name</i>                       | the name of the table for which help information is requested.                                                                        |
| <i>join_index_name</i>                  | the name of the join index for which help information is requested.                                                                   |
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>data_table_name</i> if something other than the current database or user.                      |
| <i>data_table_name</i>                  | the name of the data table associated with the error table for which help information is requested.                                   |
| SYSUDTLIB                               | the containing database for <i>UDT_name</i> .                                                                                         |
| <i>UDT_name</i>                         | the name of the user-defined data type for which transform help information is requested.                                             |
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>trigger_name</i> if something other than the current database or user.                         |
| <i>trigger_name</i>                     | trigger for which help information is requested.                                                                                      |
| SYSUDTLIB                               | the containing database for <i>UDT_name</i> .                                                                                         |
| <i>UDT_name</i>                         | the name of the user-defined data type for which type help information is requested.                                                  |

| Syntax Element...                       | Specifies ...                                                                                                                                                                                                                                                                                                                                                               |                             |                                    |          |                                                         |            |                                        |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------------------------------|----------|---------------------------------------------------------|------------|----------------------------------------|
| ATTRIBUTE                               | that the composition of the specified UDT is the help information requested. <table border="1"> <tr> <th>IF the UDT is this type ...</th><th>THEN Teradata Database returns ...</th></tr> <tr> <td>distinct</td><td>one row that describes the predefined source data type.</td></tr> <tr> <td>structured</td><td>one row for each attribute of the UDT.</td></tr> </table> | IF the UDT is this type ... | THEN Teradata Database returns ... | distinct | one row that describes the predefined source data type. | structured | one row for each attribute of the UDT. |
| IF the UDT is this type ...             | THEN Teradata Database returns ...                                                                                                                                                                                                                                                                                                                                          |                             |                                    |          |                                                         |            |                                        |
| distinct                                | one row that describes the predefined source data type.                                                                                                                                                                                                                                                                                                                     |                             |                                    |          |                                                         |            |                                        |
| structured                              | one row for each attribute of the UDT.                                                                                                                                                                                                                                                                                                                                      |                             |                                    |          |                                                         |            |                                        |
| METHOD                                  | that a report of the methods associated with <i>UDT_type</i> is requested.<br>One row is returned for each method associated with the UDT, including one row for each system-generated observer or mutator method.                                                                                                                                                          |                             |                                    |          |                                                         |            |                                        |
| <i>user_name</i>                        | the name of the user for which help information is requested.                                                                                                                                                                                                                                                                                                               |                             |                                    |          |                                                         |            |                                        |
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>view_name</i> if something other than the current database or user.                                                                                                                                                                                                                                                                  |                             |                                    |          |                                                         |            |                                        |
| <i>view_name</i>                        | the name of the view for which help information is requested.                                                                                                                                                                                                                                                                                                               |                             |                                    |          |                                                         |            |                                        |
| <i>volatile_table_name</i>              | the name of the volatile table for which help information is requested.<br>If you do not specify the name of a volatile table, the systems returns a list of all volatile tables in the current session.                                                                                                                                                                    |                             |                                    |          |                                                         |            |                                        |

## ANSI Compliance

The following HELP statements are all Teradata extensions to the ANSI SQL:2008 standard.

- HELP CAST
- HELP COLUMN
- HELP CONSTRAINT
- HELP DATABASE
- HELP ERROR TABLE
- HELP FUNCTION
- HELP HASH INDEX
- HELP INDEX
- HELP JOIN INDEX
- HELP MACRO
- HELP METHOD
- HELP PROCEDURE
- HELP REPLICATION GROUP
- HELP SESSION
- HELP STATISTICS (Optimizer Form)
- HELP STATISTICS (QCD Form)
- HELP TABLE
- HELP TRANSFORM
- HELP TRIGGER
- HELP TYPE
- HELP USER
- HELP VIEW
- HELP VOLATILE TABLE

## Required Privileges

Except for `HELP USER DBC`, the user requesting `HELP` information must either own the specified object or have any privilege on that object. `HELP USER DBC` does not require any privileges on user `DBC`.

Use the `SHOW` privilege to enable a user to perform `HELP` or `SHOW` requests *only* against a database object or database.

## Related Topics

See [“HELP \(Online Form\)” on page 789](#) for information about obtaining online help for SQL statements and client utility command syntax.

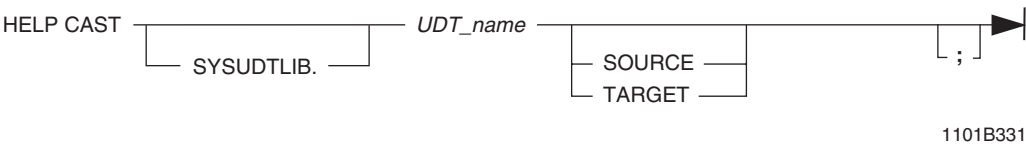
Also see [“SHOW” on page 791](#) and [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#) for information about how to display the current DDL definitions for the objects referenced by a specified DML statement or just to view the current DDL create text for a given object.

# HELP CAST

## Purpose

Returns the available cast operations for the specified UDT.

## Syntax



where:

| Syntax element ... | Specifies ...                                                                                                                                                   |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SYSUDTLIB          | the containing database for <i>UDT_name</i> .                                                                                                                   |
| <i>UDT_name</i>    | the name of the UDT for which information about casts is requested.                                                                                             |
| SOURCE             | to report all cast operations that have the specified data type as their source data type.<br>If you specify neither SOURCE nor TARGET, then both are reported. |
| TARGET             | to report all cast operations that have the specified data type as their target data type.<br>If you specify neither SOURCE nor TARGET, then both are reported. |

## ANSI Compliance

HELP CAST is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have at least one privilege on the *SYSUDTLIB* database to perform HELP CAST.

Use the SHOW privilege to enable a user to perform HELP or SHOW requests *only* against *SYSUDTLIB*.

## Example 1: Source Castings Only

The following example reports the source castings for the UDT named *euro*:

```
HELP CAST SYSUDTLIB.euro SOURCE;
```

| Source | Target        | Cast Routine | As Assignment |
|--------|---------------|--------------|---------------|
| euro   | DECIMAL(10,2) | System       | YES           |
| euro   | us_dollar     | EurotoUS     | NO            |

## Example 2: Target Castings Only

The following example reports the target castings for the UDT named *euro*:

```
HELP CAST SYSUDTLIB.euro TARGET;
```

| Source        | Target | Cast Routine | As Assignment |
|---------------|--------|--------------|---------------|
| DECIMAL(10,2) | euro   | System       | YES           |
| us_dollar     | euro   | UstoEuro     | YES           |

## Example 3: All Castings For A UDT That Has A Single Casting Pair

The following example reports both the source and target castings for the UDT named *address*:

```
HELP CAST address;
```

| Source      | Target      | Cast Routine   | As Assignment |
|-------------|-------------|----------------|---------------|
| address     | VARCHAR(80) | address_2_char | YES           |
| VARCHAR(80) | address     | char_2_address | YES           |

Note the following things about this report:

- The castings from *address* to VARCHAR(80) and from VARCHAR(80) to *address* are complementary to one another.
- Both casting routines are user-defined, which you can tell because neither is named *System*.
- This UDT has only one casting pair defined for it, neither of which is named *System*, which suggests that it is probably a structured type.<sup>1</sup>

1. Castings for structured types are never system-generated, while the system always generates default casts for distinct types. Because it is also possible to drop the system-generated casts for a distinct UDT and replace them with user-defined casts, the inference that the casting reported in this example is for a structured UDT cannot be made with certainty. See [“CREATE CAST/ REPLACE CAST” on page 125](#).

### Example 4: All Castings For A UDT That Has Multiple Casting Pairs

The following example extends “[Example 3: All Castings For A UDT That Has A Single Casting Pair](#)” on page 694 to show what the output of running `HELP CAST euro` (see “[Example 1: Source Castings Only](#)” on page 694 and “[Example 2: Target Castings Only](#)” on page 694) with no options:

```
HELP CAST euro;
```

| Source        | Target        | Cast Routine | As Assignment |
|---------------|---------------|--------------|---------------|
| euro          | DECIMAL(10,2) | System       | YES           |
| DECIMAL(10,2) | euro          | System       | YES           |
| us_dollar     | euro          | UstoEuro     | YES           |
| euro          | us_dollar     | EurotoUS     | NO            |

Note the following things about this report:

- Because this UDT has two casting pairs (`euro:DECIMAL` and `euro:us_dollar`), there are four rows in the report.
- The `euro:DECIMAL` casting pair was system-generated (which you can tell because its cast routine in both cases is named *System*), while the `euro:us_dollar` casting pair was user-defined.
- There is no implicit casting for the *euro-to-us\_dollar* cast because it was not defined with the `AS ASSIGNMENT` option.

### Related Topics

See the documentation for the following statements and manuals for additional information about creating castings for UDTs.

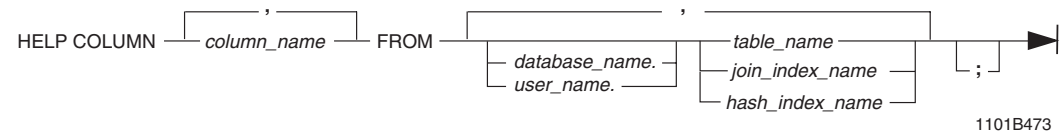
- “[CREATE CAST/ REPLACE CAST](#)” on page 125
- “[SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW](#)” on page 796
- *SQL External Routine Programming*

# HELP COLUMN

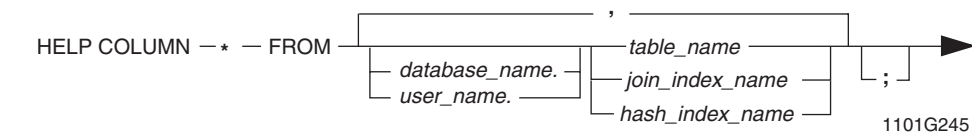
## Purpose

Displays the attributes of a column, including whether it is a single-column primary or secondary index and, if so, whether it is unique.

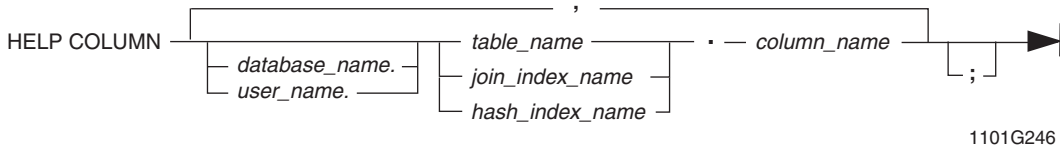
## Syntax 1



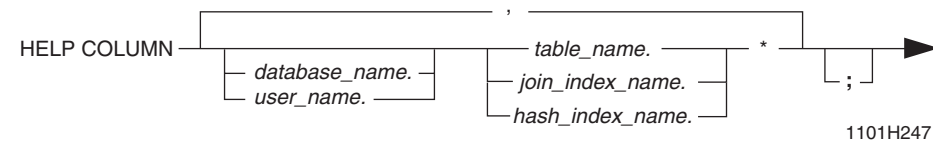
## Syntax 2



## Syntax 3

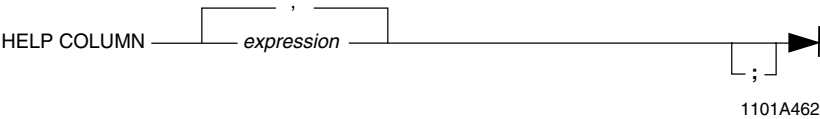


## Syntax 4

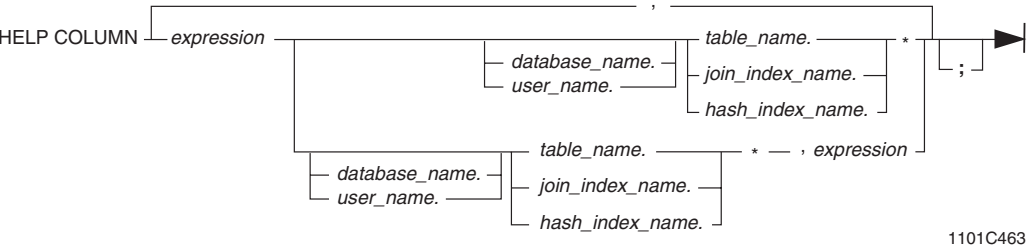




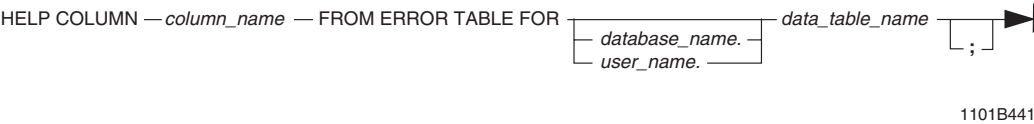
Syntax 5



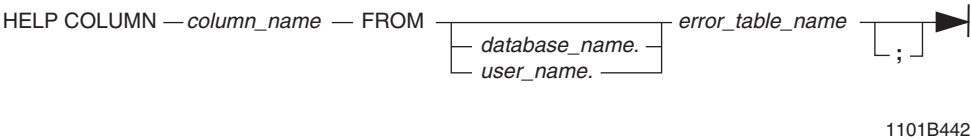
Syntax 6



Syntax 7



Syntax 8



where:

| Syntax Element ...                      | Specifies ...                                                                                                                                                                                                 |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>table_name</i> , <i>error_table_name</i> , <i>data_table_name</i> , <i>hash_index_name</i> , or <i>join_index_name</i> if different from the current database or user. |
| <i>column_name</i>                      | the name of the column for which attribute information is required.                                                                                                                                           |
| <i>table_name</i>                       | the name of the table for which attribute information is required.<br>You cannot request help for a journal table.                                                                                            |
| <i>join_index_name</i>                  | the name of the join index for which attribute information is required.                                                                                                                                       |

| Syntax Element ...      | Specifies ...                                                                                              |
|-------------------------|------------------------------------------------------------------------------------------------------------|
| <i>hash_index_name</i>  | the name of the hash index for which attribute information is required.                                    |
| <i>*</i>                | that attribute information for all the columns in the named table, join index, or hash index is requested. |
| <i>expression</i>       | an expression, either based on a column or not, for which the data type is required.                       |
| <i>data_table_name</i>  | the name of the data table to which the desired error table is attached.                                   |
| <i>error_table_name</i> | the name of the desired error table.                                                                       |

ANSI Compliance

HELP COLUMN is a Teradata extension to the ANSI SQL:2008 standard.

Required Privileges

You must either own the table, join index, or hash index in which the column is defined or have at least one privilege on that table.

Use the SHOW privilege to enable a user to perform HELP or SHOW requests *only* against a specified table, join index, or hash index.

Example 1

The following shows a sample output display for HELP COLUMN on the table defined by the preceding CREATE TABLE request.

```
CREATE TABLE table_1
  (field_1 INTEGER NOT NULL PRIMARY KEY,
   field_2 INTEGER CHECK (field_2>0) CHECK (field_2<100));

HELP COLUMN table_1.field_2;
```

|                           |        |
|---------------------------|--------|
| Column Name               | f2     |
| Type                      | I      |
| Nullable                  | Y      |
| Format                    | -(10)9 |
| Max Length                | 4      |
| Decimal Total Digits      | ?      |
| Decimal Fractional Digits | ?      |
| Range Low                 | ?      |
| Range High                | ?      |
| Uppercase                 | N      |
| Table/View?               | T      |
| Indexed?                  | N      |
| Unique?                   | N      |
| Primary?                  | N      |

```

      Title      ?
Column Constraint CHECK (( "f2">0) AND
      Char Type  ?
      IdCol Type ?
      UDT Name   ?
```

In BTEQ, a ? returned in the displayed report indicates a null.

**Example 2**

The following two statements return information about the attributes of the named column(s) in the named table or view.

```

HELP COLUMN column_name
FROM table_name;

HELP COLUMN table_name.column_name;
```

**Example 3**

The following two statements return attribute information for all the columns of the named table or view. All column attributes are returned except any default values and comments (for these, use HELP TABLE table\_name).

```

HELP COLUMN * FROM table_name;

HELP COLUMN table_name.*;
```

**Example 4**

The following statement requests information about particular columns in the Employee and Department tables (note that each column reference is fully qualified with its table name):

```

HELP COLUMN Employee.Name, Employee.DeptNo, Department.DeptNo
FROM Employee, Department;
```

The return from the preceding query lists each column in the order in which it was specified; therefore, the first DeptNo column listed is for the Employee table, the second is for the Department table:

| Column Name | Type | Nullable |
|-------------|------|----------|
| -----       | ---- | -----    |
| Name        | CV   | N        |
| DeptNo      | I2   | Y        |
| DeptNo      | I2   | N        |

## Example 5

Consider a KanjiEBCDIC user who creates a table using all five character data types. The table definition is as follows.

```
CREATE TABLE kanji_user.table_1,
NO FALLBACK,
NO BEFORE JOURNAL,
NO AFTER JOURNAL (
  clatin CHARACTER(5) CHARACTER SET LATIN,
  ckanjil CHARACTER(5) CHARACTER SET KANJI1,
  cgraphic CHARACTER(5) CHARACTER SET GRAPHIC,
  csjis CHARACTER(5) CHARACTER SET KANJISJIS,
  cunicode CHARACTER(5) CHARACTER SET UNICODE)
PRIMARY INDEX (clatin);
```

You submit the following HELP COLUMN statement using BTEQ with the SIDETITLES and FOLDLINE formatting options specified.

```
HELP COLUMN table_1.*;
```

The output, abbreviated to illustrate some relevant columns only, looks like the following:

|                   |          |
|-------------------|----------|
| Column Name       | clatin   |
| Type              | CF       |
| Format            | X(5)     |
| Max Length        | 5        |
| Title             | ?        |
| Column Constraint | ?        |
| Char Type         | 1        |
| IdCol Type        | ?        |
| Column Name       | ckanjil  |
| Type              | CF       |
| Format            | X(5)     |
| Max Length        | 5        |
| Title             | ?        |
| Column Constraint | ?        |
| Char Type         | 5        |
| IdCol Type        | ?        |
| Column Name       | cgraphic |
| Format            | X(5)     |
| Type              | CF       |
| Max Length        | 10       |
| Title             | ?        |
| Column Constraint | ?        |
| Char Type         | 4        |
| IdCol Type        | ?        |
| Column Name       | csjis    |
| Format            | X(5)     |

|                   |          |
|-------------------|----------|
| Type              | CF       |
| Max Length        | 5        |
| Title             | ?        |
| Column Constraint | ?        |
| Char Type         | 3        |
| IdCol Type        | ?        |
| Column Name       | cunicode |
| Format            | X(5)     |
| Type              | CF       |
| Max Length        | 10       |
| Title             | ?        |
| Column Constraint | ?        |
| Char Type         | 2        |
| IdCol Type        | ?        |

**Example 6: HELP COLUMN On Noncolumn Expressions Only**

The following request executes HELP COLUMN on 3 expressions, but no actual columns. Note that no column names are returned in the report, though the data types, nullability, and output format are.

```
HELP COLUMN 1+10, 10.1+1, 'asdf' || 'asdl';
*** Help information returned. 3 rows.
*** Total elapsed time was 1 second.
```

| Column Name | Type | Nullable | Format |
|-------------|------|----------|--------|
|             | I    | Y        | -(10)9 |
|             | D    | Y        | -----9 |
|             | CV   | Y        | X(8)   |

**Example 7: HELP COLUMN On Multiple *table\_name.\** Expressions**

The following request executes HELP COLUMN on all columns of two separate tables.

```
HELP COLUMN d.*, transaction_detail.*;
*** Help information returned. 8 rows.
*** Total elapsed time was 1 second.
```

| Column Name            | Type | Nullable | Format |
|------------------------|------|----------|--------|
| transaction_header_key | I    | Y        | -(10)9 |
| vendor_key             | I    | Y        | -(10)9 |
| item_key               | I    | Y        | -(10)9 |
| stuff                  | CF   | Y        | X(300) |
| transaction_header_key | I    | Y        | -(10)9 |
| vendor_key             | I    | Y        | -(10)9 |
| item_key               | I    | Y        | -(10)9 |
| stuff                  | CF   | Y        | X(300) |

## Example 8: HELP COLUMN On a Mixture of Noncolumn Expressions and *table\_name.\** Expressions

The following request executes HELP COLUMN on an integer expression and all columns of the d table. Note that the report does not report a column name for the integer expression.

```
HELP COLUMN 1+1, d.*;
*** Help information returned. 5 rows.
*** Total elapsed time was 1 second.
```

| Column Name            | Type | Nullable | Format |
|------------------------|------|----------|--------|
| -----                  | ---- | -----    | -----  |
|                        | I    | Y        | -(10)9 |
| transaction_header_key | I    | Y        | -(10)9 |
| vendor_key             | I    | Y        | -(10)9 |
| item_key               | I    | Y        | -(10)9 |
| stuff                  | CF   | Y        | X(300) |

## Example 9: Partitioned Primary Index Table

This example uses the following table definition:

```
CREATE TABLE Orders (
  o_orderkey      INTEGER NOT NULL,
  o_custkey       INTEGER,
  o_orderstatus   CHARACTER(1) CASESPECIFIC,
  o_totalprice    DECIMAL(13,2) NOT NULL,
  o_orderdate     DATE FORMAT 'yyyy-mm-dd' NOT NULL,
  o_orderpriority CHARACTER(21),
  o_clerk         CHARACTER(16),
  o_shippriority  INTEGER,
  o_comment       VARCHAR(79))
PRIMARY INDEX orders_PI (o_orderkey)
PARTITION BY RANGE_N(o_orderdate BETWEEN DATE '1992-01-01'
                        AND         DATE '1998-12-31'
                        EACH INTERVAL '1' MONTH)

UNIQUE INDEX (o_orderkey)
INDEX (o_custkey)
INDEX (o_orderdate) ORDER BY VALUES
INDEX (o_orderdate)
INDEX (o_orderdate, o_custkey) ORDER BY VALUES(o_orderdate);
INDEX (o_orderdate, o_orderstatus);
```

HELP COLUMN generates the following report on this table. The BTEQ commands are included to show how the report format was derived. Attributes of particular interest for this example are highlighted in boldface.

```
BTEQ -- Enter your DBC/SQL request or BTEQ command:
.SIDETITLES
BTEQ -- Enter your DBC/SQL request or BTEQ command:
.FOLDLINE
BTEQ -- Enter your DBC/SQL request or BTEQ command:
HELP COLUMN * FROM orders;

*** Help information returned. 9 rows.
*** Total elapsed time was 1 second.
```

```

Column Name o_orderkey
    Type I
    Nullable N
    Format - (10) 9
    Max Length 4
    Decimal Total Digits ?
    Decimal Fractional Digits ?
    Range Low ?
    Range High ?
    UpperCase N
    Table/View? T
    Indexed? Y
    Unique? N
    Primary? P
    Title ?
    Column Constraint ?
    Char Type ?
    IdCol Type ?
    UDT Name ?

Column Name o_custkey
    Type I
    Nullable Y
    Format - (10) 9
    Max Length 4
    Decimal Total Digits ?
    Decimal Fractional Digits ?
    Range Low ?
    Range High ?
    UpperCase N
    Table/View? T
    Indexed? Y
    Unique? N
    Primary? S
    Title ?
    Column Constraint ?
    Char Type ?
    IdCol Type ?
    UDT Name ?

Column Name o_orderstatus
    Type CF
    Nullable Y
    Format X(1)
    Max Length 1
    Decimal Total Digits ?
    Decimal Fractional Digits ?

```

```

Range Low ?
Range High ?
UpperCase C
Table/View? T
Indexed? Na
Unique? ?
Primary? ?
Title ?
Column Constraint ?
Char Type 1
IdCol Type ?
UDT Name ?
Column Name o_totalprice
Type D
Nullable N
Format -----.99
Max Length 8
Decimal Total Digits 13
Decimal Fractional Digits 2
Range Low ?
Range High ?
UpperCase N
Table/View? T
Indexed? Nb
Unique? ?
Primary? ?
Title ?
Column Constraint ?
Char Type ?
IdCol Type ?
UDT Name ?
Column Name o_orderdate
Type DA
Nullable N
Format yyyy-mm-dd
Max Length 4
Decimal Total Digits ?
Decimal Fractional Digits ?
Range Low ?
Range High ?
UpperCase N
Table/View? T
Indexed? Y
Unique? N
Primary? S
Title ?

```



```

Column Constraint ?
    Char Type ?
    IdCol Type ?
    UDT Name ?
    Column Name o_orderpriority
    Type CF
    Nullable Y
    Format X(21)
    Max Length 21
    Decimal Total Digits ?
    Decimal Fractional Digits ?
    Range Low ?
    Range High ?
    UpperCase N
    Table/View? T
    Indexed? N
    Unique? ?
    Primary? ?
    Title ?
Column Constraint ?
    Char Type 1
    IdCol Type ?
    UDT Name ?
    Column Name o_clerk
    Type CF
    Nullable Y
    Format X(16)
    Max Length 16
    Decimal Total Digits ?
    Decimal Fractional Digits ?
    Range Low ?
    Range High ?
    UpperCase N
    Table/View? T
    Indexed? N
    Unique? ?
    Primary? ?
    Title ?
Column Constraint ?
    Char Type 1
    IdCol Type ?
    UDT Name ?
    Column Name o_shippriority
    Type I
    Nullable Y

```

```

        Format - (10) 9
        Max Length 4
        Decimal Total Digits ?
        Decimal Fractional Digits ?
        Range Low ?
        Range High ?
        UpperCase N
        Table/View? T
        Indexed? N
        Unique? ?
        Primary? ?
        Title ?
        Column Constraint ?
        Char Type ?
        IdCol Type ?
        UDT Name ?
        Column Name o_comment
        Type CV
        Nullable Y
        Format X(79)
        Max Length 79
        Decimal Total Digits ?
        Decimal Fractional Digits ?
        Range Low ?
        Range High ?
        UpperCase N
        Table/View? T
        Indexed? N
        Unique? ?
        Primary? ?
        Title ?
        Column Constraint ?
        Char Type 1
        IdCol Type ?
        UDT Name ?

```

- a. o\_orderstatus is a component of a composite secondary index.
- b. o\_totalprice is not a component of any index.

Example 10: Distinct UDT Column

The following example shows possible output for a HELP COLUMN statement run against a column having a distinct UDT type:

```
HELP COLUMN t1.distinct_column;

Column Name  distinct_column
Type        UD
Nullable     N
Format       ?
Max Length   4
Decimal Total Digits  ?
Decimal Fractional Digits ?
Range Low    ?
Range High   ?
UpperCase    N
Table/View?  T
Indexed?     N
Unique?      ?
Primary?     ?
Title?       ?
Column Constraint? ?
Char Type?   ?
UDT Name     SYSUDTLIB.distinct_type_name
```

Related Topics

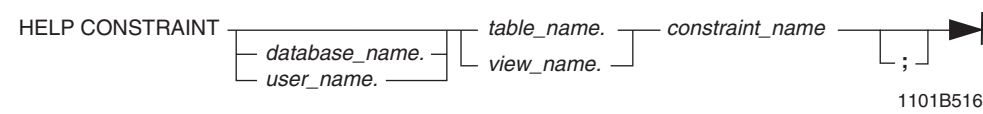
- [“CREATE ERROR TABLE” on page 135](#)
- [“CREATE TABLE” on page 382](#)
- [“DROP ERROR TABLE” on page 560](#)
- [“HELP ERROR TABLE” on page 713](#)
- [“HELP TABLE” on page 769](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)
- *Database Administration*

# HELP CONSTRAINT

## Purpose

Displays the attributes for a specific *named* constraint on a table. Unnamed constraint information can be obtained using the SHOW TABLE statement (see “[SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW](#)” on page 796).

## Syntax



where:

| Syntax element...          | Specifies...                                                                                                                                                     |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| database_name   user_name  | the name of the containing database or user for table_name or view_name if different from the current database or user.                                          |
| table_name.constraint_name | the table-qualified name of a constraint for which attribute information is required.                                                                            |
| view_name.constraint_name  | the view-qualified name of a constraint for which attribute information is required.<br><br>You can only request HELP CONSTRAINT reports for single-table views. |

## ANSI Compliance

HELP CONSTRAINT is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

- You must either own the table in which the constraint is defined or have at least one privilege on that table.
- Use the SHOW privilege to enable a user to perform HELP or SHOW requests *only* against a specified constraint.

### Example 1: CHECK Constraint

This example shows the report returned for a table with a CHECK constraint.

```
HELP CONSTRAINT table_1.check_1;
```

| Name    | Type  | FK Columns                           |
|---------|-------|--------------------------------------|
| check_1 | CHECK | CHECK("field_1">0<br>AND"field_2">0) |

### Example 2: REFERENTIAL Constraint

The following example shows the report returned for a table with REFERENTIAL constraints.

```
HELP CONSTRAINT table_1.reference_1;
```

| Name        | Type      | FK Columns          | Parent Table Name | PK Columns          |
|-------------|-----------|---------------------|-------------------|---------------------|
| reference_1 | REFERENCE | field_1,<br>field_2 | table_2           | field_3,<br>field_4 |

### Example 3: REFERENTIAL Constraint on Primary Key

The following example shows the report returned for a table with a REFERENTIAL constraint on the primary key.

```
HELP CONSTRAINT table_1.primary_1;
```

| Name      | Type        | Columns          |
|-----------|-------------|------------------|
| primary_1 | PRIMARY KEY | field_1, field_2 |

### Example 4: UNIQUE Constraint

The following example shows the report returned for a table with a UNIQUE constraint.

```
HELP CONSTRAINT table_1.unique_1;
```

| Name     | Type   | Columns          |
|----------|--------|------------------|
| unique_1 | UNIQUE | field_3, field_4 |

### Example 5: Nonvalid Request

The following example shows how the system handles a HELP CONSTRAINT request that does not fit the table being analyzed.

```
HELP CONSTRAINT table_1.no_such_check;
```

The system returns the error message “The specified constraint name does not exist in table” if *table\_1* does not have a constraint with the name *no\_such\_check*.

## Related Topics

See the documentation for the following statements and manual for additional information about database constraints.

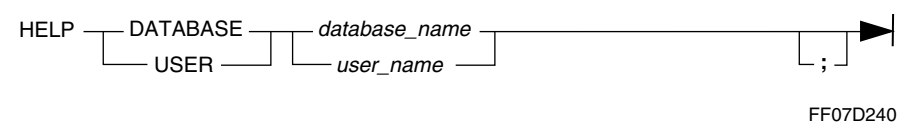
- “CREATE TABLE (Column Definition Clause)” in *SQL Data Definition Language Detailed Topics*
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)
- *Database Design*
- *SQL Data Definition Language Detailed Topics*

# HELP DATABASE/ HELP USER

## Purpose

Displays the attributes, sorted by object name, for all tables, views, join indexes, hash indexes, stored procedures, user-defined functions, and macros in the specified database.

## Syntax



where:

| Syntax Element...    | Specifies...                                                  |
|----------------------|---------------------------------------------------------------|
| <i>database_name</i> | the name of the database about which information is required. |
| <i>user_name</i>     | the name of the user about whom information is required.      |

Note that `DATABASE` and `USER` are interchangeable in this statement: either keyword returns the same result for a particular database or user. You should use the appropriate keyword for clarity.

## ANSI Compliance

`HELP DATABASE` and `HELP USER` are Teradata extensions to the ANSI SQL:2008 standard.

## Required Privileges

You must either own the user or database or have at least one privilege on that user or database with one exception: `HELP USER DBC` does not require any rights on user `DBC`.  
Use the `SHOW` privilege to enable a user to perform `HELP` or `SHOW` requests *only* against a specified user or database.

Example 1

The following statement returns the following information about the *personnel* database:

```
HELP DATABASE Personnel;
```

| Table/View/Macro Name | Kind | Comment | Protection | Creator Name   |
|-----------------------|------|---------|------------|----------------|
| Department            | T    |         | F          | Administration |
| .                     | .    |         | .          | .              |
| .                     | .    |         | .          | .              |

Example 2

The following example shows that there is a UDT named *euro* and a method named *euro\_To\_US* in the *SYSUDTLIB* database:

```
HELP DATABASE SYSUDTLIB;
```

|                       |            |
|-----------------------|------------|
| Table/View/Macro name | euro       |
| Kind                  | U          |
| Comment               | ?          |
| Protection            | F          |
| Creator Name          | USER1      |
| Commit Option         | N          |
| Transaction Log       | Y          |
| Table/View/Macro name | euro_To_US |
| Kind                  | H          |
| Comment               | ?          |
| Protection            | F          |
| Creator Name          | USER1      |
| Commit Option         | N          |
| Transaction Log       | Y          |

Related Topics

See the documentation for the following statements and manuals for additional information about creating and administering users and databases.

- [“CREATE DATABASE” on page 130](#)
- [“CREATE USER” on page 524](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)
- *Database Administration*
- *Security Administration*

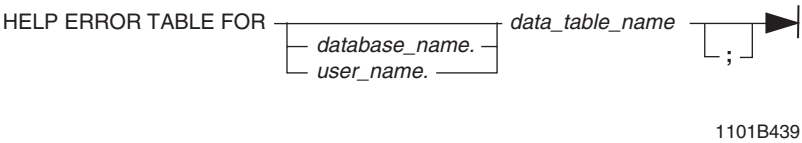


# HELP ERROR TABLE

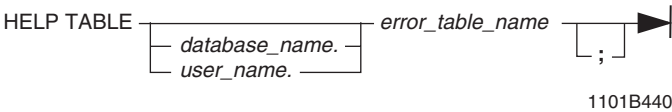
## Purpose

Displays the attributes for the specified error table.

## Syntax 1



## Syntax 2



where:

| Syntax element ...        | Specifies ...                                                                                                                                                                                                                                               |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| database_name   user_name | the containing database or user for the specified data table or error table if it is defined in a database other than the current database or user.                                                                                                         |
| FOR data_table_name       | the name of the data table for which the error table about which help information is requested is defined.<br><br>This syntax is particularly useful if you did not define a name for the error table and you do not know its system-assigned default name. |
| error_table_name          | the name of the error table for which help information is requested.                                                                                                                                                                                        |

## ANSI Compliance

HELP ERROR TABLE is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

To run this statement, you must have either of the following privileges:

- Ownership of the specified data tables.
- At least one privilege on the specified object.

Use the SHOW privilege to enable a user to perform HELP or SHOW requests *only* against a specified error table.

## Example

The reports generated by HELP ERROR TABLE are identical to those produced by HELP TABLE except that they always include information about the additional error table-specific columns listed in the HELP ERROR TABLE “System-Defined Attribute Characteristics for the Error Table-Specific Columns” topic in *SQL Data Definition Language Detailed Topics*.

The attributes for the two reports are identical (see the HELP MACRO “Table, View, Macro, Hash Index, and Join Index Attributes” topic in *SQL Data Definition Language Detailed Topics*).

See, for example, [“Example 2: HELP TABLE With UDTs” on page 770](#).

## Related Topics

The following manuals and topics provide additional information about error tables:

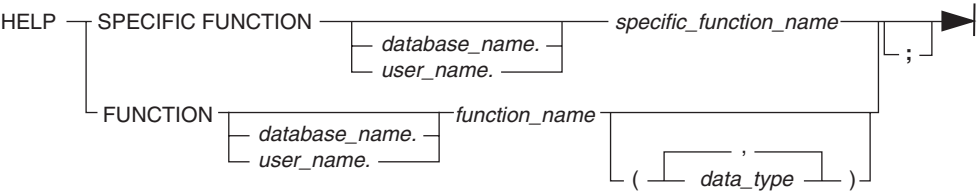
- “INSERT/INSERT ... SELECT” in *SQL Data Manipulation Language*
- “MERGE” in *SQL Data Manipulation Language*
- [“CREATE ERROR TABLE” on page 135](#)
- [“CREATE TABLE” on page 382](#)
- [“DROP ERROR TABLE” on page 560](#)
- [“HELP COLUMN” on page 696](#)
- [“HELP TABLE” on page 769](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)

# HELP FUNCTION

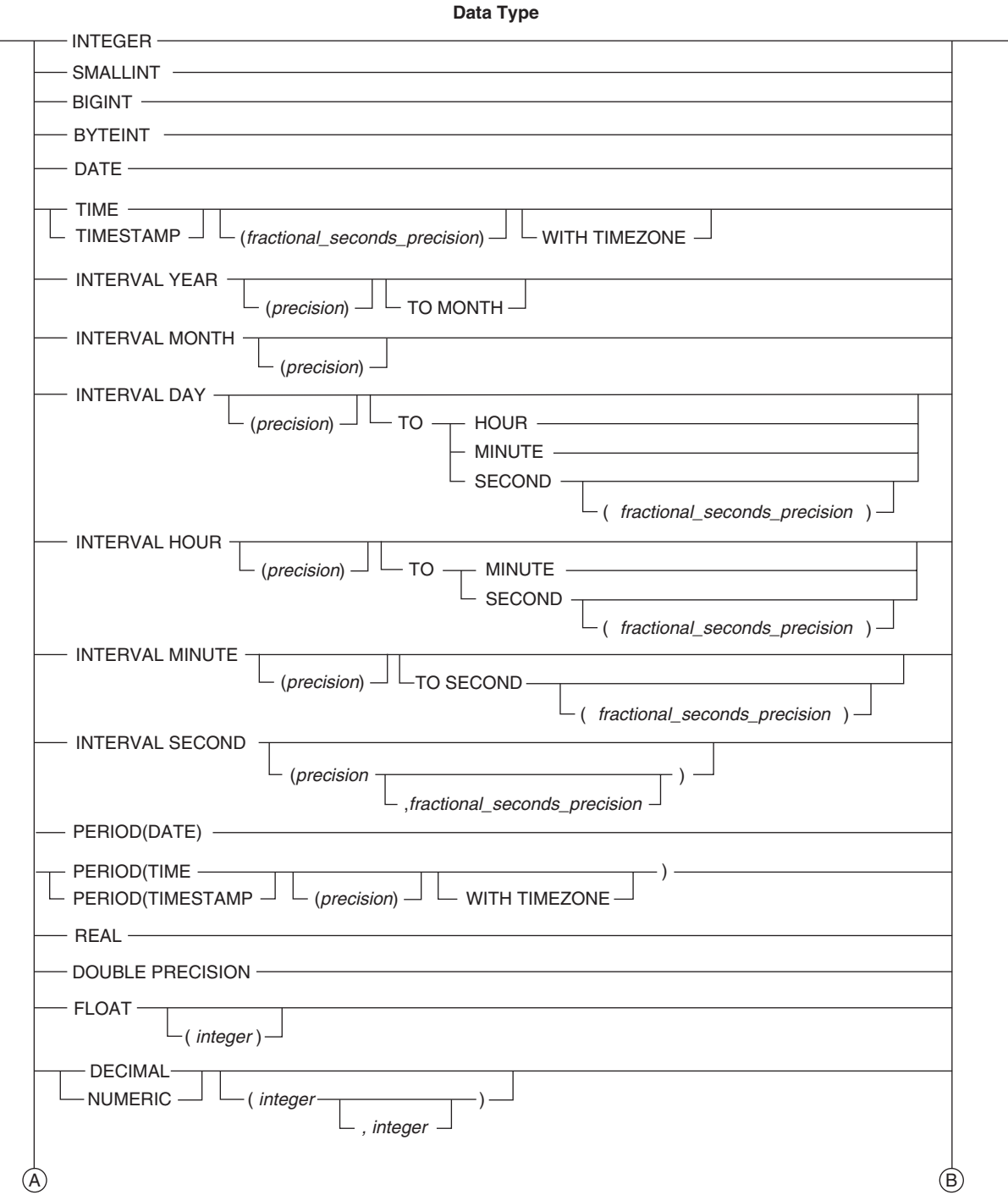
## Purpose

Reports the specific function name, list of parameters, the data types of the parameters, and any comments associated with the parameters for scalar, aggregate, and table functions.

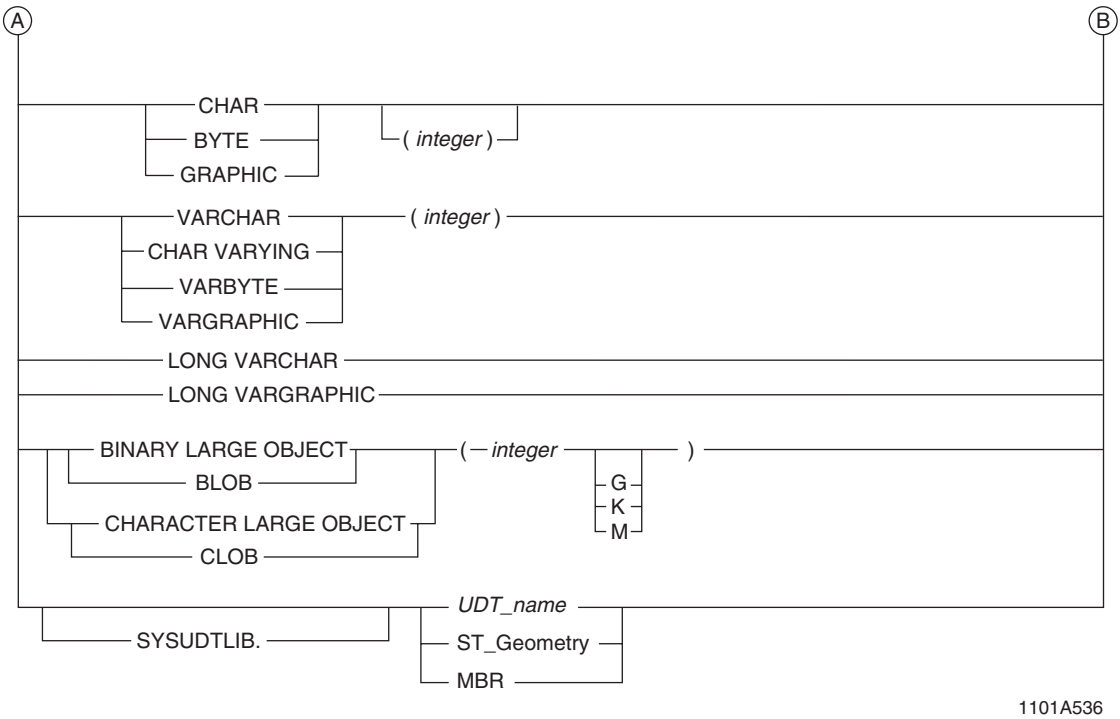
## Syntax



1101C098



1101A535



1101A536

where:

| Syntax element ...                     | Specifies ...                                                                                                     |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <code>SPECIFIC FUNCTION</code>         | that the help request uses the specific name of the user-defined function.                                        |
| <code>database_name   user_name</code> | the containing database or user for <i>specific_function_name</i> if different from the current database or user. |
| <code>specific_function_name</code>    | the specific name of the user-defined function for which help information is requested.                           |
| <code>FUNCTION</code>                  | that the help request uses the name of the user-defined function.                                                 |
| <code>database_name   user_name</code> | the containing database or user for <i>function_name</i> if different from the current database or user.          |
| <code>function_name</code>             | the name of the user-defined function for which help information is requested.                                    |
| <code>data_type</code>                 | the data type parameter set that uniquely identify an overloaded function name.                                   |

ANSI Compliance

HELP FUNCTION is a Teradata extension to the ANSI SQL:2008 standard.

Required Privileges

You must have at least one privilege on the function or its containing database.

Use the SHOW privilege to enable a user to perform HELP or SHOW requests *only* against a specified function.

Example 1

This example demonstrates a simple HELP FUNCTION report:

```
HELP FUNCTION first1;

*** Help information returned. 3 rows.
*** Total elapsed time was 1 second.

      Parameter Name  P1
              Type    I
            Comment    ?
          Nullable    Y
            Format    -(10)9
          MaxLength    4
    Decimal Total Digits  ?
Decimal Fractional Digits  ?
      Table/View?    F
        Char Type    ?
      Parameter Type  I
          UDT Name    ?
      Parameter Name  P2
              Type    F
            Comment    ?
          Nullable    Y
            Format    -9.999999999999999E-999
          MaxLength    8
    Decimal Total Digits  ?
Decimal Fractional Digits  ?
      Table/View?    F
        Char Type    ?
      Parameter Type  I
          UDT Name    ?
      Parameter Name  RETURN0
              Type    F
            Comment    ?
          Nullable    Y
            Format    -9.999999999999999E-999
          MaxLength    8
    Decimal Total Digits  ?
```

```
Decimal Fractional Digits  ?
      Table/View?      F
      Char Type        ?
      Parameter Type    O
      UDT Name         ?
```

**Example 2**

This example demonstrates a HELP FUNCTION report for a UDF defined with the TD\_GENERAL parameter style. Notice that the value of the *Nullable* column is N for all parameters.

```
HELP FUNCTION tdgenfnc;

*** Help information returned. 3 rows.
*** Total elapsed time was 1 second.

      Parameter Name  P1
      Type            I
      Comment         ?
      Nullable        N
      Format           -(10)9
      MaxLength        4
      Decimal Total Digits  ?
      Decimal Fractional Digits  ?
      Table/View?      F
      Char Type        ?
      Parameter Type    I
      UDT Name         ?

      Parameter Name  P2
      Type            F
      Comment         ?
      Nullable        N
      Format           -9.999999999999999E-999
      MaxLength        8
      Decimal Total Digits  ?
      Decimal Fractional Digits  ?
      Table/View?      F
      Char Type        ?
      Parameter Type    I
      UDT Name         ?

      Parameter Name  RETURN0
      Type            F
      Comment         ?
      Nullable        N
```

```

Format      -9.999999999999999E-999
MaxLength   8
Decimal Total Digits  ?
Decimal Fractional Digits  ?
Table/View?  F
Char Type   ?
Parameter Type  O
UDT Name    ?

```

### Example 3: Displaying UDT Parameters

The following example shows how UDT parameters are indicated in a HELP FUNCTION report:

```

HELP FUNCTION  SYSUDTLIB.AdhocIntToSQL;

Parameter Name  P1
Type            I
Comment        ?
Nullable       N
Format         -(10)9
Max Length     4
Decimal Total Digits  ?
Decimal Fractional Digits  ?
Table/View?    F
Char Type      ?
Parameter Type I
UDT Name      ?
Parameter Name RETURN0
Type          UT
Comment       ?
Nullable     N
Format       ?
Max Length   ?
Decimal Total Digits  ?
Decimal Fractional Digits  ?
Table/View?  F
Char Type    ?
Parameter Type  O
UDT Name      UDINT

```



## Example 4: VARIANT\_TYPE Input Parameter Data Type

The following example shows the output from a HELP FUNCTION request when the function specifies VARIANT\_TYPE UDTs as input parameters.

```

HELP FUNCTION udf_agch002002dynudt;

*** Help information returned. 2 rows.
*** Total elapsed time was 1 second.

Parameter Name parameter_1
Type UT
Comment ?
Nullable Y
Format ?
Max Length ?
Decimal Total Digits ?
Decimal Fractional Digits ?
Table/View? A
Char Type ?
Parameter Type I
UDT Name VARIANT_TYPE
Parameter Name RETURN0
Type UT
Comment ?
Nullable Y
Format ?
Max Length ?
Decimal Total Digits ?
Decimal Fractional Digits ?
Table/View? A
Char Type ?
Parameter Type O
UDT Name INTEGERUDT

```

## Related Topics

For more information about user-defined functions, see the following statements and manual:

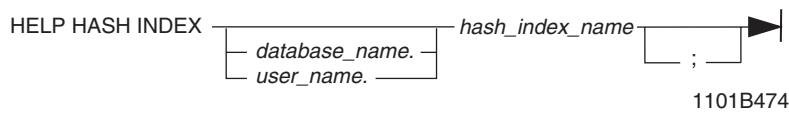
- [“ALTER FUNCTION” on page 16](#)
- [“CREATE FUNCTION/ REPLACE FUNCTION” on page 138](#)
- [“CREATE GLOBAL TEMPORARY TRACE TABLE” on page 186](#)
- [“SET SESSION FUNCTION TRACE” on page 676](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)
- *SQL External Routine Programming*

# HELP HASH INDEX

## Purpose

Displays the data types of the columns defined by a particular hash index.

## Syntax



where:

| Syntax element ...        | Specifies ...                                                                                       |
|---------------------------|-----------------------------------------------------------------------------------------------------|
| database_name   user_name | the containing database or user for hash_index_name if different from the current database or user. |
| hash_index_name           | the name of the hash index for which information is desired.                                        |

## ANSI Compliance

HELP HASH INDEX is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must either own the table on which the hash index is defined or have at least one privilege on that table.

Use the SHOW privilege to enable a user to perform HELP or SHOW requests *only* against a specified hash index.

## Example

The following example shows the output of a HELP HASH INDEX statement performed on the hash index named OrdHIdx.

```
HELP HASH INDEX OrdHIdx;

Column Name      Type Comment
-----
o_orderdate      DA      ?
```

## Related Topics

See the documentation for the following statements and manuals for additional information about hash indexes.

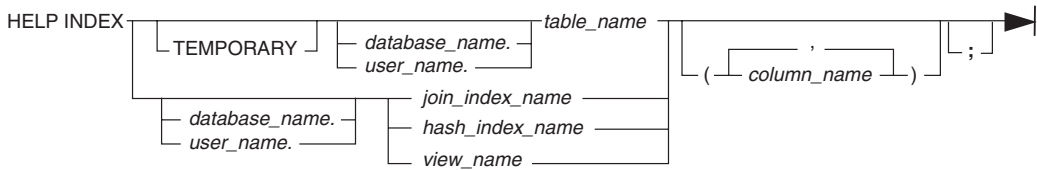
- [“CREATE HASH INDEX” on page 200](#)
- [“COLLECT STATISTICS \(Optimizer Form\)” on page 99](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)
- *SQL Request and Transaction Processing*
- *Database Design*

# HELP INDEX

## Purpose

Displays the attributes for the primary and secondary indexes defined for a base data table, hash index,<sup>2</sup> or join index.<sup>3</sup>

## Syntax



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where:

| Syntax Element...         | Specifies...                                                                                                                                                                                         |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TEMPORARY                 | that the indexes in question are defined on a materialized global temporary table.<br>This keyword is valid only for global temporary tables.                                                        |
| database_name   user_name | the containing database or user for table_name if something other than the current database or user.                                                                                                 |
| table_name                | the table on which a report of all primary and secondary indexes is desired.                                                                                                                         |
| database_name   user_name | the containing database or user for join_index_name, hash_index_name, or view_name if something other than the current database or user.                                                             |
| join_index_name           | the join index on which a report of all primary and secondary indexes is desired.                                                                                                                    |
| hash_index_name           | the hash index on which a report of all primary indexes is desired.                                                                                                                                  |
| view_name                 | the name of a single-table view for which index information is required.<br>You can only request HELP INDEX reports for single-table views.                                                          |
| column_name               | a column in a column list for which an index or index list is desired.<br>Use this syntax to exclude primary, secondary, join, and hash indexes defined on columns for which you are not interested. |

- 2. Because hash indexes cannot have secondary indexes, a HELP INDEX statement run against a hash index reports the attributes of its primary index only.
- 3. HELP INDEX does *not* display the attributes for hash or join indexes. See [“HELP HASH INDEX” on page 722](#) and [“HELP JOIN INDEX” on page 730](#) for information about how to report the attributes for hash and join indexes, respectively.

## ANSI Compliance

HELP INDEX is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must either own the table or join index on which the index is defined or have at least one privilege on that table, hash index, or join index.

Use the SHOW privilege to enable a user to perform HELP or SHOW requests *only* against a specified index.

## Example 1

The following example returns information about the specified index or indexes defined on the table columns named *cname\_1*, *cname\_2*, and *cname\_3*.

```
HELP INDEX tname (cname_1, cname_2, cname_3);
```

## Example 2

The response to the following statement shows that one index is defined for the *Department* table.

```
HELP INDEX Personnel.Department;
```

| Unique | Primary<br>or<br>Secondary | Column Names | Index Id | Approximate Count |
|--------|----------------------------|--------------|----------|-------------------|
| -----  | -----                      | -----        | -----    | -----             |
| Y      | P                          | DeptNo       | 1        | 7                 |

### Example 3: Partitioned Primary Index

This example uses the following table definition:

```
CREATE TABLE Orders (  
  o_orderkey      INTEGER NOT NULL,  
  o_custkey       INTEGER,  
  o_orderstatus   CHARACTER(1) CASESPECIFIC,  
  o_totalprice    DECIMAL(13,2) NOT NULL,  
  o_orderdate     DATE FORMAT 'yyyy-mm-dd' NOT NULL,  
  o_orderpriority CHARACTER(21),  
  o_clerk         CHARACTER(16),  
  o_shippriority  INTEGER,  
  o_comment       VARCHAR(79))  
PRIMARY INDEX OrdPI (o_orderkey)  
PARTITION BY RANGE_N(o_orderdate BETWEEN DATE '1992-01-01'  
                        AND      DATE '1998-12-31'  
                        EACH INTERVAL '1' MONTH)  
  
UNIQUE INDEX OrdUSI (o_orderkey)  
INDEX OrdX1 (o_orderdate)  
INDEX OrdX2 (o_orderdate)  
  ORDER BY VALUES (o_orderdate)  
INDEX OrdX3 (o_custkey, o_orderdate)  
  ORDER BY VALUES (o_orderdate)  
INDEX OrdX4 (o_custkey, o_orderdate)  
  ORDER BY HASH (o_orderdate)  
INDEX OrdX5 ALL (o_custkey, o_orderstatus)  
  ORDER BY VALUES (o_custkey)  
INDEX OrdX6 ALL (o_custkey, o_orderstatus)  
  ORDER BY HASH (o_custkey)  
INDEX OrdX7 ALL (o_custkey)  
  ORDER BY VALUES (o_custkey)  
INDEX OrdX8 ALL (o_custkey)  
  ORDER BY HASH (o_custkey)  
INDEX OrdX9 (o_shippriority)  
  ORDER BY HASH (o_shippriority)  
INDEX OrdXA ALL (o_clerk)  
  ORDER BY HASH (o_clerk)  
INDEX OrdXB (o_orderkey, o_orderdate);
```

HELP INDEX generates the following report on this table. The BTEQ commands are included to show how the report format was derived. Attributes of particular interest for this example are highlighted in boldface.

```
BTEQ -- Enter your DBC/SQL request or BTEQ command:  
.sidetitles  
.sidetitles  
BTEQ -- Enter your DBC/SQL request or BTEQ command:  
.foldline  
.foldline  
BTEQ -- Enter your DBC/SQL request or BTEQ command:  
HELP INDEX orders;  
  
HELP INDEX orders;  
  
*** Help information returned. 13 rows.  
*** Total elapsed time was 1 second.
```

```

Unique? N
Primary//or//Secondary? P
Column Names o_orderkey
Index Id 1
Approximate Count 0
Index Name OrdPI
Ordered//or//Partitioned? P
Unique? Y
Primary//or//Secondary? S
Column Names o_orderkey
Index Id 4
Approximate Count 0
Index Name OrdUSI
Ordered//or//Partitioned? H
Unique? N
Primary//or//Secondary? S
Column Names o_orderdate
Index Id 8
Approximate Count 0
Index Name OrdX1
Ordered//or//Partitioned? H
Unique? N
Primary//or//Secondary? S
Column Names o_orderdate
Index Id 12
Approximate Count 0
Index Name OrdX2
Ordered//or//Partitioned? V
Unique? N
Primary//or//Secondary? S
Column Names o_custkey, o_orderdate
Index Id 16
Approximate Count 0
Index Name OrdX3
Ordered//or//Partitioned? V
Unique? N
Primary//or//Secondary? S
Column Names o_custkey, o_orderdate
Index Id 24
Approximate Count 0
Index Name OrdX4
Ordered//or//Partitioned? H

```

```
Unique? N
Primary//or//Secondary? S
Column Names o_custkey, o_orderstatus
Index Id 32
Approximate Count 0
Index Name Ord5
Ordered//or//Partitioned? V
Unique? N
Primary//or//Secondary? S
Column Names o_custkey, o_orderstatus
Index Id 40
Approximate Count 0
Index Name Ord6
Ordered//or//Partitioned? H
Unique? N
Primary//or//Secondary? S
Column Names o_custkey
Index Id 48
Approximate Count 0
Index Name Ord7
Ordered//or//Partitioned? V
Unique? N
Primary//or//Secondary? S
Column Names o_custkey
Index Id 52
Approximate Count 0
Index Name Ord8
Ordered//or//Partitioned? H
Unique? N
Primary//or//Secondary? S
Column Names o_shippriority
Index Id 56
Approximate Count 0
Index Name Ord9
Ordered//or//Partitioned? H
Unique? N
Primary//or//Secondary? S
Column Names o_clerk
Index Id 60
Approximate Count 0
Index Name OrdA
Ordered//or//Partitioned? H
Unique? N
```



```

Primary//or//Secondary? S
      Column Names o_orderkey, o_orderdate
      Index Id 64
      Approximate Count 0
      Index Name OrdxB
Ordered//or//Partitioned? H

```

## Related Topics

See the documentation for the following statements and manuals for additional information about primary and secondary indexes.

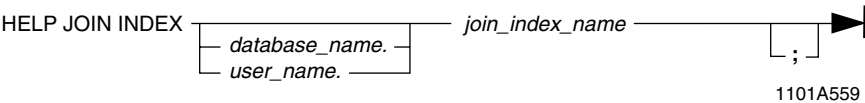
- [“COLLECT STATISTICS \(Optimizer Form\)” on page 99](#)
- [“CREATE INDEX” on page 211](#)
- [“CREATE TABLE” on page 382](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)
- *SQL Request and Transaction Processing*
- *Database Design*

# HELP JOIN INDEX

## Purpose

Displays the attributes of the columns defined by a particular join index.

## Syntax



where:

| Syntax Element...                | Specifies...                                                                                                                 |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name   user_name</i> | the name of the containing database or user for <i>join_index_name</i> if something other than the current database or user. |
| <i>join_index_name</i>           | the name of the join index for which information is desired.                                                                 |

## ANSI Compliance

HELP JOIN INDEX is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must either own the tables on which the join index is defined or have at least one privilege on each of those tables.

Use the SHOW privilege to enable a user to perform HELP or SHOW requests *only* against a specified join index.

## Example

The following example shows the output of a HELP JOIN INDEX statement performed on the join index named *OrdCustIdx*.

```
HELP JOIN INDEX OrdCustIdx;

Column Name      Type      Comment
-----
c_custkey        I         ?
c_name           CF        ?
o_status         CF        ?
o_date           DA        ?
o_comment        CV        ?
```

## Related Topics

See the documentation for the following statements and manuals for additional information about join indexes.

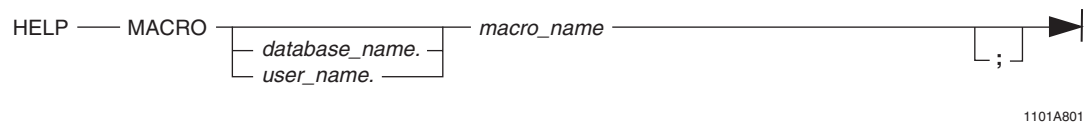
- [“COLLECT STATISTICS \(Optimizer Form\)” on page 99](#)
- [“CREATE JOIN INDEX” on page 216](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)
- *SQL Request and Transaction Processing*
- *Database Design*

# HELP MACRO

## Purpose

Displays the attributes for the specified macro.

## Syntax



where:

| Syntax Element...                       | Specifies the name of the ...                                                                               |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>macro_name</i> if something other than the current database or user. |
| <i>macro_name</i>                       | macro for which help is required.                                                                           |

## ANSI Compliance

HELP MACRO is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

To execute this statement, you must have either of the following privileges:

- Ownership of the macro.
- At least one privilege on the requested object.

Use the SHOW privilege to enable a user to perform HELP or SHOW requests *only* against a specified macro.

## Example 1: HELP MACRO

The following request returns information about the *NewEmp* macro.

```
HELP MACRO NewEmp;

Parameter Name      Type      Comment
-----
Name                CV        Employee name, last name first; required
Number              I         Employee number; required
Dept                I2        Department number; required
```

Example 2: HELP MACRO With UDTs

The following example shows HELP MACRO output for a macro that uses UDT parameters:

```
HELP MACRO SYSUDTLB.Example;

Parameter Name P1
Type I
Comment ?
Nullable N
Format -(10)9
Title ?
Max Length 4
Decimal Total Digits ?
Decimal Fractional Digits ?
Range Low ?
Range High ?
Uppercase ?
Default Value ?
Char Type ?
IdCol Type ?
UDT Name ?
Parameter Name RETURN0
Type UT
Comment ?
Nullable N
Format ?
Title ?
Max Length ?
Decimal Total Digits ?
Decimal Fractional Digits ?
Range Low ?
Range High ?
Uppercase ?
Default Value ?
Char Type ?
IdCol Type ?
UDT Name ?
```

## Related Topics

See the documentation for the following statements for additional information about macros, tables, and views.

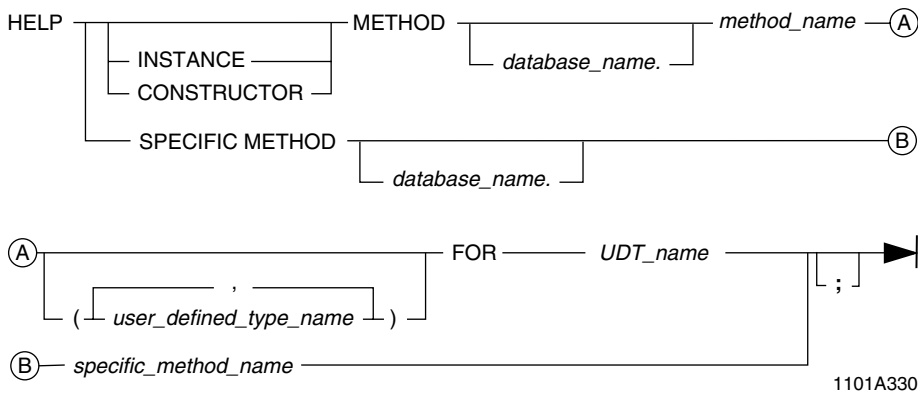
- [“CREATE MACRO/ REPLACE MACRO” on page 297](#)
- [“CREATE RECURSIVE VIEW/ REPLACE RECURSIVE VIEW” on page 387](#)
- [“CREATE TABLE” on page 406](#)
- [“CREATE VIEW/ REPLACE VIEW” on page 580](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)

# HELP METHOD

## Purpose

Displays the parameter list of the specified method.

## Syntax



where:

| Syntax element ...                                   | Specifies ...                                                                                                                                                                                |
|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| INSTANCE                                             | to return parameter information for the instance method named <i>method_name</i> .<br>If you do not specify INSTANCE or CONSTRUCTOR, then INSTANCE is assumed by default.                    |
| CONSTRUCTOR                                          | to return parameter information for the constructor method named <i>method_name</i> .<br>If you do not specify INSTANCE or CONSTRUCTOR, then INSTANCE is assumed by default.                 |
| SYSUDTLIB                                            | the containing database for <i>method_name</i>                                                                                                                                               |
| <i>method_name</i>                                   | the name of the method whose parameter information is to be returned.                                                                                                                        |
| <i>user_defined_type_name</i><br>FOR <i>UDT_name</i> | the name of the UDT with which the specified method is associated.<br>Note that you do not specify a FOR <i>UDT_name</i> clause for a method if you have identified it by its SPECIFIC name. |
| <i>specific_method_name</i>                          | the name of the specific method whose parameter information is to be returned.                                                                                                               |

ANSI Compliance

HELP METHOD is a Teradata extension to the ANSI SQL:2008 standard.

Required Privileges

To perform HELP METHOD, you must have one or more of the following privileges:

- At least one privilege on the *SYSUDTLIB* database.
- UDT usage on *UDT\_name*.

Use the SHOW privilege to enable a user to perform HELP or SHOW requests *only* against a specified method.

Example 1: Complete Example With Sample Output

The following example reports the parameter list of the method named *intordering* that is associated with the UDT named *udtint*:

```
HELP METHOD intordering FOR udtint;

Parameter Name  SELF
              Type  UT
              Comment ?
              Nullable Y
              Format ?
              Max Length 0
              Decimal Total Digits ?
              Decimal Fractional Digits ?
              Table/View? M
              Char Type ?
              Parameter Type I
              UDT Name UDTINT
Parameter Name  RETURN0
              Type  I
              Comment ?
              Nullable Y
              Format -(10)9
              Max Length 4
              Decimal Total Digits ?
              Decimal Fractional Digits ?
              Table/View? M
              Char Type ?
              Parameter Type O
              UDT Name ?
```



## Example 2: Miscellaneous Examples

The following example requests information for the SPECIFIC method name *polygon\_mbr*:

```
HELP SPECIFIC METHOD SYSUDTLIB.polygon_mbr;
```

The following example requests information about the method name *area* for the UDT *circle*:

```
HELP METHOD SYSUDTLIB.area() FOR circle;
```

The following example requests information about the method name *in\_state* for the UDT *address*:

```
HELP METHOD in_state( CHAR(2) ) FOR address;
```

## Related Topics

See the documentation for the following statement and manual for additional information about methods.

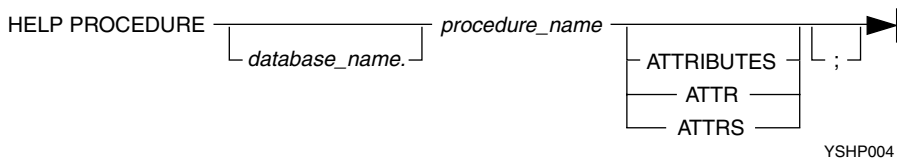
- [“CREATE METHOD” on page 259](#)
- *SQL External Routine Programming*

# HELP PROCEDURE

## Purpose

Displays the attribute and format parameters for each parameter of a stored procedure or just the creation time attributes for the specified procedure.

## Syntax



where:

| Syntax Element...                       | Specifies...                                                                                                                                                                                                                  |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | the name of the containing database or user for the procedure if different from the current database or user.<br><br>If no database is specified, then the current default database is assumed.                               |
| <i>procedure_name</i>                   | the name of the procedure for which the attributes and format of each parameter in the procedure is desired.                                                                                                                  |
| ATTRIBUTES<br>ATTR<br>ATTRS             | a keyword indicating that the stored procedure creation-time attributes from the column SPObjectCodeRows in <i>DBC.TVM</i> are to be displayed rather than the attribute and format information for the procedure parameters. |

## ANSI Compliance

HELP PROCEDURE is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have one of the following access privileges to perform HELP PROCEDURE:

- At least one procedure-specific privilege on the database containing the procedure.
- At least one privilege on the specified stored procedure.

Use the SHOW privilege to enable a user to perform HELP or SHOW requests *only* against a specified procedure.

### Example: Reporting UDT Parameters

The following example shows a possible report returned by HELP PROCEDURE when the data type of a parameter in the specified stored procedure is a UDT:

```
HELP PROCEDURE udtblobset;

Parameter Name  b
                Type  UT
                Comment ?
                Nullable Y
                Format  ?
                Title  ?
                Max Length ?
                Decimal Total Digits ?
                Decimal Fractional Digits ?
                Range Low ?
                Range High ?
                UpperCase N
                Table/View? P
                Default Value ?
                Char Type ?
                Parameter Type O
                IdCol Type ?
                UDT Name  CRPV_BLOB
```

If the procedure had been defined with an input parameter with the VARIANT\_TYPE data type, then the UDT Name in the output would have been reported as VARIANT\_TYPE.

### Related Topics

See the documentation for the following statements and manual for additional information about stored procedures.

- [“CREATE PROCEDURE \(External Form\)/ REPLACE PROCEDURE \(External Form\)” on page 276](#)
- [“CREATE PROCEDURE \(SQL Form\)/ REPLACE PROCEDURE” on page 310](#)
- *SQL External Routine Programming*

# HELP REPLICATION GROUP

## Purpose

Reports the attributes of the specified replication group and its member tables.

## Invocation

Executable.

## Syntax

```
HELP REPLICATION GROUP  _____ replication_group_name _____ [ ; ] ▶
```

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where:

| Syntax element ...            | Specifies ...                                                                                                                                                  |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>replication_group_name</i> | the name of the authorization group for which an attribute report is desired.<br><br>The specified replication group must be defined on the Teradata platform. |

## ANSI Compliance

HELP REPLICATION GROUP is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

- You must have the REPLCONTROL privilege to request a report of replication group attributes.
- Use the SHOW privilege to enable a user to perform HELP or SHOW requests *only* against a specified replication group.

Example

The following example requests an attribute report for the replication group named `receivables_group`:

```
HELP REPLICATION GROUP receivables_group;
```

The response in Field Mode looks like the following report:

| Group Name        | Identifier   | Operation     | MaxProtect | Status |
|-------------------|--------------|---------------|------------|--------|
| receivables_group | 123          | C             | Y          | I      |
| DatabaseName      | TableName    | Identifier    | Operation  | Status |
| payables          | invoices     | '000A0040000' | xb C       | I      |
| payables          | transactions | '000B0040000' | xb C       | I      |

Related Topics

See the following resources for further information about replication services:

- [“CREATE REPLICATION GROUP” on page 371](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)
- *Database Administration*
- *Teradata Replication Solutions*

# HELP SESSION

## Purpose

Displays attribute information for the user of the current session.

## Invocation

Executable.

## Syntax



## ANSI Compliance

HELP SESSION is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must either own the session or the user or database that is using that session.

Use the SHOW privilege to enable a user to perform HELP or SHOW requests *only* against a session.

**Example 1**

The following statement reports the attributes of the session for the current user:

```
HELP SESSION;
```

```

      User Name  SPEC2
      Account Name  DBC
      Logon Date  02/08/31
      Logon Time  10:58:56
      Current DataBase  DBC
      Collation  ASCII
      Character Set  ASCII
      Transaction Semantics  Teradata
      Current DateForm  IntegerDate
      Session Time Zone  -08:00
      Default Character Type  LATIN
      Export Latin  1
      Export Unicode  1
      Export Unicode Adjust  0
      Export KanjiSJIS  1
      Export Graphic  0
      Default Date Format  YY/MM/DD
      Radix Separator  .
      Group Separator  ,
      Grouping Rule  3
      Currency Radix Separator  .
      Currency Group Separator  ,
      Currency Grouping Rule  3
      Currency Name  US Dollars
      Currency  $
      ISOCurrency  USD
      Dual Currency Name  US Dollars
      Dual Currency  $
      Dual ISOCurrency  USD
      Default ByteInt format  -(3)9
      Default Integer format  -(10)9
      Default SmallInt format  -(5)9
      Default Numeric format  --(I).9(F)
      Default Real format  -9.999999999999999E-999
      Default Time format  HH:MI:SS.S(F)Z
      Default Timestamp format  YYYY-MM-DDBHH:MI:SS.S(F)Z
      Current Role  Finance
      Logon Account  DBC
      Profile  Human_Resources
      LDAP  N
      Audit Trail ID  ?
      Proxy User  df120639
      Proxy Role  HR_Admin
      Current Isolation Level  SR

```

```
Default BigInt format  -(19)9
QueryBand  =S>  JOB=RPT1;ORG=world
```

## Example 2

A KanjiEBCDIC user issues a HELP SESSION request having an export width of the expected defaults. The HELP SESSION request was entered using BTEQ with the SIDETITLES and FOLDLINE formatting options.

The system reports the following information:

```

User Name      KANJI_USER
Account Name   KANJI_USER
Logon Date     02/05/23
Logon Time     11:43:09
Current Database KANJI_USER
Collation      CHARSET_COLL
Character Set   KANJIEBCDIC5035_0I
Transaction Semantics Teradata
Current DateForm ANSI
Session Time Zone -09:00
Default Character Type UNICODE
Export Latin     1
Export Unicode   2
Export Unicode Adjusted 2
Export KanjiSJIS 1
Export Graphic   2
Default Date Format YYYY\u5E74MM\u6708DD\u65E5
Radix Separator  .
Group Separator  ,
Grouping Rule    3
Currency Radix Separator .
Currency Group Separator ,
Currency Grouping Rule 3
Currency Name    Yen
Currency         \u00A5
ISOCurrency      JPY
Dual Currency Name Yen
Dual Currency    \u00A5
Dual ISOCurrency JPY
Default ByteInt format  -(3)9
Default Integer format  G-(I)9
Default SmallInt format G-(I)9
Default Numeric format  G--(I)D9(F)
Default Real format     G-9D99999999999999E-999
Default Time format     HH\u6642MI\u5206SSDS(F)\u79D
Default Timestamp format YYYY\u5E74MM\u6708DD\u65E5BH
```



|                         |                         |
|-------------------------|-------------------------|
| Current Role            | Finance                 |
| Logon Account           | KANJI_USER              |
| Profile                 | Human_Resources         |
| LDAP                    | N                       |
| Audit Trail ID          | ?                       |
| Proxy User              | ?                       |
| Proxy Role              | ?                       |
| Current Isolation Level | SR                      |
| Default BigInt format   | -(19)9                  |
| QueryBand               | =S> JOB=RPT1;ORG=world; |

## Related Topics

See the documentation for the following statements and manuals for additional information about sessions.

- [“SET SESSION” on page 659](#)
- [“SET SESSION CHARACTERISTICS AS TRANSACTION ISOLATION LEVEL” on page 667](#)
- [“SET SESSION COLLATION” on page 670](#)
- [“SET SESSION DATABASE” on page 673](#)
- [“SET SESSION DATEFORM” on page 674](#)
- [“SET SESSION FUNCTION TRACE” on page 676](#)
- [“SET SESSION OVERRIDE REPLICATION” on page 678](#)
- *SQL Data Definition Language Detailed Topics*
- *SQL Request and Transaction Processing*
- *Database Administration*

## HELP STATISTICS (Optimizer Form)

## Purpose

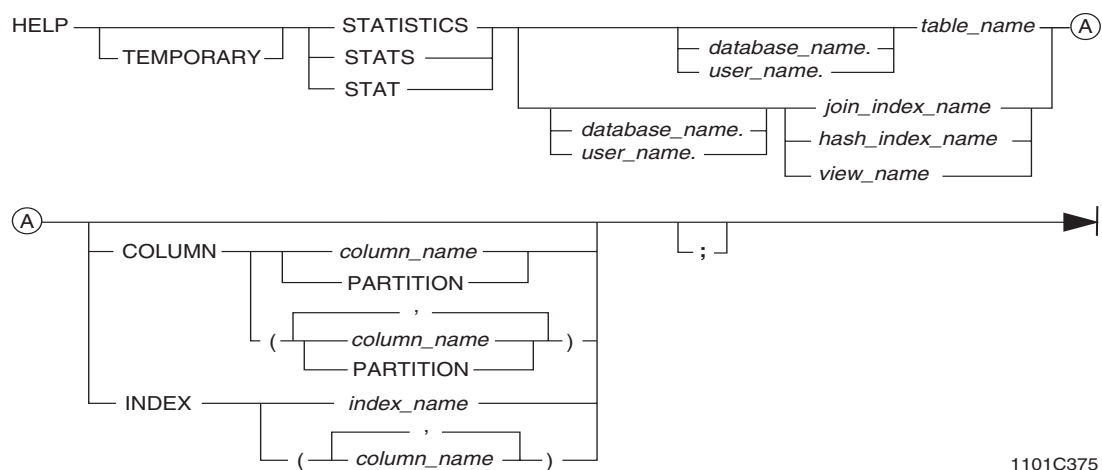
Displays summary or detail attributes for the statistics that have been collected in the data dictionary for the specified data table or hash or join index.

You can view the complete data table or hash or join index statistics using the Statistics Collection module of Teradata Manager.

## Invocation

Executable.

## Syntax



where:

| Syntax Element...                       | Specifies...                                                                                                                                             |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| TEMPORARY                               | that statistics information is desired for a temporary table.                                                                                            |
| <i>database_name</i>   <i>user_name</i> | the name of the containing database or user for <i>table_name</i> if different from the default database or user.                                        |
| <i>table_name</i>                       | the name of the table for which statistics information is required.                                                                                      |
| <i>database_name</i>                    | the name of the containing database for <i>join_index_name</i> , <i>hash_index_name</i> , or <i>view_name</i> if different from the containing database. |
| <i>join_index_name</i>                  | the name of the join index for which statistics information is required.                                                                                 |
| <i>hash_index_name</i>                  | the name of the hash index for which statistics information is required.                                                                                 |

| Syntax Element...  | Specifies...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>view_name</i>   | the name of a view for which statistics information is required.<br>You can only request HELP STATISTICS reports for single-table views.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| COLUMN             | that detailed statistics help is desired for a column set from the specified data table or hash or join index.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <i>column_name</i> | the name of a column on which statistics have been collected.<br>This can be the name of a specific column in the specified data table or hash or join index for which statistics help is required or the system-derived PARTITION column.<br>You cannot reference the system-derived PARTITION#Ln columns of a table in a HELP STATISTICS request.<br>Hash indexes do not have PPIs, so there is no information to be reported on the PARTITION column for these database objects.<br>To request information on multiple column names, enclose the individual names within PARENTHESIS characters and separate each of them with a COMMA character. |
| INDEX              | that detailed statistics help is desired for an index column set from the named index.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <i>index_name</i>  | the name of a specific index for which statistics help is required.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <i>column_name</i> | the set of index columns in the specified data table or hash or join index for which statistics help is required.<br>To request information on multiple columns, enclose the individual column names within PARENTHESIS characters and separate each name in the list with a COMMA character.                                                                                                                                                                                                                                                                                                                                                        |

## ANSI Compliance

HELP STATISTICS (Optimizer Form) is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have one of the following privileges to perform the standard form of HELP STATISTICS:

- Any privilege on *table\_name*, *join\_index\_name*, or *hash\_index\_name*.
- Own *table\_name* or *join\_index\_name*.

Use either the STATISTICS privilege or the SHOW privilege to enable a user to perform HELP or SHOW requests *only* against the optimizer statistics collected on a specified database object.

Example 1: Summary Statistics

If statistics have been collected for the *employee* table in the *personnel* database, you can use the following statement to obtain a list of the columns of the *employee* table that currently have statistics:

```
HELP STATISTICS personnel.employee;
```

The result shows that statistics were last collected for *YrsExp* on 02/06/03, when there were 17 unique values for the column:

| Date     | Time     | Unique Values | Column Names |
|----------|----------|---------------|--------------|
| 02/06/03 | 13:12:45 | 17            | YrsExp       |

You can view the table statistics for these columns using the STATS module of Teradata Manager.

Example 2: Detailed Interval Statistics (Field Mode)

The following example displays detailed interval statistics in Field Mode. The example also demonstrates the use of BTEQ options to control the display of a row consisting of many columns.

Note that the reported negative values returned as part of the detailed statistics are special indicators used by the Optimizer to mark the associated Mode and Max values as high frequency loner values.

```
.SET FOLDLINE ON
.SET SIDETITLES ON
.SET RETLIMIT 1000 *

HELP STATISTICS personnel.employee COLUMN YrsExp;
```

```
*** Help information returned. 8 rows.
*** Total elapsed time was 1 second.
```

|                     |          |
|---------------------|----------|
| Date                | 02/06/17 |
| Time                | 13:12:45 |
| Number of Rows      | 21       |
| Number of Nulls     | 0        |
| Number of All Nulls | 0        |
| Number of AMPs      | 2        |
| Average AMP RPV     | 0        |
| Number of Intervals | 7        |
| Interval            | 0        |
| Number of Uniques   | 17       |
| Numeric             | Y        |
| Sampled             | 0        |
| Sampled Percent     | 0        |

|                     |          |    |
|---------------------|----------|----|
| Version             | 3        |    |
| Max Value           | 3        |    |
| Mode Value          | 5        |    |
| Mode Frequency      |          | 3  |
| Non-Modal Values    |          | ?  |
| Non-Modal Rows      |          | ?  |
| Date                | 02/06/17 |    |
| Time                | 13:12:45 |    |
| Number of Rows      |          | 21 |
| Number of Nulls     |          | 0  |
| Number of All Nulls |          | 0  |
| Number of AMPs      | 2        |    |
| Average AMP RPV     | 0        |    |
| Number of Intervals | 7        |    |
| Interval            | 1        |    |
| Number of Uniques   |          | 17 |
| Numeric             | Y        |    |
| Sampled             | 0        |    |
| Sampled Percent     | 0        |    |
| Version             | 3        |    |
| Max Value           | 4        |    |
| Mode Value          | 3        |    |
| Mode Frequency      |          | 2  |
| Non-Modal Values    |          | -2 |
| Non-Modal Rows      |          | 2  |
| Date                | 02/06/17 |    |
| Time                | 13:12:45 |    |
| Number of Rows      |          | 21 |
| Number of Nulls     |          | 0  |
| Number of All Nulls |          | 0  |
| Number of AMPs      | 2        |    |
| Average AMP RPV     | 0        |    |
| Number of Intervals | 7        |    |
| Interval            | 2        |    |
| Number of Uniques   |          | 17 |
| Numeric             | Y        |    |
| Sampled             | 0        |    |
| Sampled Percent     | 0        |    |
| Version             | 3        |    |
| Max Value           | 6        |    |
| Mode Value          | 5        |    |
| Mode Frequency      |          | 3  |
| Non-Modal Values    |          | -2 |

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HELP STATISTICS (Optimizer Form)

|                     |          |    |
|---------------------|----------|----|
| Non-Modal Rows      |          | 1  |
| Date                | 02/06/17 |    |
| Time                | 13:12:45 |    |
| Number of Rows      |          | 21 |
| Number of Nulls     |          | 0  |
| Number of All Nulls |          | 0  |
| Number of AMPs      | 2        |    |
| Average AMP RPV     | 0        |    |
| Number of Intervals | 7        |    |
| Interval            | 3        |    |
| Number of Uniques   |          | 17 |
| Numeric             | Y        |    |
| Sampled             | 0        |    |
| Sampled Percent     | 0        |    |
| Version             | 3        |    |
| Max Value           | 8        |    |
| Mode Value          | 7        |    |
| Mode Frequency      |          | 1  |
| Non-Modal Values    |          | -2 |
| Non-Modal Rows      |          | 2  |
| Date                | 02/06/17 |    |
| Time                | 13:12:45 |    |
| Number of Rows      |          | 21 |
| Number of Nulls     |          | 0  |
| Number of All Nulls |          | 0  |
| Number of AMPs      | 2        |    |
| Average AMP RPV     | 0        |    |
| Number of Intervals | 7        |    |
| Interval            | 4        |    |
| Number of Uniques   |          | 17 |
| Numeric             | Y        |    |
| Sampled             | 0        |    |
| Sampled Percent     | 0        |    |
| Version             | 3        |    |
| Max Value           | 10       |    |
| Mode Value          | 9        |    |
| Mode Frequency      |          | 2  |
| Non-Modal Values    |          | -2 |
| Non-Modal Rows      |          | 3  |
| Date                | 02/06/17 |    |
| Time                | 13:12:45 |    |
| Number of Rows      |          | 21 |
| Number of Nulls     |          | 0  |

|                     |          |    |
|---------------------|----------|----|
| Number of All Nulls |          | 0  |
| Number of AMPs      | 2        |    |
| Average AMP RPV     | 0        |    |
| Number of Intervals | 7        |    |
| Interval            | 5        |    |
| Number of Uniques   |          | 17 |
| Numeric             | Y        |    |
| Sampled             | 0        |    |
| Sampled Percent     | 0        |    |
| Version             | 3        |    |
| Max Value           | 12       |    |
| Mode Value          | 11       |    |
| Mode Frequency      |          | 2  |
| Non-Modal Values    |          | -2 |
| Non-Modal Rows      |          | 2  |
| Date                | 02/06/17 |    |
| Time                | 13:12:45 |    |
| Number of Rows      |          | 21 |
| Number of Nulls     |          | 0  |
| Number of All Nulls |          | 0  |
| Number of AMPs      | 2        |    |
| Average AMP RPV     | 0        |    |
| Number of Intervals | 7        |    |
| Interval            | 6        |    |
| Number of Uniques   |          | 17 |
| Numeric             | Y        |    |
| Sampled             | 0        |    |
| Sampled Percent     | 0        |    |
| Version             | 3        |    |
| Max Value           | 15       |    |
| Mode Value          | 13       |    |
| Mode Frequency      |          | 1  |
| Non-Modal Values    |          | -2 |
| Non-Modal Rows      |          | 1  |
| Date                | 02/06/07 |    |
| Time                | 13:12:45 |    |
| Number of Rows      |          | 21 |
| Number of Nulls     |          | 0  |
| Number of All Nulls |          | 0  |
| Number of AMPs      | 2        |    |
| Average AMP RPV     | 0        |    |
| Number of Intervals | 7        |    |
| Interval            | 7        |    |

|                   |    |    |
|-------------------|----|----|
| Number of Uniques |    | 17 |
| Numeric           | Y  |    |
| Sampled           | 0  |    |
| Sampled Percent   | 0  |    |
| Version           | 3  |    |
| Max Value         | 25 |    |
| Mode Value        | 20 |    |
| Mode Frequency    |    | 1  |
| Non-Modal Values  |    | -2 |
| Non-Modal Rows    |    | 1  |

Example 3: PARTITION Statistics

The following example closely examines the results of collecting statistics on the system-derived PARTITION column of a PPI table.

The following CREATE TABLE request defines the PPI table used for the example:

```
CREATE SET TABLE t1 (  
  a1 CHARACTER(1),  
  p1 INTEGER)  
PRIMARY INDEX ( a1 )  
PARTITION BY RANGE_N(p1 BETWEEN 1 AND 10  
                      EACH      2);
```

The following SELECT request demonstrates that if you request data from all columns in the table, no information for the PARTITION column is returned.

```
SELECT *  
FROM t1  
ORDER BY 1, 2;  
  
a1      p1  
--  -----  
a          1  
b          2  
c          5  
d          6  
e          8  
f          9
```

Now perform a query on the same table that counts how many rows are in each of the partitions:

```
SELECT COUNT (*), PARTITION  
FROM t1  
GROUP BY 2  
ORDER BY 2;
```

Note that while the partition numbers reported are the *external* partition numbers (see the section on the system-derived PARTITION column in *Database Design* for information about the difference between internal and external partition numbers), partition statistics are actually collected on the *internal* partition numbers.



| Count (*) | PARTITION |
|-----------|-----------|
| 2         | 1         |
| 2         | 3         |
| 1         | 4         |
| 1         | 5         |

Now collect statistics on the PARTITION column of *t1*.

First collect single-column partition statistics:

```
COLLECT STATISTICS ON t1 COLUMN PARTITION;
```

Next collect multicolumn partition statistics:

```
COLLECT STATISTICS ON t1 COLUMN (PARTITION, a1);
```

Because the reported partition numbers are the external versions, you must perform a manual conversion on them to be able to interpret the histogram.

Finally, run HELP STATISTICS on the system-derived PARTITION column of *t1* to see what the collected statistics are.

First run the single-column PARTITION statistics report:

```
HELP STATISTICS t1 COLUMN PARTITION;

/* Interval - 0*/
      Date 05/01/26
      Time 11:17:29
      Number of Rows                6 ← Total number of rows
      Number of Nulls                0
      Number of All Nulls            0
      Number of AMPs                 2
      Average AMP RPV 0
      Number of Intervals            4
      Interval                       0
      Number of Uniques                4 ← Total number of non-empty partitions
      Numeric Y
      Sampled 0
      Sampled Percent 0
      Version 3
      Max Value 7
      Mode Value 3
      Mode Frequency                2
      Non-Modal Values                0
      Non-Modal Rows                0
/* Interval - 1*/
      Date 05/01/26
      Time 11:17:29
```

```

        Number of Rows                6 ← Total number of rows
        Number of Nulls                0
        Number of All Nulls            0
        Number of AMPs                 2
        Average AMP RPV                0
        Number of Intervals            4
        Interval                       1
        Number of Uniques               4 ← Total number of non-empty partitions
        Numeric                        Y
        Sampled                        0
        Sampled Percent                0
        Version                        3
        Max Value                      3
        Mode Value                     3
        Mode Frequency                  2
        Non-Modal Values                0
        Non-Modal Rows                  0
/* Interval - 2*/
        Date 05/01/26
        Time 11:17:29
        Number of Rows                6 ← Total number of rows
        Number of Nulls                0
        Number of All Nulls            0
        Number of AMPs                 2
        Average AMP RPV                0
        Number of Intervals            4
        Interval                       2
        Number of Uniques               4 ← Total number of non-empty partitions
        Numeric                        Y
        Sampled                        0
        Sampled Percent                0
        Version                        3
        Max Value                      5
        Mode Value                     5
        Mode Frequency                  2
        Non-Modal Values                0
        Non-Modal Rows                  0
/* Interval - 3*/
        Date 05/01/26
        Time 11:17:29

```

|                     |          |                                        |
|---------------------|----------|----------------------------------------|
| Number of Rows      | 6        | ← Total number of rows                 |
| Number of Nulls     | 0        |                                        |
| Number of All Nulls | 0        |                                        |
| Number of AMPs      | 2        |                                        |
| Average AMP RPV     | 0        |                                        |
| Number of Intervals | 4        |                                        |
| Interval            | 3        |                                        |
| Number of Uniques   | 4        | ← Total number of non-empty partitions |
| Numeric             | Y        |                                        |
| Sampled             | 0        |                                        |
| Sampled Percent     | 0        |                                        |
| Version             | 3        |                                        |
| Max Value           | 6        |                                        |
| Mode Value          | 6        |                                        |
| Mode Frequency      | 1        |                                        |
| Non-Modal Values    | 0        |                                        |
| Non-Modal Rows      | 0        |                                        |
| /* Interval - 4*/   |          |                                        |
| Date                | 05/01/26 |                                        |
| Time                | 11:17:29 |                                        |
| Number of Rows      | 6        | ← Total number of rows                 |
| Number of Nulls     | 0        |                                        |
| Number of All Nulls | 0        |                                        |
| Number of AMPs      | 2        |                                        |
| Average AMP RPV     | 0        |                                        |
| Number of Intervals | 4        |                                        |
| Interval            | 4        |                                        |
| Number of Uniques   | 4        | ← Total number of non-empty partitions |
| Numeric             | Y        |                                        |
| Sampled             | 0        |                                        |
| Sampled Percent     | 0        |                                        |
| Version             | 3        |                                        |
| Max Value           | 7        |                                        |
| Mode Value          | 7        |                                        |
| Mode Frequency      | 1        |                                        |
| Non-Modal Values    | 0        |                                        |
| Non-Modal Rows      | 0        |                                        |

Now look at the multicolumn PARTITION statistics:

```
HELP STATISTICS t1 COLUMN (PARTITION, a1);
```

```

/* Interval - 0*/
    Date                05/01/26
    Time                11:17:46
    Number of Rows                        6
    Number of Nulls                      0
    Number of All Nulls                  0
    Number of AMPs                      2
    Average AMP RPV          0
    Number of Intervals              5
    Interval                    0
    Number of Uniques                        6
    Numeric                      N
    Sampled                      0
    Sampled Percent              0
    Version                      3
    Max Value                    7,'f'
    Mode Value                    3,'a'
    Mode Frequency                        1
    Non-Modal Values              0
    Non-Modal Rows                0
/* Interval - 1*/
    Date                05/01/26
    Time                11:17:46
    Number of Rows                        6
    Number of Nulls                      0
    Number of All Nulls                  0
    Number of AMPs                      2
    Average AMP RPV          0
    Number of Intervals              5
    Interval                    1
    Number of Uniques                        6
    Numeric                      N
    Sampled                      0
    Sampled Percent              0
    Version                      3
    Max Value                    3,'a'
    Mode Value                    3,'a'
    Mode Frequency                        1
    Non-Modal Values              0
    Non-Modal Rows                0
/* Interval - 2*/
    Date                05/01/26

```

```

Time                11:17:46
Number of Rows      6
Number of Nulls     0
Number of All Nulls 0
Number of AMPs      2
Average AMP RPV     0
Number of Intervals 5
Interval            2
Number of Uniques   6
Numeric             N
Sampled              0
Sampled Percent     0
Version              3
Max Value            5, 'c'
Mode Value           3, 'b'
Mode Frequency       1
Non-Modal Values     1
Non-Modal Rows       1
/* Interval - 3*/
Date                05/01/26
Time                11:17:46
Number of Rows      6
Number of Nulls     0
Number of All Nulls 0
Number of AMPs      2
Average AMP RPV     0
Number of Intervals 5
Interval            3
Number of Uniques   6
Numeric             N
Sampled              0
Sampled Percent     0
Version              3
Max Value            5, 'd'
Mode Value           5, 'd'
Mode Frequency       1
Non-Modal Values     0
Non-Modal Rows       0
/* Interval - 4*/
Date                05/01/26
Time                11:17:46
Number of Rows      6
Number of Nulls     0

```

|                     |          |   |
|---------------------|----------|---|
| Number of All Nulls |          | 0 |
| Number of AMPs      | 2        |   |
| Average AMP RPV     | 0        |   |
| Number of Intervals | 5        |   |
| Interval            | 4        |   |
| Number of Uniques   |          | 6 |
| Numeric             | N        |   |
| Sampled             | 0        |   |
| Sampled Percent     | 0        |   |
| Version             | 3        |   |
| Max Value           | 6, 'e'   |   |
| Mode Value          | 6, 'e'   |   |
| Mode Frequency      |          | 1 |
| Non-Modal Values    |          | 0 |
| Non-Modal Rows      |          | 0 |
| /* Interval - 5*/   |          |   |
| Date                | 05/01/26 |   |
| Time                | 11:17:46 |   |
| Number of Rows      |          | 6 |
| Number of Nulls     |          | 0 |
| Number of All Nulls |          | 0 |
| Number of AMPs      | 2        |   |
| Average AMP RPV     | 0        |   |
| Number of Intervals | 5        |   |
| Interval            | 5        |   |
| Number of Uniques   |          | 6 |
| Numeric             | N        |   |
| Sampled             | 0        |   |
| Sampled Percent     | 0        |   |
| Version             | 3        |   |
| Max Value           | 7, 'f'   |   |
| Mode Value          | 7, 'f'   |   |
| Mode Frequency      |          | 1 |
| Non-Modal Values    |          | 0 |
| Non-Modal Rows      |          | 0 |

**Example 4: Pure High-Biased Interval Histogram Statistics**

Suppose you create the following table:

```
CREATE TABLE t (  
  x INTEGER,  
  y INTEGER)  
INDEX (y);
```

You then insert rows into the empty table:

```
INSERT INTO t VALUES (1,2);
INSERT INTO t VALUES (2,2);
INSERT INTO t VALUES (3,3);
INSERT INTO t VALUES (4,4);
INSERT INTO t VALUES (5,5);
INSERT INTO t VALUES (6,5);
INSERT INTO t VALUES (7,);
```

Table *t* then has seven rows with the following values in its columns:

| t    |      |
|------|------|
| x    | y    |
| NUPI | NUSI |
| 1    | 2    |
| 2    | 2    |
| 3    | 3    |
| 4    | 4    |
| 5    | 5    |
| 6    | 5    |
| 7    | ?    |

You then collect column statistics on column *y*:

```
COLLECT STATISTICS t COLUMN y;
```

After you collect the statistics, you submit the following HELP STATISTICS request for the NUSI column *y* of table *t*:

```
.FOLDLINE
.SIDETITLES
HELP STATISTICS t COLUMN y;
```

The report produced by this request looks something like this:

```

Date 07/04/06
Time 10:44:53
Number of Rows              7
Number of Nulls             1
Number of All Nulls         1
Number of AMPs              2
Average AMP RPV +7.000000000000000E-1
Number of Intervals         2
Interval                    0
Number of Uniques           5
Numeric Y
Sampled                     0
Sampled Percent             0
```

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```

Version      3
Max Value    2
Mode Value   2
Mode Frequency      2
Non-Modal Values    ?
Non-Modal Rows      ?
Date 07/04/26
Time 10:44:53
Number of Rows      7
Number of Nulls     1
Number of All Nulls 1
Number of AMPs      2
Average AMP RPV +7.000000000000000E-1
Number of Intervals 2
Interval          1
Number of Uniques   5
Numeric Y
Sampled           0
Sampled Percent    0
Version           3
Max Value          3
Mode Value         2
Mode Frequency      2
Non-Modal Values    -2
Non-Modal Rows      1
Date 07/04/26
Time 10:44:53
Number of Rows      7
Number of Nulls     1
Number of All Nulls 1
Number of AMPs      2
Average AMP RPV +7.000000000000000E-1
Number of Intervals 2
Interval           2
Number of Uniques   5
Numeric Y
Sampled           0
Sampled Percent    0
Version           3
Max Value          5
Mode Value         4
Mode Frequency      1
Non-Modal Values    -2

```



Note the following about these statistics:

- The values for the following statistics are repeated for each interval in the histogram:
 

|                        |                       |                     |
|------------------------|-----------------------|---------------------|
| • Date (of collection) | • Number of All Nulls | • Number of Uniques |
| • Time (of collection) | • Number of AMPs      | • Numeric           |
| • Number of Rows       | • Average AMP RPV     | • Sampled           |
| • Number of Nulls      | • Number of Intervals | • Sampled Percent   |
|                        |                       | • Version           |
- The summary information across all intervals is reported in interval 0. Note that, with the exception of the *Interval*, *Max Value*, *Mode Value*, *Mode Frequency*, *Non-Modal Values*, and *Non-Modal Rows* attributes for interval 0, the summary information is repeated for each interval in the histogram.
  - The number of intervals that contain nonsummary information is 2.
  - The number of rows containing at least one null for the specified column set is 1.
  - The number of rows containing all nulls for the specified column set is 1.

This example is degenerate because statistics were collected on only one column, so the values for *Number of Nulls* and *Number of All Nulls* always match.

If statistics had been collected on a multicolumn set of a composite index, the values might differ.

  - There are 5 unique values among the 7 individual values of column *y*. By examining table *t*, you can see that they are the following: null, 2, 3, 4, and 5.
  - COLLECT STATISTICS has determined that the statistics for these 5 unique values are best represented by a 2-interval histogram composed of two high-biased intervals (see *SQL Request and Transaction Processing* for definitions of this interval type).- Interval 1 is a high-biased interval, as indicated by the value of -2 for the *Non-Modal Values* statistic. This changes the meaning of the reported statistics as follows:
  - The value of the *Max Value* statistic for interval 1 is 3.  
Because this is a high-biased interval, the value reported is actually the value of the larger loner value in the interval, not its maximum value.
  - The value of the *Mode Value* statistic for interval 1 is 2.  
Because this is a high-biased interval, the value reported is actually the value of the smaller loner value in the interval, not its modal value.
  - The value of the *Non-Modal Rows* statistic for interval 1 is 1.  
Because this is a high-biased interval, the value reported is actually the frequency of occurrence of the larger loner value, not the number of nonmodal rows.  
By examining table *t*, you can see that the reported value, 1, matches the frequency of occurrence of the higher loner value in the interval, which is 3. There is only one occurrence of the value 3 in column *y* of table *t*.

- Interval 2 is also a high-biased interval, as indicated by the value of -2 for the *Non-Modal Values* statistic. This changes the meaning of the reported statistics as follows:
  - The value of the *Max Value* statistic for interval 2 is 5.  
Because this is a high-biased interval, the value reported is actually the value of the larger loner value in the interval, not its maximum value.
  - The value of the *Mode Value* statistic for interval 2 is 4.  
Because this is a high-biased interval, the value reported is actually the value of the smaller loner value in the interval, not its modal value.
  - The value of the *Non-Modal Rows* statistic for interval 2 is 2.  
Because this is a high-biased interval, the value reported is actually the frequency of occurrence of the larger loner value, not the number of non-modal rows.  
By examining table *t*, you can see that the reported value, 2, matches the frequency of occurrence of the higher loner value in the interval, which is 5. There are two occurrences of the value 5 in column *y* of table *t*.

## Example 5

Suppose you have collected statistics on the following single and multicolumn sets from the *orders* table:

```
COLLECT STATISTICS COLUMN (o_orderdate),  
                        COLUMN (o_orderkey),  
                        COLUMN (o_orderdate, o_orderkey),  
                        COLUMN (o_orderkey, o_orderdate)  
ON orders;
```

The following request displays a summary of statistical information for the *orders* table.

```
HELP STATISTICS orders;
```

The following request displays detailed statistical information for column (*o\_orderdate*).

```
HELP STATISTICS orders COLUMN (o_orderdate);
```

## Example 6: Column Expressions

Suppose you have collected statistics on the following column expressions from the *orders* table:

```
COLLECT STATISTICS COLUMN (o_orderdate - 7),  
                        COLUMN (o_orderdate + 7, o_orderkey)  
ON orders;
```

The following request displays a summary of statistical information for the *orders* table.

```
HELP STATISTICS orders;
```

The following request displays detailed statistical information for the column expression (*o\_orderdate - 7*).

```
HELP STATISTICS orders COLUMN (o_orderdate - 7);
```

## Related Topics

For information about collecting and dropping optimizer statistics, see the following:

- [“COLLECT STATISTICS \(Optimizer Form\)” on page 99](#)
- [“DROP STATISTICS \(Optimizer Form\)” on page 586](#)

Also see *SQL Request and Transaction Processing* and *Database Design* for information about statistics and their collection.

# HELP STATISTICS (QCD Form)

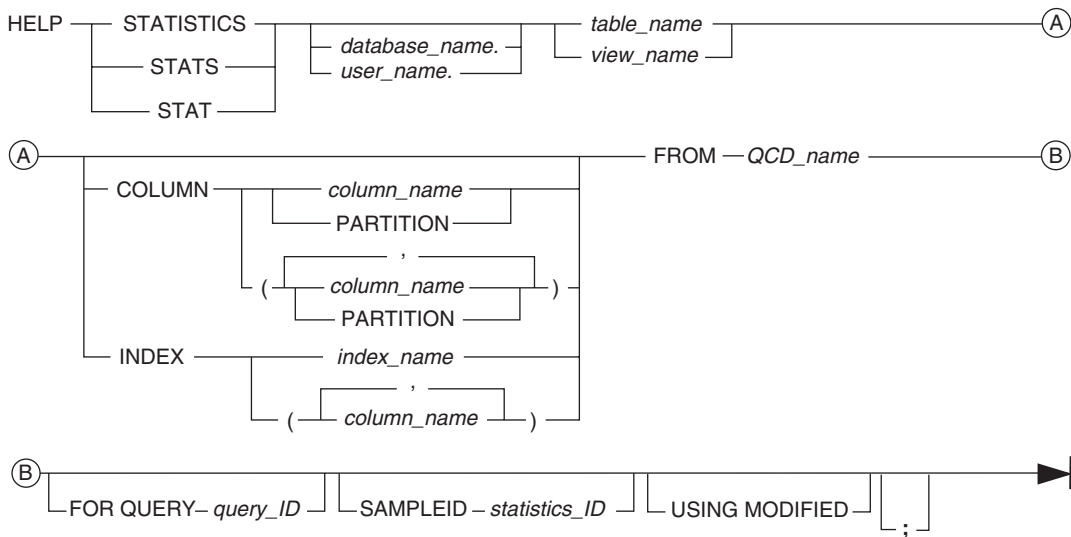
## Purpose

Displays summary or detailed attributes for the statistics that have been collected in the TableStatistics table of the specified QCD database for the specified table.

## Invocation

Executable.

## Syntax



1101J243

where:

| Syntax element ...                      | Specifies ...                                                                                                           |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | the name of the containing database or user for <i>table_name</i> if something other than the current database or user. |
| <i>table_name</i>                       | the name of the table for which QCD statistics information is required.                                                 |
| <i>view_name</i>                        | the name of a single-table view for which QCD statistics information is required.                                       |
| COLUMN                                  | that detailed statistics help is desired for a column set from the specified table.                                     |

| Syntax element ...            | Specifies ...                                                                                                                                                                                                                                                                          |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>column_name</i>            | <p>the name of a specific column in the specified table for which statistics help is required.</p> <p>To request information on multiple columns, enclose the individual column names within PARENTHESIS characters and separate each name in the list with a COMMA character.</p>     |
| PARTITION                     | <p>that statistics help information is desired for the PARTITION column of an SLPPI table.</p> <p>You cannot reference the PARTITION#<i>Ln</i> columns of an MLPPI table in a HELP STATISTICS statement.</p>                                                                           |
| INDEX                         | that detailed statistics help is desired for an index column set from the named index.                                                                                                                                                                                                 |
| <i>index_name</i>             | the name of the index in the specified table for which statistics help is required.                                                                                                                                                                                                    |
| <i>column_name</i>            | <p>the name of a specific column in the specified index for which statistics help is required.</p> <p>To request information on multiple columns, enclose the individual column names within PARENTHESIS characters and separate each name in the list with a COMMA character.</p>     |
| FROM <i>QCD_name</i>          | that the statistics to be retrieved are to be found in the TableStatistics table of the specified QCD database.                                                                                                                                                                        |
| FOR QUERY <i>query_ID</i>     | <p>a value inserted into <i>QCD.TableStatistics.QueryId</i>.</p> <p>Each unique composite of <i>query_ID</i> and <i>statistics_ID</i> identifies a separate set of statistics in <i>QCD.TableStatistics</i> for a given column or index.</p> <p>The default value is 0.</p>            |
| SAMPLEID <i>statistics_ID</i> | <p>a value to be inserted into <i>QCD.TableStatistics.StatisticsId</i>.</p> <p>Each unique composite of <i>query_ID</i> and <i>statistics_ID</i> identifies a separate set of statistics in <i>QCD.TableStatistics</i> for a given column or index.</p> <p>The default value is 1.</p> |
| USING MODIFIED                | <p>that you want to report the modified statistics stored in <i>QCD.TableStatistics.ModifiedStats</i>.</p> <p>If you do not specify the USING MODIFIED option, the system reports the unmodified statistics stored in <i>QCD.TableStatistics.StatisticsInfo</i>.</p>                   |

## ANSI Compliance

HELP STATISTICS (QCD Form) is a Teradata extension to the ANSI SQL:2008 standard.

Required Privileges

You must have one of the following privileges to perform the QCD form of HELP STATISTICS:

- Any privilege on *table\_name*.
- Own *table\_name* and have SELECT privilege on the *TableStatistics* table in *QCD\_name*.

Use the SHOW privilege to enable a user to perform HELP or SHOW requests *only* against the QCD statistics collected on a specified database object.

Example 1: Summary Statistics

The report produced by the summary form of HELP STATISTICS (QCD Form) is identical to that produced by the summary form of HELP STATISTICS (Optimizer Form).

Assume you collected statistics on the Employee table at the same time using COLLECT STATISTICS (Optimizer Form) and COLLECT STATISTICS (QCD Form) with a 99 percent sample percentage<sup>4</sup>, then the following statement would report the columns and indexes of the Employee table that currently have sampled statistics in the TableStatistics table of the MyQCD database:

```
HELP STATISTICS Personnel.Employee FROM MyQCD;
```

The result shows that statistics were last collected for YrsExp on 02/06/17, when there were 17 unique values for the column:

| Date     | Time     | Unique Values | Column Names |
|----------|----------|---------------|--------------|
| 02/06/17 | 13:12:45 | 17            | YrsExp       |

Example 2: Detailed Interval Statistics (Field Mode)

The following example displays detailed interval statistics in Field Mode. The example also demonstrates the use of BTEQ options to control the display of a row consisting of many columns.

Note that the reported negative values returned as part of the detailed statistics are special indicators used by the Optimizer to mark the associated Mode and Max values as high frequency loner values.

4. The report does not reflect sample size. Sample size is mentioned only to ensure that the comparison between the reports is accurate. A significantly smaller sample size could produce somewhat different statistics.

```
.SET FOLDLINE ON
.SET SIDETITLES ON
.SET RETLIMIT 1000 *
```

```
HELP STATISTICS Personnel.Employee COLUMN YrsExp FROM MyQCD;
```

|                     |          |
|---------------------|----------|
| Date                | 02/06/17 |
| Time                | 13:12:45 |
| Number of Rows      | 21       |
| Number of Nulls     | 0        |
| Number of Intervals | 7        |
| Number of Uniques   | 17       |
| Numeric             | Y        |
| Sampled             | 0        |
| Sampled Percent     | 0        |
| Version             | 2        |
| Min Value           | 3        |
| Mode Value          | 5        |
| Mode Frequency      | 3        |
| Max Value           | 4        |
| Mode Value          | 3        |
| Mode Frequency      | 2        |
| Non-Modal Values    | -2       |
| Non-Modal Rows      | 2        |
| Max Value           | 6        |
| Mode Value          | 5        |
| Mode Frequency      | 3        |
| Non-Modal Values    | -2       |
| Non-Modal Rows      | 1        |
| Max Value           | 8        |
| Mode Value          | 7        |
| Mode Frequency      | 1        |
| Non-Modal Values    | -2       |
| Non-Modal Rows      | 2        |
| Max Value           | 10       |
| Mode Value          | 9        |
| Mode Frequency      | 2        |
| Non-Modal Values    | -2       |
| Non-Modal Rows      | 3        |
| Max Value           | 12       |

|                  |    |
|------------------|----|
| Mode Value       | 11 |
| Mode Frequency   | 2  |
| Non-Modal Values | -2 |
| Non-Modal Rows   | 2  |
| Max Value        | 15 |
| Mode Value       | 13 |
| Mode Frequency   | 1  |
| Non-Modal Values | -2 |
| Non-Modal Rows   | 1  |
| Max Value        | 25 |
| Mode Value       | 20 |
| Mode Frequency   | 1  |
| Non-Modal Values | -2 |
| Non-Modal Rows   | 1  |

## Related Topics

For information about collecting and dropping QCD statistics, see the following:

- “COLLECT STATISTICS (QCD Form) in *SQL Data Manipulation Language*
- “DROP STATISTICS (QCD Form) in *SQL Data Manipulation Language*

Also see the chapter on query capture databases in *SQL Request and Transaction Processing*.

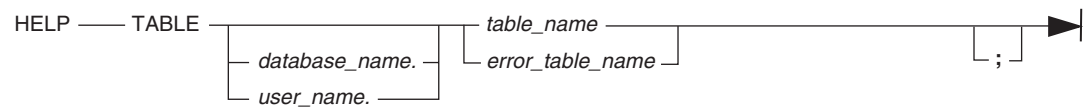


# HELP TABLE

## Purpose

Displays the attributes for the specified base data table.

## Syntax



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where:

| Syntax Element...                       | Specifies the name of the ...                                                                                |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>table_name</i> if something other than the current database or user.  |
| <i>table_name</i>                       | table or queue table for which help is required.                                                             |
| <i>error_table_name</i>                 | error table for which help is required.<br>See “ <a href="#">HELP ERROR TABLE</a> ” on page 713 for details. |

## ANSI Compliance

HELP TABLE is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

To execute this statement, you must have either of the following privileges:

- Ownership of the specified base table or queue table.
- At least one privilege on the requested object.

Use the SHOW privilege to enable a user to perform HELP or SHOW requests *only* against a specified table.

## Example 1: HELP TABLE

The following request returns information about the *department* table.

```
HELP TABLE personnel.department;
```

| Column Name | Type | Comment                               |
|-------------|------|---------------------------------------|
| DeptNo      | I2   | Department number                     |
| DeptName    | CV   | Department name                       |
| Loc         | CF   | Department location                   |
| MgrNo       | I    | Employee number of department manager |

## Example 2: HELP TABLE With UDTs

The following example shows the HELP TABLE report for a table containing a UDT named *UDTINT*:

```
HELP TABLE t1;
```

|                                |        |
|--------------------------------|--------|
| Column Name                    | id     |
| Type                           | I      |
| Comment                        | ?      |
| Nullable                       | Y      |
| Format                         | -(10)9 |
| Title                          | ?      |
| Max Length                     | 4      |
| Decimal Total Digits           | ?      |
| Decimal Fractional Digits      | ?      |
| Range Low                      | ?      |
| Range High                     | ?      |
| UpperCase                      | N      |
| Table/View?                    | T      |
| Default value                  | ?      |
| Char Type                      | ?      |
| IdCol Type                     | ?      |
| UDT Name                       | ?      |
| Temporal Column                | ?      |
| Current ValidTime Unique       | ?      |
| Sequenced ValidTime Unique     | ?      |
| Nonsequenced ValidTime Unique  | ?      |
| Current TransactionTime Unique | ?      |
| Column Name                    | myint  |
| Type                           | UT     |
| Comment                        | ?      |
| Nullable                       | Y      |
| Format                         | -(10)9 |
| Title                          | ?      |

```
Max Length 4
Decimal Total Digits ?
Decimal Fractional Digits ?
Range Low ?
Range High ?
UpperCase N
Table/View? T
Default value ?
Char Type ?
IdCol Type ?
UDT Name UDINT
Temporal Column ?
Current ValidTime Unique ?
Sequenced ValidTime Unique ?
Nonsequenced ValidTime Unique ?
Current TransactionTime Unique ?
```

**Example 3: HELP TABLE With Temporal Columns**

Assume the following table definition.

```
CREATE TABLE department (
  deptname VARCHAR(10),
  deptno INTEGER NOT NULL UNIQUE,
  avgsalary INTEGER,
  deptduration PERIOD(DATE) AS VALIDTIME,
  depttran PERIOD(TIMESTAMP(6) WITH TIME ZONE) TRANSACTIONTIME)
PRIMARY INDEX (deptname);
```

The following example shows the HELP TABLE report for the *department* table using BTEQ:

```
HELP TABLE department;

*** Help information returned. 5 rows.

Column Name  deptname
Type         CV
Nullable     Y
Format       X(10)
Max Length   10
Decimal Total Digits ?
Decimal Fractional Digits ?
Range Low    ?
Range High   ?
UpperCase    N
Table/View?  T
Indexed?     Y
Unique?      N
```

|                                |           |   |   |
|--------------------------------|-----------|---|---|
| Primary?                       | P         |   |   |
| Title                          | ?         |   |   |
| Column Constraint              | ?         |   |   |
| Char Type                      | 1         |   |   |
| IdCol Type                     | ?         |   |   |
| UDT Name                       | ?         |   |   |
| Temporal Column                | ?         |   |   |
| Current ValidTime Unique       | ?         |   |   |
| Sequenced ValidTime Unique     | ?         |   |   |
| Nonsequenced ValidTime Unique  | ?         |   |   |
| Current TransactionTime Unique | ?         |   |   |
| Column Name                    | deptno    |   |   |
| Type                           | I         |   |   |
| Nullable                       | N         |   |   |
| Format                         | -(10)9    |   |   |
| Max Length                     |           | 4 |   |
| Decimal Total Digits           | ?         |   |   |
| Decimal Fractional Digits      | ?         |   |   |
| Range Low                      |           |   | ? |
| Range High                     |           |   | ? |
| UpperCase                      | N         |   |   |
| Table/View?                    | T         |   |   |
| Indexed?                       | Y         |   |   |
| Unique?                        | Y         |   |   |
| Primary?                       | S         |   |   |
| Title                          | ?         |   |   |
| Column Constraint              | ?         |   |   |
| Char Type                      | ?         |   |   |
| IdCol Type                     | ?         |   |   |
| UDT Name                       | ?         |   |   |
| Temporal Column                | ?         |   |   |
| Current ValidTime Unique       | ?         |   |   |
| Sequenced ValidTime Unique     | ?         |   |   |
| Nonsequenced ValidTime Unique  | ?         |   |   |
| Current TransactionTime Unique | ?         |   |   |
| Column Name                    | avgsalary |   |   |
| Type                           | I         |   |   |
| Nullable                       | Y         |   |   |
| Format                         | -(10)9    |   |   |
| Max Length                     |           | 4 |   |
| Decimal Total Digits           | ?         |   |   |
| Decimal Fractional Digits      | ?         |   |   |
| Range Low                      |           |   | ? |

|                                |              |
|--------------------------------|--------------|
| Range High                     | ?            |
| UpperCase                      | N            |
| Table/View?                    | T            |
| Indexed?                       | N            |
| Unique?                        | ?            |
| Primary?                       | ?            |
| Title                          | ?            |
| Column Constraint              | ?            |
| Char Type                      | ?            |
| IdCol Type                     | ?            |
| UDT Name                       | ?            |
| Temporal Column                | ?            |
| Current ValidTime Unique       | ?            |
| Sequenced ValidTime Unique     | ?            |
| Nonsequenced ValidTime Unique  | ?            |
| Current TransactionTime Unique | ?            |
| Column Name                    | deptduration |
| Type                           | PD           |
| Nullable                       | Y            |
| Format                         | YY/MM/DD     |
| Max Length                     | 8            |
| Decimal Total Digits           | ?            |
| Decimal Fractional Digits      | ?            |
| Range Low                      | ?            |
| Range High                     | ?            |
| UpperCase                      | N            |
| Table/View?                    | T            |
| Indexed?                       | N            |
| Unique?                        | ?            |
| Primary?                       | S            |
| Title                          | ?            |
| Column Constraint              | ?            |
| Char Type                      | ?            |
| IdCol Type                     | ?            |
| UDT Name                       | ?            |
| Temporal Column                | ?            |
| Current ValidTime Unique       | ?            |
| Sequenced ValidTime Unique     | ?            |
| Nonsequenced ValidTime Unique  | ?            |
| Current TransactionTime Unique | ?            |
| Column Name                    | depttran     |
| Type                           | PZ           |
| Nullable                       | Y            |

|                                |                           |
|--------------------------------|---------------------------|
| Format                         | YYYY-MM-DDBHH:MI:SS.S(6)Z |
| Max Length                     | 24                        |
| Decimal Total Digits           | ?                         |
| Decimal Fractional Digits      | 6                         |
| Range Low                      | ?                         |
| Range High                     | ?                         |
| UpperCase                      | N                         |
| Table/View?                    | T                         |
| Indexed?                       | N                         |
| Unique?                        | ?                         |
| Primary?                       | S                         |
| Title                          | ?                         |
| Column Constraint              | ?                         |
| Char Type                      | ?                         |
| IdCol Type                     | ?                         |
| UDT Name                       | ?                         |
| Temporal Column                | ?                         |
| Current ValidTime Unique       | ?                         |
| Sequenced ValidTime Unique     | ?                         |
| Nonsequenced ValidTime Unique  | ?                         |
| Current TransactionTime Unique | ?                         |

# HELP TRANSFORM

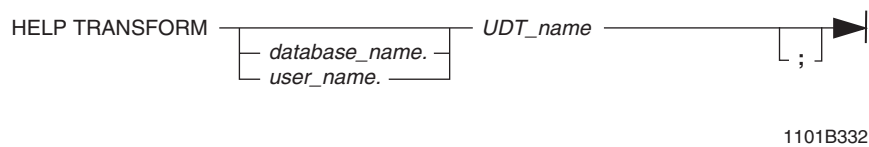
## Purpose

Reports the fromsql and tosql transform routines for the specified UDT or predefined data type.

## Invocation

Executable.

## Syntax



where:

| Syntax element ... | Specifies ...                                                                                                    |
|--------------------|------------------------------------------------------------------------------------------------------------------|
| SYSUDTLIB          | the name of the containing database for the transform group being reported.<br>This is always <i>SYSUDTLIB</i> . |
| <i>UDT_name</i>    | the name of the UDT for which the transform group information is being reported.                                 |

## ANSI Compliance

HELP TRANSFORM is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

- You must have at least one privilege on the *SYSUDTLIB* database to perform HELP TRANSFORM.
- Use the SHOW privilege to enable a user to perform HELP or SHOW requests *only* against the specified UDT transform.

Example

The following example reports the transform group name (*client\_IO*), predefined data type to which the UDT is converted (*VARCHAR(40)*), fromsql external routine name (*toString*) and tosql external routine name (*stringToAddress*) for the UDT named *address*:

```
HELP TRANSFORM address;
```

| Group     | Predefined Type | from-sql           | to-sql                    |
|-----------|-----------------|--------------------|---------------------------|
| client_IO | VARCHAR(40)     | SYSUDTLIB.toString | SYSUDTLIB.stringToAddress |

Related Topics

- See the documentation for the following statement and manual for additional information about transform groups.
- [“CREATE TRANSFORM/ REPLACE TRANSFORM” on page 484](#)
  - *SQL Data Definition Language Detailed Topics*
  - *SQL External Routine Programming*



# HELP TRIGGER

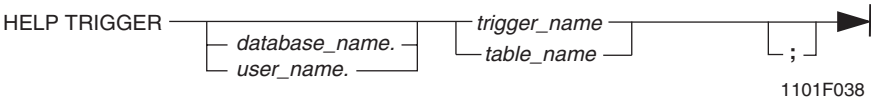
## PurposePurpose

Displays the attributes for the specified trigger.

## Invocation

Executable.

## Syntax



where:

| Syntax Element ...                      | Specifies ...                                                                                                              |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | the name of the containing database or user for the trigger or table if something other than the current database or user. |
| <i>trigger_name</i>                     | the name of the trigger for which information is being requested.                                                          |
| <i>table_name</i>                       | that information for all triggers defined on the named table are to be displayed.                                          |

## ANSI Compliance

HELP TRIGGER is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must either own the specified trigger or table or have at least one privilege on its containing database or, for a trigger, its subject table.

Use the SHOW privilege to enable a user to perform HELP or SHOW requests *only* against the specified trigger.

## Example

The following example reports the information for a trigger that updates a table key.

```
HELP TRIGGER UpdateForKey;

*** Help information returned. 1 row.
*** Total elapsed time was 1 second.
```

| Name                | UpdateForKey        |
|---------------------|---------------------|
| -----               | -----               |
| ActionTime          | B                   |
| Decimal Order Value | 10                  |
| Creation TimeStamp  | 2003-02-12 15:55:02 |
| Event               | I                   |
| Kind                | S                   |
| Enabled             | Y                   |
| Comment             | ?                   |

## Related Topics

See the documentation for the following statements for additional information about triggers.

- [“CREATE TRIGGER/ REPLACE TRIGGER” on page 489](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)
- *SQL Data Definition Language Detailed Topics*

# HELP TYPE

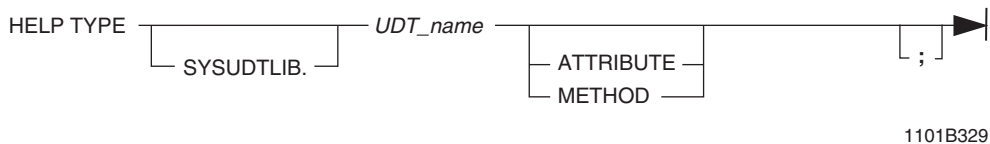
## Purpose

Displays the attributes for a UDT and, optionally, all the attributes of a structured UDT or all the methods associated with the UDT.

## Invocation

Executable.

## Syntax



where:

| Syntax element ...          | Specifies ...                                                                                                                                                                                                                                                                                                                                      |                             |                             |          |                                                         |            |                                        |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-----------------------------|----------|---------------------------------------------------------|------------|----------------------------------------|
| SYSUDTLIB                   | the name of the containing database for <i>UDT_name</i> .<br>This is always <i>SYSUDTLIB</i> .                                                                                                                                                                                                                                                     |                             |                             |          |                                                         |            |                                        |
| <i>UDT_name</i>             | the name of a UDT for which a help report is requested.                                                                                                                                                                                                                                                                                            |                             |                             |          |                                                         |            |                                        |
| ATTRIBUTE                   | that the composition of the specified UDT is the help information requested. <table><tr><th>IF the UDT is this type ...</th><th>THEN the system returns ...</th></tr><tr><td>distinct</td><td>one row that describes the predefined source data type.</td></tr><tr><td>structured</td><td>one row for each attribute of the UDT.</td></tr></table> | IF the UDT is this type ... | THEN the system returns ... | distinct | one row that describes the predefined source data type. | structured | one row for each attribute of the UDT. |
| IF the UDT is this type ... | THEN the system returns ...                                                                                                                                                                                                                                                                                                                        |                             |                             |          |                                                         |            |                                        |
| distinct                    | one row that describes the predefined source data type.                                                                                                                                                                                                                                                                                            |                             |                             |          |                                                         |            |                                        |
| structured                  | one row for each attribute of the UDT.                                                                                                                                                                                                                                                                                                             |                             |                             |          |                                                         |            |                                        |
| METHOD                      | that a report of the methods associated with <i>UDT_type</i> is requested.<br>One row is returned for each method associated with the UDT, including one row for each system-generated observer or mutator method.                                                                                                                                 |                             |                             |          |                                                         |            |                                        |

## ANSI Compliance

HELP TYPE is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have at least one of the following privileges to perform HELP TYPE:

- At least one privilege on the *SYSUDTLIB* database.
- The UDTUSAGE privilege on the UDT.

Use the SHOW privilege to enable a user to perform HELP or SHOW requests *only* against the specified UDT.

## Example 1: HELP TYPE With No Options Specified

The following example shows the standard report returned by HELP TYPE when you do not specify any options:

```
HELP TYPE euro;

      Name  euro
Internal Type  UD
External Type  D
Max Length    8
Decimal Total Digits  ?
Decimal Fractional Digits  ?
Contains LOB  N
Ordering      F
Ordering Category  M
Ordering Routine SYSUDTLIB.euro_to_decimal
Cast          Y
Transform     Y
Method        Y
```

## Example 2: HELP TYPE With ATTRIBUTE Option

The following examples show the standard report returned by HELP TYPE when you specify the ATTRIBUTE option.

The first example shows how the name for the structured UDT named *address* is returned with full qualification:

```
HELP TYPE address ATTRIBUTE;

Attribute Name  street
Type           CV
Max Length     20
Decimal Total Digits  ?
Decimal Fractional Digits  ?
Range Low      ?
Range High     ?
```

```

Char Type 1
UDT Name SYSUDTLIB.UDTName ← (assuming street is an udt)
Attribute Name zip
Type CF
Max Length 5
Decimal Total Digits ?
Decimal Fractional Digits ?
Range Low ?
Range High ?
Char Type 1
UDT Name ?

```

The second example shows a report returned when the specified structured type *INSV\_STRUCTURED\_SMALLINT* has multiple attributes, two of which are themselves structured UDTs.

```

HELP TYPE INSV_STRUCTURED_SMALLINT ATTRIBUTE;

Attribute Name Attribute1
Type I2
Max Length 2
Decimal Total Digits ?
Decimal Fractional Digits ?
Range Low ?
Range High ?
Char Type ?
UDT Name ?
Attribute Name Attribute2
Type UD
Max Length 4
Decimal Total Digits ?
Decimal Fractional Digits ?
Range Low ?
Range High ?
Char Type ?
UDT Name SYSUDTLIB.UDTINT
Attribute Name Attribute3
Type UD
Max Length 50
Decimal Total Digits ?
Decimal Fractional Digits ?
Range Low ?

```

Range High ?  
Char Type ?  
UDT Name SYSUDTLIB.UDTBLOB10

### Example 3: HELP TYPE With METHOD Option

The following example shows the report produced by submitting HELP TYPE with the METHOD option.

Suppose you have the following type definition:

```
CREATE TYPE MyStructuredType AS (  
    Attribute1 DECIMAL(8,2),  
    Attribute2 REAL,  
    Attribute3 VARCHAR(20) )  
NOT FINAL  
/* Signature of constructor method MyStructuredType */  
CONSTRUCTOR METHOD MyStructuredType( P1 INTEGER )  
RETURNS MyStructuredType  
SPECIFIC MyStructuredType_c1  
SELF AS RESULT  
LANGUAGE C  
PARAMETER STYLE SQL  
DETERMINISTIC  
NO SQL,  
/* Signature of instance method Method1 */  
METHOD Method1(VARCHAR(20))  
RETURNS INTEGER  
LANGUAGE C  
NO SQL  
PARAMETER STYLE SQL;
```

Now you submit the following HELP TYPE request for *MyStructuredType* with the METHOD option:

```
HELP TYPE MyStructuredType METHOD;  
  
*** Help information returned. 8 rows.  
*** Total elapsed time was 1 second.  
  
Method Name  ATTRIBUTE3  
Specific Name MYSTRUCTUR_ATTRIBUTE3_04E1_M  
Method Type  M  
Null Call    Y  
Exec Mode    NP  
Deterministic Y  
Method Name  ATTRIBUTE3  
Specific Name MYSTRUCTUR_ATTRIBUTE3_04E0_O  
Method Type  O  
Null Call    N  
Exec Mode    NP  
Deterministic Y
```

```

Method Name  ATTRIBUTE2
Specific Name MYSTRUCTUR_ATTRIBUTE2_04DF_M
Method Type  M
      Null Call  Y
      Exec Mode  NP
Deterministic  Y
Method Name  ATTRIBUTE2
Specific Name MYSTRUCTUR_ATTRIBUTE2_04DE_O
Method Type  O
      Null Call  N
      Exec Mode  NP
Deterministic  Y
Method Name  ATTRIBUTE1
Specific Name MYSTRUCTUR_ATTRIBUTE1_04DD_M
Method Type  M
      Null Call  Y
      Exec Mode  NP
Deterministic  Y
Method Name  ATTRIBUTE1
Specific Name MYSTRUCTUR_ATTRIBUTE1_04DC_O
Method Type  O
      Null Call  N
      Exec Mode  NP
Deterministic  Y
Method Name  MYSTRUCTUREDTYPE
Specific Name MYSTRUCTUREDTYPE_C1
Method Type  C
      Null Call  Y
      Exec Mode  P
Deterministic  Y
Method Name  METHOD1
Specific Name MYSTRUCTUR_METHOD1_04DB_R
Method Type  I
      Null Call  Y
      Exec Mode  P
Deterministic  N

```

## Related Topics

See the documentation for the following statements and manual for additional information about UDTs.

- [“CREATE TYPE \(Distinct Form\)” on page 507](#)
- [“CREATE TYPE \(Structured Form\)” on page 515](#)
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)
- *SQL Data Definition Language Detailed Topics*
- *SQL External Routine Programming*

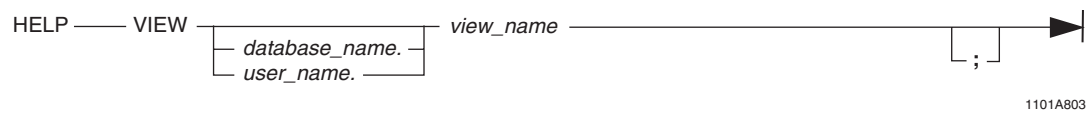


# HELP VIEW

## Purpose

Displays the attributes for the specified view or recursive view.

## Syntax



where:

| Syntax Element...                       | Specifies the name of the ...                                                                              |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | the containing database or user for <i>view_name</i> if something other than the current database or user. |
| <i>view_name</i>                        | view or recursive view for which help is required.                                                         |

## ANSI Compliance

HELP VIEW is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

To execute this statement, you must have either of the following privileges:

- Ownership of the view.
- At least one privilege on the requested object.

Use the SHOW privilege to enable a user to perform HELP or SHOW requests *only* against a specified view.

## Example 1

The following example shows the HELP VIEW report for a view containing a UDT named *udtint*:

```
HELP TABLE udt_view;

Column Name  id
Type        I
Comment      ?
Nullable     Y
Format       -(10) 9
```

```

                Title ?
            Max Length 4
        Decimal Total Digits ?
    Decimal Fractional Digits ?
        Range Low ?
        Range High ?
        UpperCase N
    Table/View? V
    Default value ?
        Char Type ?
        IdCol Type ?
        UDT Name ?
        Temporal Column ?
        Current ValidTime Unique ?
    Sequenced ValidTime Unique ?
    Nonsequenced ValidTime Unique ?
    Current TransactionTime Unique ?
        Column Name myint
            Type UT
            Comment ?
            Nullable Y
            Format -(10)9
                Title ?
            Max Length 4
        Decimal Total Digits ?
    Decimal Fractional Digits ?
        Range Low ?
        Range High ?
        UpperCase N
    Table/View? V
    Default value ?
        Char Type ?
        IdCol Type ?
        UDT Name udint
        Temporal Column ?
        Current ValidTime Unique ?
    Sequenced ValidTime Unique ?
    Nonsequenced ValidTime Unique ?
    Current TransactionTime Unique ?

```

# HELP VOLATILE TABLE

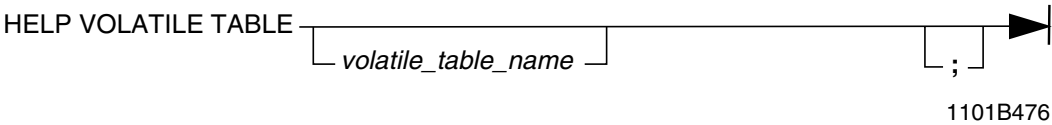
## Purpose

Displays the attributes for the requested volatile table.

## Invocation

Executable.

## Syntax



where:

| Syntax Element ...        | Specifies ...                                                                                                                                                                                        |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>volatile_able_name</i> | the name of the volatile table for which you want help information.<br>If you do not specify the name of a volatile table, the systems returns a list of all volatile tables in the current session. |

## ANSI Compliance

HELP VOLATILE TABLE is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must either own the volatile table or have at least one privilege on it.

Use the SHOW privilege to enable a user to perform HELP or SHOW requests *only* against the specified volatile table.

## Example

Suppose you need to know the Table ID of the volatile table Sales\_temp. To determine this information, you enter the following statement.

```
HELP VOLATILE TABLE sales_temp;
```

The result shows that the Table ID for this table is 40C00E000000.

|            |              |
|------------|--------------|
| Table Name | Sales_temp   |
| Table Id   | 40C00E000000 |

## Related Topics

See the documentation for the following statements for additional information about volatile tables.

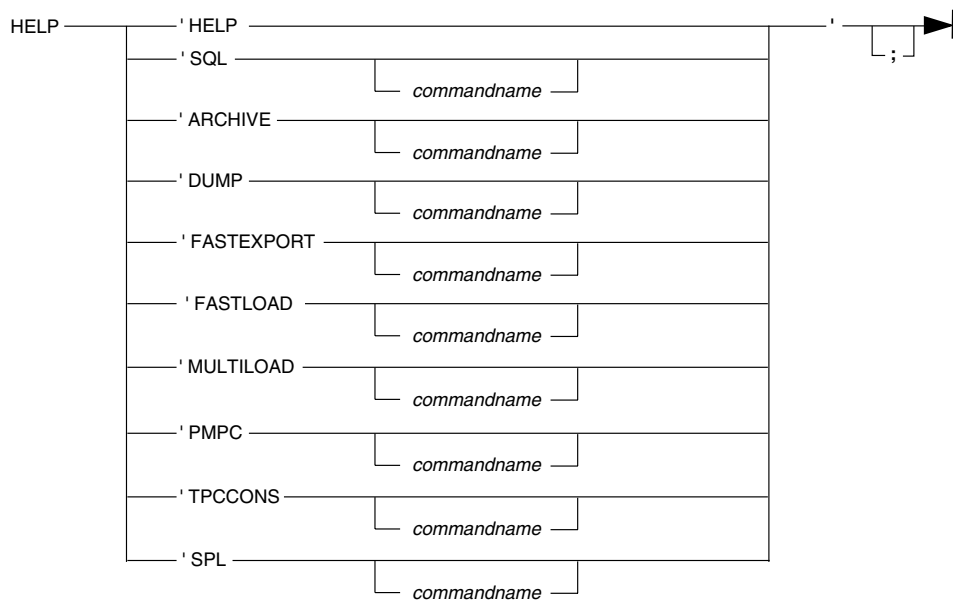
- “CREATE TABLE (Temporary/Volatile Table Preservation Clause)” in *SQL Data Definition Language Syntax and Examples*
- [“SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW” on page 796](#)
- *SQL Data Definition Language Detailed Topics*

# HELP (Online Form)

## Purpose

Displays help on any SQL or client utility syntax topic.

## Syntax



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where:

| Syntax Element ...                                                                      | Specifies ...                                                                                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HELP                                                                                    | HELP 'HELP' displays information about using the online help statement.                                                                                                                                                                                                |
| SQL<br>Archive<br>Dump<br>FastExport<br>FastLoad<br>MultiLoad<br>PMPC<br>TPCCONS<br>SPL | a help request for the syntax of an SQL statement or one of the client utilities. These are the topics about which HELP is requested.<br><br>If these topics are not followed by a specific statement or utility name, a list of commands is displayed for that topic. |
| command_name                                                                            | An optional specific SQL statement or utility command name.                                                                                                                                                                                                            |

ANSI Compliance

HELP is a Teradata extension to the ANSI SQL:2008 standard.

Required Privileges

None required.

Examples

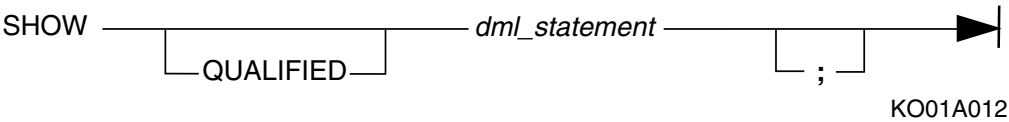
| This statement ... | Displays ...                                                                   |
|--------------------|--------------------------------------------------------------------------------|
| HELP 'sql';        | a list of SQL statements.                                                      |
| HELP 'multiload';  | a list of MultiLoad commands.                                                  |
| HELP 'sql update'; | the syntax for the UPDATE statement.                                           |
| HELP 'spl';        | a list of all stored procedure SQL DDL and control statements.                 |
| HELP 'spl if';     | the syntax, semantics, and usage of the stored procedure IF control statement. |

# SHOW

## Purpose

Displays the DDL for all database objects referenced by a specified DML statement.

## Syntax



where:

| Syntax Element ...   | Specifies ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| QUALIFIED            | <p>that if any view DDL is returned, it is to be qualified by the appropriate database and table names. This qualified text is taken from the <i>DBC.TVM.CreateText</i> column.</p> <p>All qualified objects in the report are enclosed within QUOTATION MARK characters.</p> <p>If you do not specify QUALIFIED, then any returned view DDL is taken from the <i>DBC.TVM.RequestText</i> column and is <i>not</i> qualified by the names of the appropriate database and table names.</p> |
| <i>dml_statement</i> | an SQL DML statement for which the full text of the DDL for all the database objects it references is to be returned.                                                                                                                                                                                                                                                                                                                                                                      |

## ANSI Compliance

SHOW is a Teradata extension to the ANSI SQL:2008 standard.

## Required Privileges

You must have either of the following privileges:

- Necessary privileges to perform the specified DML statement
- Any on the database objects to show.

Use the SHOW privilege to enable a user to perform HELP or SHOW requests *only* against the specified DML statement.

## Example 1

The following example reports the DDL definitions supporting a simple SELECT statement involving one view and one table. Both objects were created in database DAFDB, so qualification is unnecessary.

```
SHOW
SELECT * FROM View_1, Table_2
WHERE View1.column_1=Table2.column_3;
```

The report looks like this.

```
*** Text of DDL statement returned.
*** Total elapsed time was 1 second.
-----
CREATE SET TABLE DAFDB.Table_2
  NO FALLBACK,
  NO BEFORE JOURNAL,
  NO AFTER JOURNAL
  (column_1 INTEGER,
   column_2 INTEGER)
  PRIMARY INDEX(column_1);

CREATE SET TABLE DAFDB.Table_1
  NO FALLBACK,
  NO BEFORE JOURNAL,
  NO AFTER JOURNAL
  (column_1 INTEGER)
  PRIMARY INDEX (column_1);

CREATE VIEW View_1 AS
  SELECT column_1 FROM Table_1;
```

## Example 2

Consider the following scenario: you create a view using two other views, each having the same name, but created in different databases.

The database names are *US* and *International*. The session is in Teradata mode.

Here is the DDL used to create the objects used for this example:

```
DATABASE us;

CREATE TABLE table_1 (
  eno INTEGER);

CREATE VIEW view_1 AS
  SELECT *
  FROM table_1;

DATABASE international;

CREATE TABLE table_1 (
  zno INTEGER);

CREATE VIEW view_1 AS
  SELECT *
  FROM table_1;

CREATE VIEW view_3 AS
  SELECT *
  FROM international.view_1, us.view_1;
```



If you perform a SHOW request on a query that selects data from *view\_3*, the report it returns will be ambiguous with respect to the two *view\_1* elements of *view\_3* unless you specify the QUALIFIED option.

For example, suppose you perform SHOW on the following query:

```
SHOW SELECT * FROM view_3;
```

The report looks like this:

```
*** Text of DDL statement returned.
*** Total elapsed time was 1 second.
-----
CREATE SET TABLE international.table_1, NO FALLBACK,
NO BEFORE JOURNAL,
NO AFTER JOURNAL
(zno INTEGER)
PRIMARY INDEX (a);

*** Text of DDL statement returned.
-----
CREATE SET TABLE us.table_1, NO FALLBACK,
NO BEFORE JOURNAL,
NO AFTER JOURNAL
(eno INTEGER)
PRIMARY INDEX (eno);
*** Text of DDL statement returned.
-----
CREATE VIEW view_1 AS SELECT * FROM table_1;

*** Text of DDL statement returned.
-----
CREATE VIEW view_1 AS SELECT * FROM table_1;

*** Text of DDL statement returned.
-----
CREATE VIEW view_3 AS SELECT * FROM international.view_1,us.view_1;
```

### Example 3

Notice that none of the views in “[Example 2](#)” on page 792 is qualified by the name of its containing database.

Use the QUALIFIED option to produce a report that resolves the ambiguous dependencies.

Consider the same scenario used in “[Example 2](#)” on page 792, but this time specify that the report must be qualified.

```
SHOW QUALIFIED SELECT * FROM view_3;
```

The report looks like this:

```
*** Text of DDL statement returned.
*** Total elapsed time was 1 second.
-----
CREATE SET TABLE international.table_1, NO FALLBACK,
NO BEFORE JOURNAL,
NO AFTER JOURNAL
(zno INTEGER)
PRIMARY INDEX (a);

*** Text of DDL statement returned.
-----
CREATE SET TABLE us.table_1, NO FALLBACK,
NO BEFORE JOURNAL,
NO AFTER JOURNAL
(eno INTEGER)
PRIMARY INDEX (eno);

*** Text of DDL statement returned.
-----
CREATE VIEW "international"."view_1" AS SELECT * FROM
"international"."table_1";

*** Text of DDL statement returned.
-----
CREATE VIEW "us"."view_1" AS SELECT * FROM "us"."table_1";

*** Text of DDL statement returned.
-----
CREATE VIEW "international"."view_3" AS SELECT * FROM
"international"."view_1"."zno", "us"."view_1"."eno";
```

Each of the view definitions in this report is fully qualified, removing the ambiguity seen in [“Example 2” on page 792](#).

## Example 4

Suppose you have three base tables, two of which are parents to the third by means of referential integrity relationships.

In the following set of DDL table definitions, tables *t1* and *t3* are both parents to table *t2*:

```
CREATE SET TABLE t1 (
  a1 INTEGER,
  b1 INTEGER,
  FOREIGN KEY (b1) REFERENCES WITH CHECK OPTION t3(a3))
UNIQUE PRIMARY INDEX (a1);

CREATE SET TABLE t3 (
  a3 INTEGER,
  b3 INTEGER,
  FOREIGN KEY (b3) REFERENCES WITH CHECK OPTION t1(a1))
UNIQUE PRIMARY INDEX (a3);
```

```
CREATE SET TABLE t2 (
  a2 INTEGER,
  b2 INTEGER,
  b3 INTEGER,
  FOREIGN KEY (a2) REFERENCES WITH CHECK OPTION t1 (a1),
  FOREIGN KEY (b3) REFERENCES WITH CHECK OPTION t3 (a3))
PRIMARY INDEX (a2);
```

You decide to run a **SHOW** report on the following query. Notice that even though the query only touches table *t2* directly, the report also displays the DDL for the two parent tables of *t2*: *t1* and *t3*.

```
SHOW SELECT *
FROM t2;

*** Text of DDL statement returned.
*** Total elapsed time was 1 second.
-----
CREATE SET TABLE TEST.T2 ,NO FALLBACK ,
      NO BEFORE JOURNAL,
      NO AFTER JOURNAL
      (a2 INTEGER,
       b2 INTEGER,
       b3 INTEGER,
  FOREIGN KEY ( a2 ) REFERENCES WITH CHECK OPTION TEST.T1 ( a1 ),
  FOREIGN KEY ( b3 ) REFERENCES WITH CHECK OPTION TEST.T3 ( a3 ))
PRIMARY INDEX ( a2 );
*** Text of DDL statement returned.
-----
CREATE SET TABLE TEST.T1, NO FALLBACK,
      NO BEFORE JOURNAL,
      NO AFTER JOURNAL
      (a1 INTEGER,
       b1 INTEGER
  FOREIGN KEY (b1) REFERENCES WITH CHECK OPTION t3(a3))
UNIQUE PRIMARY INDEX (a1);

*** Text of DDL statement returned.
-----
CREATE SET TABLE TEST.T3, NO FALLBACK,
      NO BEFORE JOURNAL,
      NO AFTER JOURNAL
      (a3 INTEGER,
       b3 INTEGER
  FOREIGN KEY (b3) REFERENCES WITH CHECK OPTION t1(a1))
UNIQUE PRIMARY INDEX (a3);
```

---

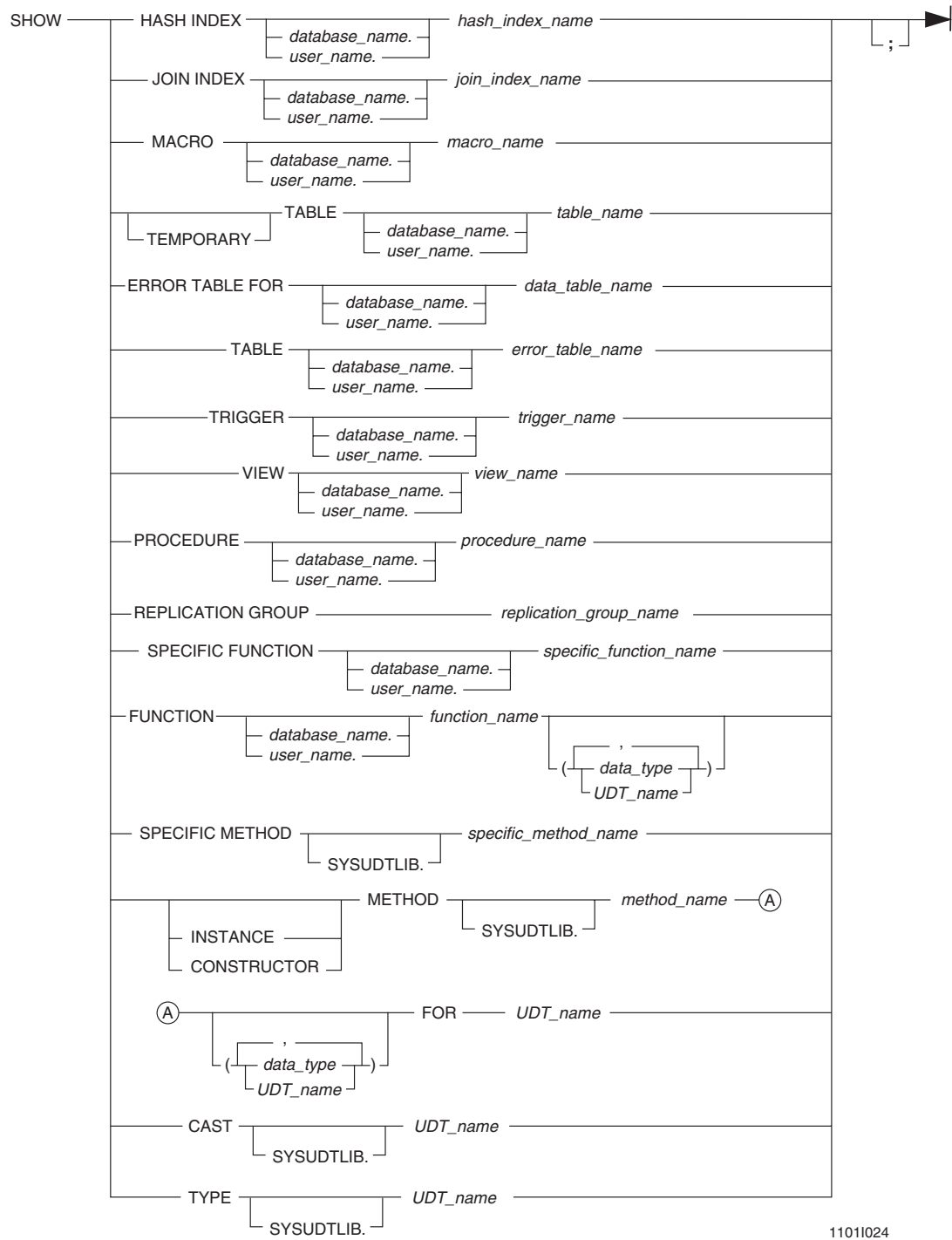
**SHOW CAST/  
SHOW ERROR TABLE/  
SHOW FUNCTION/  
SHOW HASH INDEX/  
SHOW JOIN INDEX/  
SHOW MACRO/  
SHOW METHOD/  
SHOW PROCEDURE/  
SHOW REPLICATION GROUP/  
SHOW TABLE/  
SHOW TRIGGER/  
SHOW TYPE/  
SHOW VIEW**

## **Purpose**

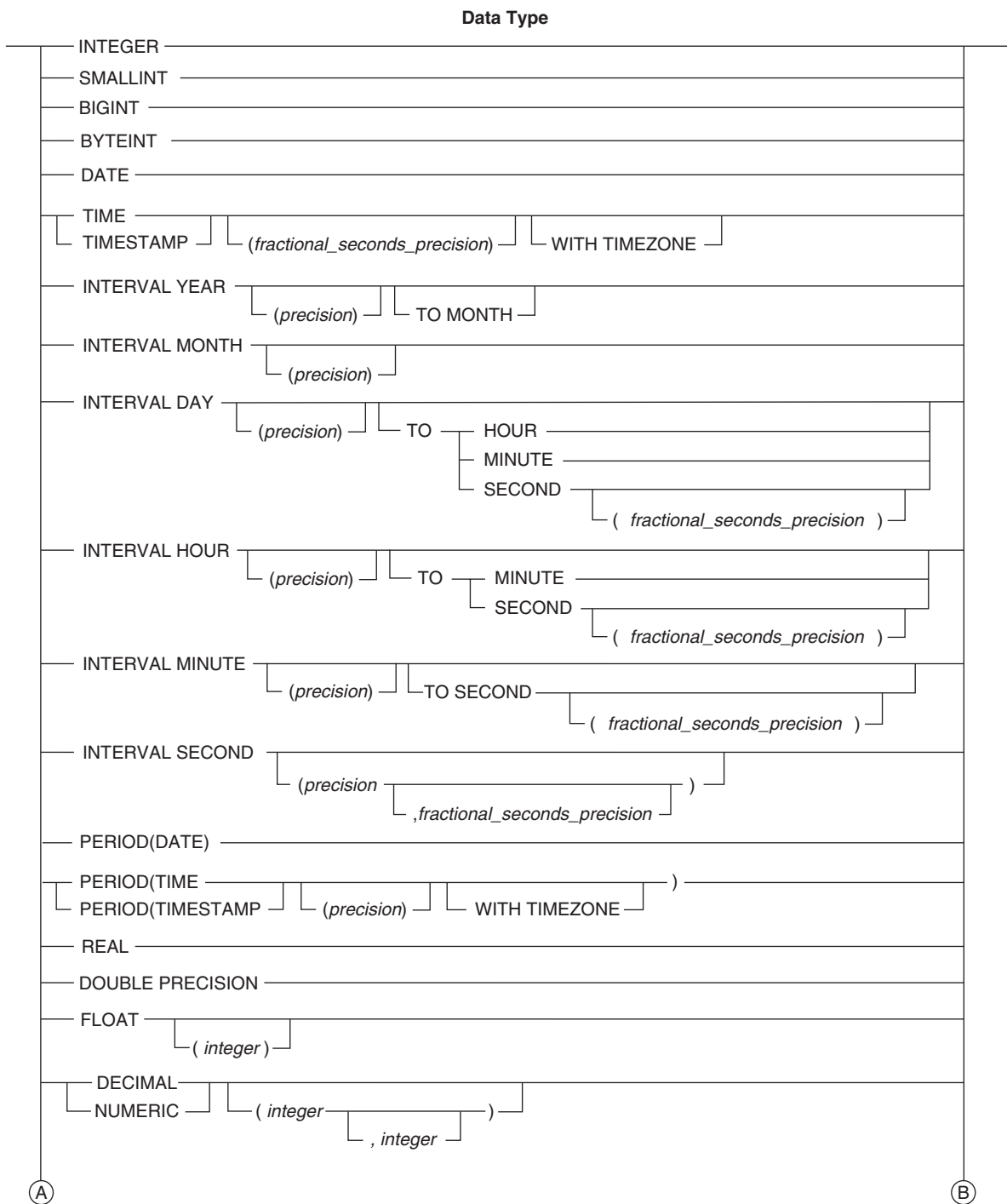
For macros and views, displays the SQL data definition text for the original create text from *DBC.TVM.RequestText*.

For all other database objects, displays the SQL text most recently used to create, replace, or modify the specified cast, error table, UDF, hash index, join index, method, stored procedure, replication group, table, trigger, or UDT definition.

General Syntax

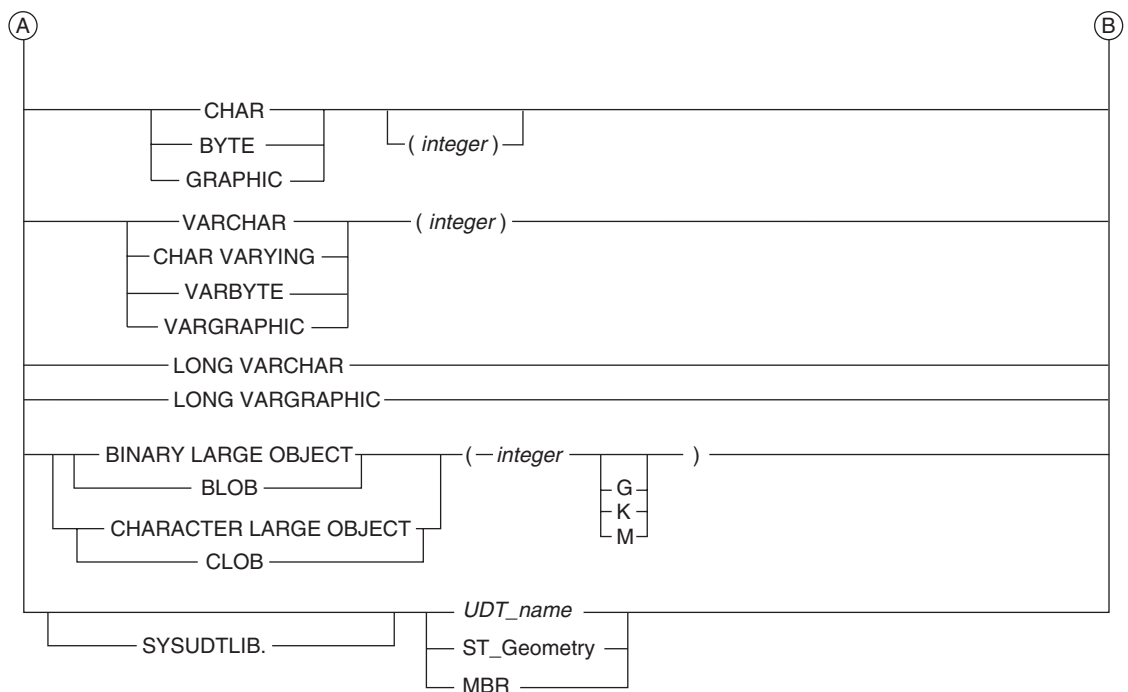


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SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/



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where:

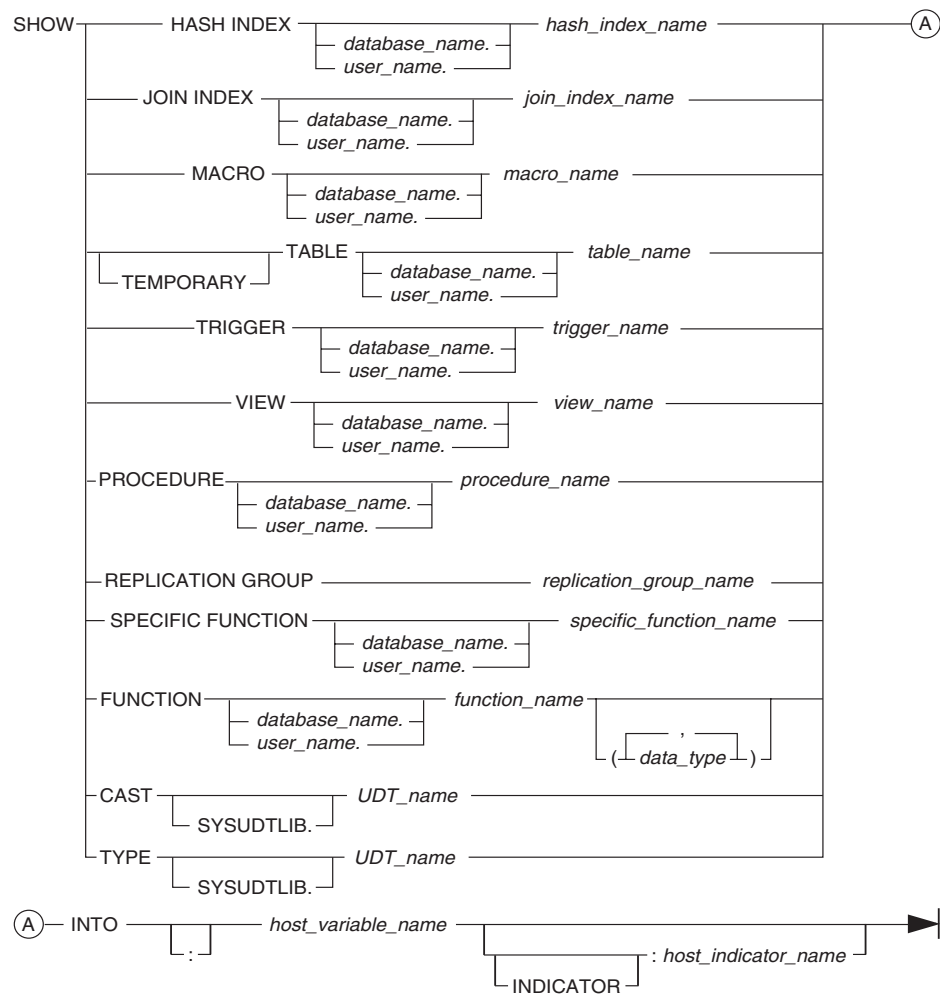
| Syntax Element...                       | Specifies...                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i> | the name of the containing database or user for the object.<br>For UDTs, methods, and UDFs related to UDTs, this is always <i>SYSUDTLIB</i> .                                                                                                                                                                                            |
| <i>hash_index_name</i>                  | the name of the hash index whose most recent SQL create text is to be reported.                                                                                                                                                                                                                                                          |
| <i>join_index_name</i>                  | the name of the join index whose most recent SQL create text is to be reported.                                                                                                                                                                                                                                                          |
| <i>macro_name</i>                       | the name of the macro whose most recent SQL create text is to be reported.<br>There is an upper limit of 12,500 characters that SHOW MACRO can display.                                                                                                                                                                                  |
| TEMPORARY                               | that the table for which the most recent SQL create text is to be reported is a materialized global temporary table.<br>If you specify TEMPORARY, then <i>table_name</i> must specify a global temporary table.<br>If you do not specify TEMPORARY, and the table is a global temporary table, the base global temporary table is shown. |

| Syntax Element...                                         | Specifies...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>table_name</i>                                         | <p>the name of the table whose most recent SQL create text is to be reported.</p> <p>SHOW displays a standardized CREATE TABLE statement that would create the named table.</p> <p>If the table has been modified using the ALTER TABLE or CREATE INDEX statements, modifications are reflected in the CREATE TABLE statement displayed.</p> <p>SHOW TABLE displays all index and constraint information for the table. There is an upper limit of 31,744 characters that SHOW TABLE can display.</p> <p>Because a standard display form is used, the result might not be identical to the text used to create the table. Its form is such that if the table were dropped and created using the SHOW TABLE output, the result would be a table with structure identical to the one shown.</p> |
| <i>data_table_name</i>                                    | <p>the name of the data table for which the error table whose most recent SQL create text is to be reported.</p> <p>This syntax is useful if you did not define an explicit name for the error table and you do not know the system-assigned default name assigned to it.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <i>error_table_name</i>                                   | the name of the error table whose most recent SQL create text is to be reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <i>trigger_name</i>                                       | the name of the trigger whose most recent SQL create text is to be reported. There is an upper limit of 12,500 characters that SHOW TRIGGER can display.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <i>view_name</i>                                          | the name of the view whose most recent SQL create text is to be reported. There is an upper limit of 12,500 characters that SHOW VIEW can display.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <i>procedure_name</i>                                     | <p>the name of the stored procedure whose most recent SQL create text is to be reported.</p> <p>SHOW PROCEDURE displays stored procedure text as it was sent to the database. You must type line breaks in the procedure using the Enter or Return key to properly display the text.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <i>replication_group_name</i>                             | the name of the replication group whose most recent SQL create text is to be reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>SPECIFIC FUNCTION</i><br><i>specific_function_name</i> | the specific function name for the UDF whose most recent SQL create text is to be reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <i>FUNCTION</i><br><i>function_name</i>                   | the function name for the UDF whose most recent SQL create text is to be reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <i>data_type</i>   <i>UDT_name</i>                        | the data type parameters, including UDTs, that uniquely identify an overloaded function name.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |



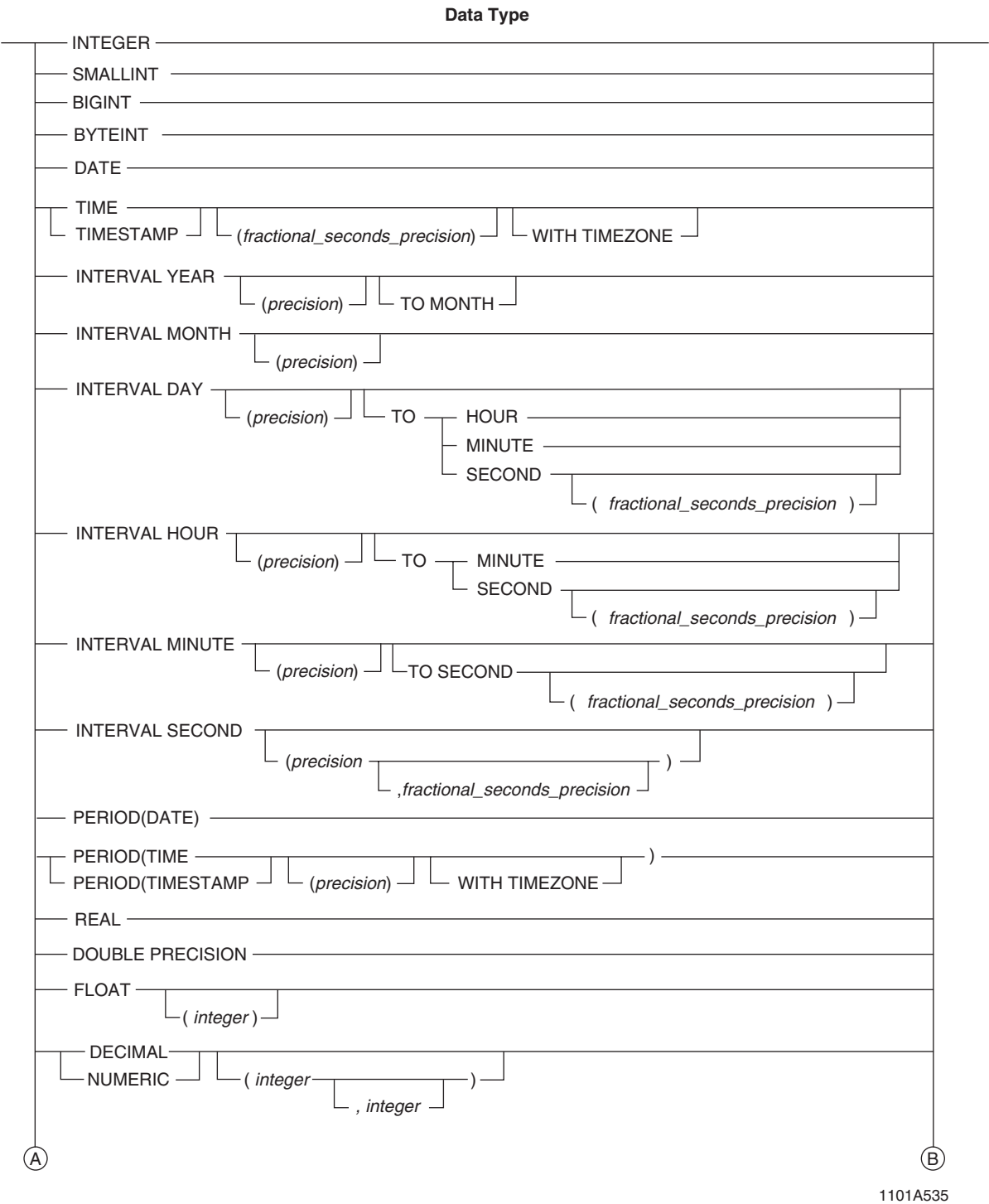
| Syntax Element...                                     | Specifies...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>SPECIFIC METHOD</i><br><i>specific_method_name</i> | <p>the specific name for the method whose most recent SQL create text is to be reported.</p> <p>See “<a href="#">SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW</a>” on <a href="#">page 796</a> for details.</p>                                                                                                                                                                                                                                                                                                                                                                                          |
| <i>method_name</i>                                    | <p>the name of the method whose most recent SQL create text is to be reported.</p> <p>See “<a href="#">SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW</a>” on <a href="#">page 796</a> for details.</p>                                                                                                                                                                                                                                                                                                                                                                                                    |
| <i>data_type</i>   <i>UDT_name</i>                    | the data type parameters, including UDTs, that uniquely identify an overloaded method name.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <i>UDT_name</i>                                       | <p>the name of the UDT for which the most recent SQL create text, including that for its CREATE ORDERING and CREATE TRANSFORM statements, are to be shown. This specification applies to both the SHOW CASE and the SHOW TYPE statements.</p> <p>Similarly, if the only cast or ordering or transform functionality for a UDT is system-generated, the system does not report that DDL because it was not created by SQL CREATE statements, so there is no create text to return.</p> <p>See “<a href="#">SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/ SHOW PROCEDURE/ SHOW REPLICATION GROUP/ SHOW TABLE/ SHOW TRIGGER/ SHOW TYPE/ SHOW VIEW</a>” on <a href="#">page 796</a> for details.</p> |

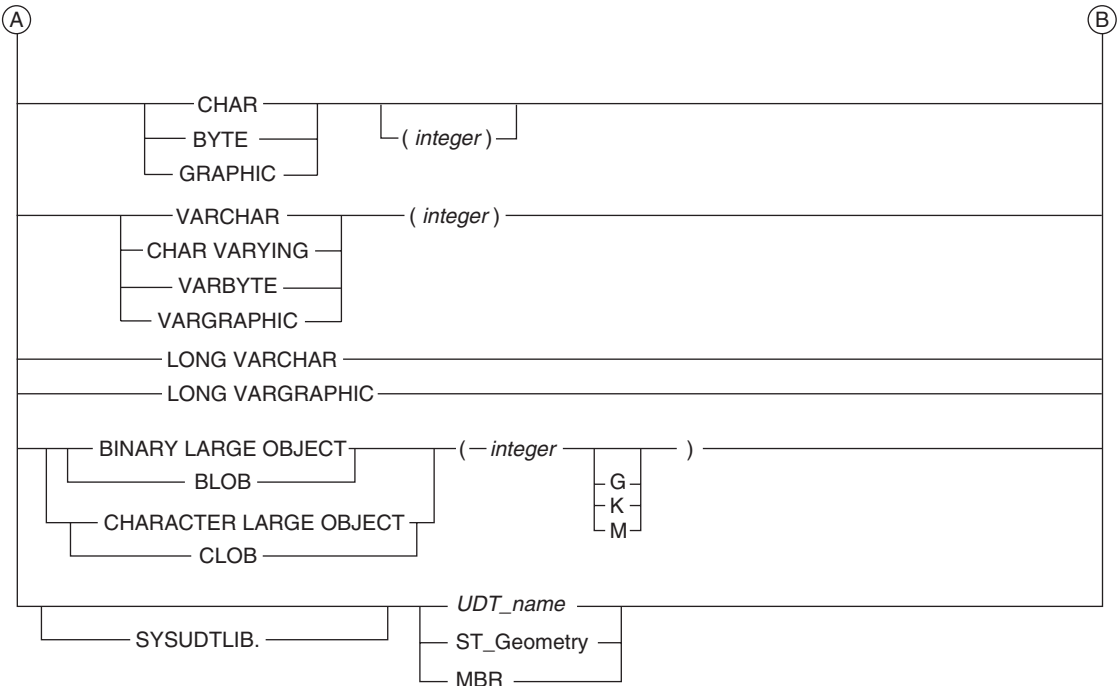
Embedded SQL Syntax



11011023

SHOW CAST/ SHOW ERROR TABLE/ SHOW FUNCTION/ SHOW HASH INDEX/ SHOW JOIN INDEX/ SHOW MACRO/ SHOW METHOD/





1101A536

where:

| Syntax element...                                  | Is the name of...                                                                      |
|----------------------------------------------------|----------------------------------------------------------------------------------------|
| <i>database_name</i>   <i>user_name</i>            | the containing database or user for the specified database object.                     |
| <i>hash_index_name</i>                             | the name of the hash index whose most recent SQL create text is to be reported.        |
| <i>join_index_name</i>                             | the name of the join index whose most recent SQL create text is to be reported.        |
| <i>macro_name</i>                                  | the name of the macro whose most recent SQL create text is to be reported.             |
| <i>table_name</i>                                  | the name of the table whose most recent SQL create text is to be reported.             |
| <i>trigger_name</i>                                | the name of the trigger whose most recent SQL create text is to be reported.           |
| <i>view_name</i>                                   | the name of the view whose most recent SQL create text is to be reported.              |
| <i>procedure_name</i>                              | the name of the stored procedure whose most recent SQL create text is to be reported.  |
| <i>replication_group_name</i>                      | the name of the replication group whose most recent SQL create text is to be reported. |
| SPECIFIC FUNCTION<br><i>specific_function_name</i> | the specific function for the UDF whose most recent SQL create text is to be reported. |

| Syntax element...          | Is the name of...                                                                                                                                                                                                                         |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>function_name</i>       | the UDF whose most recent SQL create text is to be reported.                                                                                                                                                                              |
| <i>UDT_name</i>            | the UDT for which the most recent cast or UDT SQL create text is to be reported.<br><br>If user-specified transforms or orderings for a structured UDT have been defined, then the most recent SQL create text for them is also reported. |
| <i>data_type</i>           | the data type set of the parameters of the user-defined function definition to be viewed.                                                                                                                                                 |
| <i>host_variable_name</i>  | a host variable conforming to VARCHAR(20480), into which the DDL statement is stored by Teradata Database SQL.<br><br>The preceding colon is optional.                                                                                    |
| <i>host_indicator_name</i> | an optional indicator variable for null handling.                                                                                                                                                                                         |

## ANSI Compliance

The following SHOW statements are all Teradata extensions to the ANSI SQL:2008 standard:

- SHOW CAST
- SHOW ERROR TABLE FOR
- SHOW FUNCTION
- SHOW HASH INDEX
- SHOW JOIN INDEX
- SHOW MACRO
- SHOW METHOD
- SHOW PROCEDURE
- SHOW REPLICATION GROUP
- SHOW SPECIFIC FUNCTION
- SHOW SPECIFIC METHOD
- SHOW TABLE *error\_table\_name*
- SHOW TABLE *table\_name*
- SHOW TRIGGER
- SHOW TYPE
- SHOW VIEW

## Required Privileges

The following privileges are required to run a SHOW request against the specified objects:

- To use SHOW ERROR TABLE FOR, FUNCTION, HASH INDEX, JOIN INDEX, MACRO, PROCEDURE, TABLE, or VIEW, you must have one of the following privileges:
  - A privilege on the user-defined function, hash index, join index, macro, stored procedure, table, or view, or a privilege on the database containing it.
  - At least one privilege on the *DBC.TVM* table.
- To use SHOW FUNCTION to show the C source code text, you must also have the DROP privilege on the function; otherwise, you can only display the CREATE FUNCTION text.
- To use SHOW REPLICATION GROUP, you must have the REPLCONTROL privilege.

- To use SHOW CAST, SHOW TYPE, SHOW METHOD, or SHOW SPECIFIC METHOD, you must have one of the following privileges:
  - At least one privilege on the *SYSUDTLIB* database.
  - The UDTUSAGE privilege on the UDT.
  - The SELECT privilege on the *DBC.TVM* table.

Use the SHOW privilege to enable a user to perform HELP or SHOW requests *only* against the specified database object.

## Example 1: SHOW MACRO

The following request displays the most recently executed definition of the *NewEmp* macro:

```
SHOW MACRO NewEmp;
```

The system reports:

```
REPLACE MACRO NewEmp(
  name  CHARACTER(20) NOT NULL,
  street CHARACTER(30),
  city  CHARACTER(20),
  number INTEGER,
  dept  SMALLINT DEFAULT 999)
AS (INSERT INTO Employee (Name, Street, City,
  Empno, DeptNo)
  VALUES (:name, :street, :city, :number, :dept);
UPDATE Department
  SET EmpCount = EmpCount + 1
WHERE DeptNo = :dept;);
```

## Example 2: SHOW TABLE

If a SHOW TABLE request is entered for a table that has been modified, the original CREATE TABLE statement, including all current modifications, is displayed.

For example, consider the following requests used to create and subsequently modify the *EmpBonus* table:

```
CREATE TABLE Personnel.EmpBonus (
  EmpNo      SMALLINT FORMAT '9(5)'
             CHECK (EmpNo BETWEEN 10001 AND 32001) NOT NULL,
  BonusNo    SMALLINT FORMAT 'Z9'
             CHECK (BonusNo BETWEEN 0 and 99) NOT NULL,
  BonusAmt   DECIMAL (6,2)
             CHECK (BonusAmt BETWEEN 1.00 AND 5000.00))
UNIQUE PRIMARY INDEX (EmpNo);

ALTER TABLE EmpBonus
  ADD DeptNo SMALLINT;
```

When you perform SHOW TABLE for the *EmpBonus* table, for example, the system returns the following CREATE TABLE SQL text:

```

CREATE SET TABLE Personnel.EmpBonus, FALLBACK (
  EmpNo SMALLINT FORMAT '9(5)' CHECK (EmpNo BETWEEN 10001
                                     AND      32001)
                                     NOT NULL,
  BonusNo SMALLINT FORMAT 'Z9' CHECK (BonusNo BETWEEN 0
                                     AND      99)
                                     NOT NULL,
  BonusAmt DECIMAL (6,2) CHECK (BonusAmt BETWEEN 1.00
                                     AND      5000.00),
  DeptNo SMALLINT)
UNIQUE PRIMARY INDEX (EmpNo);

```

The *DeptNo* column is included in the CREATE TABLE SQL text. The report also displays default specifications, such as FALLBACK.

### Example 3: SHOW TABLE With Column-Level Named Constraints

The statement in this example names constraints at the column level.

```

CREATE TABLE good_1 (
  field_1 INTEGER NOT NULL CONSTRAINT primary_1 PRIMARY KEY,
  field_2 INTEGER NOT NULL CONSTRAINT unique_1 UNIQUE,
  field_3 INTEGER CONSTRAINT check_1 CHECK (field_3 > 0),
  field_4 INTEGER CONSTRAINT reference_1 REFERENCES parent_1);

```

Now perform the following SHOW TABLE request on *good\_1*.

```
SHOW TABLE good_1;
```

The request returns the following CREATE TABLE SQL text:

```

CREATE SET TABLE Personnel.good_1, NO FALLBACK,
  NO BEFORE JOURNAL
  NO AFTER JOURNAL
  (
    field_1 INTEGER NOT NULL,
    field_2 INTEGER NOT NULL,
    field_3 INTEGER,
    field_4 INTEGER,
    CONSTRAINT check_1 CHECK (field_3 > 0),
    CONSTRAINT reference_1 FOREIGN KEY (field_4)
      REFERENCES Personnel.PARENT_1 (f2))
  UNIQUE PRIMARY INDEX primary_1 (field_1)
  UNIQUE INDEX unique_1 (field_2);

```

### Example 4: SHOW TABLE With REFERENCES Constraint

Table *t1* is created with a referential constraint which specifies that FOREIGN KEY columns (*f1*) reference the unique primary index columns in table *good\_1*.

```

CREATE TABLE t1 (
  f1 INTEGER NOT NULL
  f2 INTEGER)
PRIMARY INDEX (f1)
FOREIGN KEY (f1) REFERENCES good_1;
SHOW TABLE T1;

```

SHOW TABLE returns the following CREATE TABLE SQL text:

```
CREATE SET TABLE t1, NO FALLBACK, (
    NO BEFORE JOURNAL, NO AFTER JOURNAL
    f1 INTEGER NOT NULL,
    f2 INTEGER)
PRIMARY INDEX (f1)
FOREIGN KEY (f1) REFERENCES Personnel.Good_1(field_1);
```

## Example 5: SHOW VIEW

The following SHOW VIEW example begins with the creation of the view, then progresses to the SHOW VIEW statement and finally presents the result of the report request.

```
CREATE VIEW staff_info
    (number, name, position, department, sex, dob) AS
SELECT employee.empno, name, jobtitle, deptno, sex, dob
FROM employee
WHERE jobtitle NOT IN ('Vice Pres', 'Manager')
WITH CHECK OPTION;
```

When you make the following SHOW VIEW request, the system returns the immediately following view definition SQL text:

```
SHOW VIEW staff_info;

CREATE VIEW staff_info
    (number, name, position, department, sex, dob) AS
SELECT employee.empno, name, jobtitle, deptno, sex, dob
FROM employee
WHERE jobtitle NOT IN ('Vice Pres', 'Manager')
WITH CHECK OPTION;
```

## Example 6: SHOW TABLE

Consider a user whose default character type is Latin. The user creates the following table:

```
CREATE TABLE kanji_user.table_1,
    NO FALLBACK,
    NO BEFORE JOURNAL,
    NO AFTER JOURNAL
    (
        clatin      CHARACTER(5),
        ckanji1     CHARACTER(5) CHARACTER SET KANJI1,
        cgraphic    CHARACTER(5) CHARACTER SET GRAPHIC,
        ckanjisjis  CHARACTER(5) CHARACTER SET KANJISJIS,
        cunicode    CHARACTER(5))
PRIMARY INDEX (clatin);
```

A SHOW TABLE request against this table returns the following CREATE TABLE SQL text, as expected:



```
CREATE TABLE kanji_user.table_1,
NO FALLBACK,
NO BEFORE JOURNAL,
NO AFTER JOURNAL (
  clatin CHARACTER(5) CHARACTER SET LATIN,
  ckanji1 CHARACTER(5) CHARACTER SET KANJI1,
  cgraphic CHARACTER(5) CHARACTER SET GRAPHIC,
  ckanjisjis CHARACTER(5) CHARACTER SET KANJISJIS,
  cunicode CHARACTER(5) CHARACTER SET LATIN)
PRIMARY INDEX (clatin);
```

## Example 7: SHOW JOIN INDEX

The following example illustrates a SHOW JOIN INDEX request run against the join index named *OrdCustIdx*.

```
SHOW JOIN INDEX OrdCustIdx;
*** Text of DDL statement returned.
*** Total elapsed time was 1 second.

-----
CREATE JOIN INDEX DF2.OrdCustIdx AS
SELECT DF2.customer.c_custkey, DF2.customer.c_name,
DF2.orders.o_status, DF2.orders.o_date, DF2.orders.o_comment
FROM DF2.orders, DF2.customer
WHERE DF2.orders.o_custkey = DF2.customer.c_custkey
PRIMARY INDEX (c_custkey)
INDEX (o_date);
```

## Example 8: SHOW HASH INDEX

The following example illustrates a SHOW HASH INDEX request run against the hash index named *OrdHIdx* created by the following CREATE HASH INDEX statement.

```
CREATE HASH INDEX OrdHIdx (o_orderdate) ON orders;

SHOW HASH INDEX OrdHIdx;
*** Text of DDL statement returned.
*** Total elapsed time was 1 second.

-----
CREATE HASH INDEX PLS.OrdHIdx, NO FALLBACK PROTECTION
(PLS.orders.o_   ordertable) ON PLS.orders;
```

The report differs from the text of the CREATE HASH INDEX DDL in several ways.

- All names are qualified
- The fallback protection option is displayed

Note that when you do not specify a BY or ORDER clause in the CREATE HASH INDEX DDL, the default values for those clauses are not reported.

## Example 9: SHOW PROCEDURE

The following example illustrates a SHOW PROCEDURE request:

```

SHOW PROCEDURE spSample1;
*** Text of DDL statement returned.
*** Total elapsed time was 1 second.
-----
CREATE PROCEDURE spSample1 (IN  ip INTEGER,
                           OUT op INTEGER)
BEGIN DECLARE var1 INTEGER;
      SELECT col1 INTO var1
      FROM tab1
      WHERE col2 = ip;
      SET op = var1 * 10;
END;

```

## Example 10: SHOW FUNCTION

This example reports the current DDL and function body for the specific function name *addnum*.

```

SHOW FUNCTION addnum;

*** Text of DDL statement returned.
*** Total elapsed time was 1 second.
-----
REPLACE FUNCTION RGS.ADDNUM (P1 INTEGER, P2 FLOAT)
RETURNS FLOAT
SPECIFIC addnum
LANGUAGE C
NO SQL
PARAMETER STYLE SQL
NOT DETERMINISTIC
CALLED ON NULL INPUT
EXTERNAL NAME 'cs!first1!udftest/first1.c!F!first1'
*** Text of DDL statement returned.

#define SQL_TEXT Latin_Text
#include <sqltypes_td.h>

/* add integer and float */

void first1(INTEGER  *a,
            FLOAT    *b,
            FLOAT    *result,
            INT      *indc_a,
            INT      *indc_b,
            INT      *indc_result,
            CHAR     sqlstate[6],
            SQL_TEXT extname[129],
            SQL_TEXT specific_name[129],
            SQL_TEXT error_message[257])
{
    if (*indc_a == -1 || *indc_b == -1)
    {

```

```

        *indc_result = -1;
        return;
    }
    *result = *a + *b;

    *indc_result = 0;

}

```

## Example 11: SHOW REPLICATION GROUP

This example reports the current DDL for the replication group named *payables\_group*.

```
SHOW REPLICATION GROUP Payables_Group;
```

The system responds by reporting the following SQL text:

```

CREATE REPLICATION GROUP Payables_Group (
    Payables.Invoices,
    Payables.Transactions);

```

## Example 12: SHOW METHOD

The following examples show valid cases of SHOW METHOD.

- This example reports the SQL create text for a method that has the specific method name *polygon\_mbr*:

```
SHOW SPECIFIC METHOD SYSUDTLIB.polygon_mbr
```

- This example reports the SQL create text for a method that has the name *polygon\_mbr*. Note that the method has no parameters, so no parameter data type list is specified:

```
SHOW METHOD SYSUDTLIB.area() FOR circle
```

- This example reports the SQL create text for a method that has the name *in\_state* and is associated with the UDT named *circle*. To be distinguished from another method definition on *circle* named *in\_state*, the specification includes the parameter data type list for the method:

```
SHOW METHOD in_state(CHAR(2)) FOR address
```

## Example 13: SHOW CAST

The following example shows an instance of the SHOW CAST report where two different casts have been defined for the distinct UDT named DistinctUdt1:

```
SHOW CAST sysudtlib.DistinctUdt1;
```

```

*** Text of DDL statement returned.
*** Total elapsed time was 2 seconds.

```

```

-----
CREATE CAST (DistinctUdt1 AS VarByte(9012))
WITH SPECIFIC FUNCTION d2f;
CREATE CAST (Integer AS DistinctUdt1)
WITH SPECIFIC FUNCTION i2d;

```

**Example 14: SHOW TYPE**

The following examples show two instances of the SHOW TYPE report for a UDT.

Note that to report cast information for a UDT, you must use the SHOW CAST statement.

```
SHOW TYPE UdtInt;
```

```
*** Text of DDL statement returned.
*** Total elapsed time was 2 seconds.
```

```
-----
CREATE TYPE SYSUDTLIB.udtint AS INTEGER FINAL
INSTANCE METHOD intordering ( )
RETURNS INTEGER
SPECIFIC udtint_intordering_24a8_r
LANGUAGE C
NO SQL
PARAMETER STYLE SQL
DETERMINISTIC
RETURNS NULL ON NULL INPUT,
INSTANCE METHOD intfromsql ( )
RETURNS INTEGER
SPECIFIC udtint_intfromsql_24a9_r
LANGUAGE C
NO SQL
PARAMETER STYLE SQL
DETERMINISTIC
RETURNS NULL ON NULL INPUT;
```

```
SHOW TYPE udtint;
```

```
*** Text of DDL statement returned.
*** Total elapsed time was 5 seconds.
```

```
-----
CREATE TYPE SYSUDTLIB.udtint AS INTEGER FINAL
INSTANCE METHOD intordering ( )
RETURNS INTEGER
SPECIFIC udtint_intordering_24a8_r
LANGUAGE C
NO SQL
PARAMETER STYLE SQL
DETERMINISTIC
RETURNS NULL ON NULL INPUT,
INSTANCE METHOD intfromsql ( )
RETURNS INTEGER
SPECIFIC udtint_intfromsql_24a9_r
LANGUAGE C
NO SQL
PARAMETER STYLE SQL
DETERMINISTIC
RETURNS NULL ON NULL INPUT;
```

# SHOW QUERY LOGGING

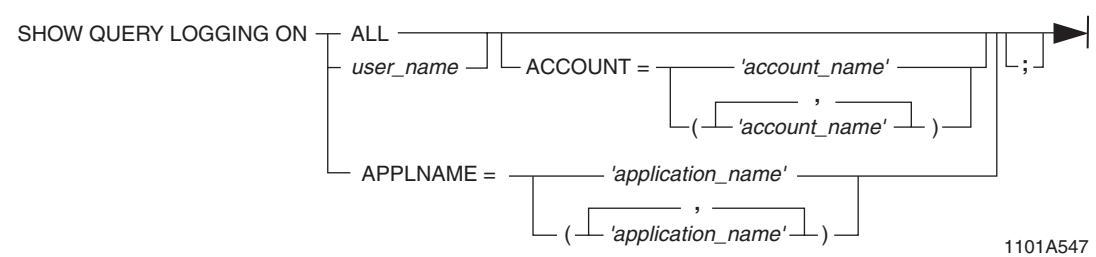
## Purpose

Returns the query logging rule set applied to the specified user, user:account set, application set, or the ALL user from the rules cache or from *DBC.DBQLRuleTbl*.

The request returns a list of the applicable rules based on the keywords and variables you specify and the hierarchy of rule orders, which is as follows:

- 1 Specified application set.
- 2 Specified user and specified account set.
- 3 Specified user and all accounts.
- 4 All users and the specified account set.
- 5 All users and all accounts.

## Syntax



| Syntax element ...                 | Specifies to return all query logging rules for ...                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ALL                                | the ALL user and all accounts.                                                                                                                                                                                                                                                                                                                                                                            |
| ALL ACCOUNT = 'account_name'       | the ALL user and the specified account name set.<br>If no matching rule is found, then Teradata Database returns the rule for the ALL user and all accounts.                                                                                                                                                                                                                                              |
| user_name                          | the specified user and all accounts.<br>If no matching rule is found, then Teradata Database returns the rule for the ALL user and all accounts.                                                                                                                                                                                                                                                          |
| user_name ACCOUNT = 'account_name' | the specified user name and the specified account name set.<br>If no matching rule is found, then Teradata Database searches for a matching rule in the order indicated and returns the first match that it finds:<br><ul style="list-style-type: none"><li>1 Specified user name and all accounts.</li><li>2 ALL user and the specified account name set.</li><li>3 ALL user and all accounts.</li></ul> |

| Syntax element ...            | Specifies to return all query logging rules for ... |
|-------------------------------|-----------------------------------------------------|
| APPLNAME = 'application_name' | the specified application set.                      |

ANSI Compliance

SHOW QUERY LOGGING is a Teradata extension to the ANSI SQL-2008 standard.

Required Privileges

None.

Example Set 1

This example set (Examples 1 - Example 6) shows how SHOW QUERY LOGGING requests report query logging rules under simple conditions where it is possible for rule matches to be made at the first search level in the rule hierarchy.

Assume that the following query logging rules, as indicated by their SQL text and the text of the rule as it is created in *DBC.DBQLRuleTbl*, have been created.

```
1 BEGIN QUERY LOGGING ON ALL;
```

This request creates a logging rule for all users and all accounts using default logging options.

The row for rule 1 in *DBC.DBQLRuleTbl* is as follows:

|                 |                 |
|-----------------|-----------------|
| UserName        | All             |
| Account         |                 |
| ApplicationName |                 |
| TypeOfRule      | Logging enabled |
| Explain         | F               |
| Object          | F               |
| SQL             | F               |
| Step            | F               |
| XMLPlan         | F               |
| Summary         | F               |
| Threshold       | F               |
| TextSize        | 200             |
| Summary//Low    | ?               |
| Med             | ?               |
| High            | ?               |
| TypeOfCriterion | NO CRITERION    |

**2** BEGIN QUERY LOGGING ON ALL ACCOUNT = 'finance';

This request creates a logging rule for all users logged on under account name *finance* using default logging options.

The row for rule 2 in *DBC.DBQLRuleTbl* is as follows:

|                 |                 |     |
|-----------------|-----------------|-----|
| UserName        | All             |     |
| Account         | FINANCE         |     |
| ApplicationName |                 |     |
| TypeOfRule      | Logging enabled |     |
| Explain         | F               |     |
| Object          | F               |     |
| SQL             | F               |     |
| Step            | F               |     |
| XMLPlan         | F               |     |
| Summary         | F               |     |
| Threshold       | F               |     |
| TextSize        |                 | 200 |
| Summary//Low    | ?               |     |
| Med             | ?               |     |
| High            | ?               |     |
| TypeOfCriterion | NO CRITERION    |     |

**3** BEGIN QUERY LOGGING ON user1 ACCOUNT = 'marketing';

This request creates a logging rule for *user1* when logged on under account name *marketing* using default logging options.

The row for rule 3 in *DBC.DBQLRuleTbl* is as follows:

|                 |                 |  |
|-----------------|-----------------|--|
| UserName        | USER1           |  |
| Account         | MARKETING       |  |
| ApplicationName |                 |  |
| TypeOfRule      | Logging enabled |  |
| Explain         | F               |  |
| Object          | F               |  |
| SQL             | F               |  |
| Step            | F               |  |
| XMLPlan         | F               |  |
| Summary         | F               |  |
| Threshold       | F               |  |

```

        TextSize          200
    Summary//Low          ?
        Med              ?
        High             ?
    TypeOfCriterion NO CRITERION

```

**4** BEGIN QUERY LOGGING ON user1 ACCOUNT = 'hr';

This request creates a logging rule for *user1* when logged on under account name *hr* using default logging options.

The row for rule 4 in *DBC.DBQLRuleTbl* is as follows:

```

        UserName  USER1
        Account   HR
    ApplicationName
    TypeOfRule    Logging enabled
        Explain   F
        Object    F
            SQL    F
            Step   F
        XMLPlan   F
        Summary   F
    Threshold     F
        TextSize          200
    Summary//Low          ?
        Med              ?
        High             ?
    TypeOfCriterion NO CRITERION

```

**5** BEGIN QUERY LOGGING ON user1;

This request creates a logging rule for *user1* when logged on under any account name using default logging options.

The row for rule 5 in *DBC.DBQLRuleTbl* is as follows:

```

        UserName  USER1
        Account
    ApplicationName
    TypeOfRule    Logging enabled
        Explain   F
        Object    F
            SQL    F
            Step   F

```



|                 |    |           |
|-----------------|----|-----------|
| XMLPlan         | F  |           |
| Summary         | F  |           |
| Threshold       | F  |           |
| TextSize        |    | 200       |
| Summary//Low    | ?  |           |
| Med             | ?  |           |
| High            | ?  |           |
| TypeOfCriterion | NO | CRITERION |

**6** BEGIN QUERY LOGGING ON APPLNAME = 'multload';

This request creates a logging rule for the MultiLoad application using default logging options.

The row for rule 6 in *DBC.DBQLRuleTbl* is as follows:

|                 |           |              |
|-----------------|-----------|--------------|
| UserName        | All       |              |
| Account         |           |              |
| ApplicationName | MULTILOAD |              |
| TypeOfRule      | WITH NONE | (No logging) |
| Explain         | F         |              |
| Object          | F         |              |
| SQL             | F         |              |
| Step            | F         |              |
| XMLPlan         | F         |              |
| Summary         | F         |              |
| Threshold       | F         |              |
| TextSize        |           | 200          |
| Summary//Low    | ?         |              |
| Med             | ?         |              |
| High            | ?         |              |
| TypeOfCriterion | NO        | CRITERION    |

The hierarchy for these rules is as follows.

| Hierarchy Level | Rule Number |
|-----------------|-------------|
| 1               | 6           |
| 2               | 3           |
| 3               | 4           |
| 4               | 5           |
| 5               | 2           |
| 6               | 1           |

Example 1

This example causes Teradata Database to search for a rule that logs all users for any account string.

```
SHOW QUERY LOGGING ON ALL;
```

The system searches level 5 of the rules hierarchy, finds an exact match, and returns Rule 1, as follows.

```
Rule UserName  ALL (From an ALL rule)
Rule UserId    00000000
      Account  (Rule for any account)

DBQL RULE:
  Explain  F
  Object   F
    SQL    F
    Step   F
  XMLPlan  F
  Summary  F
  Threshold F
Text Size Limit 200
```

## Example 2

This example causes Teradata Database to search for a rule that logs all users logged on under the *finance* account.

```
SHOW QUERY LOGGING ON ALL ACCOUNT = 'finance';
```

The system searches level 2 of the rules hierarchy, finds an exact match, and returns Rule 2, as follows.

```
Rule UserName  ALL (From an ALL rule)
Rule UserId    00000000
Account        FINANCE

DBQL RULE:
  Explain      F
  Object        F
  SQL           F
  Step          F
  XMLPlan       F
  Summary       F
  Threshold     F
Text Size Limit 200
```

## Example 3

This example causes Teradata Database to search for a rule that logs *user1* when logged on under the *marketing* account.

```
SHOW QUERY LOGGING ON user1 ACCOUNT = 'marketing';
```

The system searches level 2 of the rules hierarchy, finds an exact match, and returns Rule 3, as follows.

```
Rule UserName  user1
Rule UserId    00002668
Account        MARKETING

DBQL RULE:
  Explain      F
  Object        F
  SQL           F
  Step          F
  XMLPlan       F
  Summary       F
  Threshold     F
Text Size Limit 200
```

## Example 4

This example causes Teradata Database to search for a rule that logs *user1*, but only when logged on under account *hr*.

```
SHOW QUERY LOGGING ON user1 ACCOUNT = 'hr';
```

The system searches level 3 of the rules hierarchy, finds an exact match, and returns Rule 4, as follows.

```
Rule UserName  user1
Rule UserId    00002668
Account        HR

DBQL RULE:
  Explain      F
  Object       F
  SQL          F
  Step         F
  XMLPlan      F
  Summary      F
  Threshold    F
Text Size Limit 200
```

## Example 5

This example causes Teradata Database to search for a rule that logs *user1* for all accounts.

```
SHOW QUERY LOGGING ON user1;
```

The system searches level 4 of the rules hierarchy, finds an exact match, and returns Rule 5, as follows.

```
Rule UserName  USER1
Rule UserId    00002668
Account        (Rule for any account)

DBQL RULE:
  Explain      F
  Object       F
  SQL          F
  Step         F
  XMLPlan      F
  Summary      F
  Threshold    F
Text Size Limit 200
```

## Example 6

This example causes Teradata Database to search for a rule for the MultiLoad utility.

```
SHOW QUERY LOGGING ON APPLNAME = 'multload';
```

The system searches level 1 of the rules hierarchy, finds an exact match, and returns Rule 6, as follows.

```

Rule UserName  ALL (From an ALL rule)
Rule UserId    00000000
Account        (Rule for any account)
ApplicationName MULTLOAD

WITH NONE (No DBQL Logging)
```

## Example Set 2

This example set (Example 7- Example 12) shows how SHOW QUERY LOGGING requests report query logging rules under conditions where it is not always possible for a rule to be matched at the first search level in the rules hierarchy.

Assume that the following query logging rules, as indicated by their SQL text, have been created in *DBC.DBQLRulesTbl*. Note that except for a few differences in the specified logging options (see Rules 2, 3, and 5), these logging rules are identical to those in example set 1.

```
1 BEGIN QUERY LOGGING ON ALL;
```

This request creates a logging rule for all users and all accounts using default logging.

The row for Rule 1 in *DBC.DBQLRuleTbl* is as follows.

```

UserName  All
Account
ApplicationName
TypeOfRule Logging enabled
Explain   F
Object    F
SQL       F
Step      F
XMLPlan   F
Summary   F
Threshold F
TextSize          200
Summary//Low      ?
Med               ?
High              ?
TypeOfCriterion   NO CRITERION
```

- 2 BEGIN QUERY LOGGING WITH OBJECTS ON ALL ACCOUNT = 'finance';

This request creates a logging rule for all users logged on under account name *finance* and logs objects.

The row for Rule 2 in *DBC.DBQLRuleTbl* is as follows:

|                 |                 |     |
|-----------------|-----------------|-----|
| UserName        | All             |     |
| Account         | FINANCE         |     |
| ApplicationName |                 |     |
| TypeOfRule      | Logging enabled |     |
| Explain         | F               |     |
| Object          | T               |     |
| SQL             | F               |     |
| Step            | F               |     |
| XMLPlan         | F               |     |
| Summary         | F               |     |
| Threshold       | F               |     |
| TextSize        |                 | 200 |
| Summary//Low    | ?               |     |
| Med             | ?               |     |
| High            | ?               |     |
| TypeOfCriterion | NO CRITERION    |     |

- 3 BEGIN QUERY LOGGING WITH STEPINFO ON user1 ACCOUNT = 'marketing';

This request creates a logging rule for *user1* when that user is logged on under account name *marketing* and logs step information.

The row for Rule 3 in *DBC.DBQLRuleTbl* is as follows:

|                 |                 |     |
|-----------------|-----------------|-----|
| UserName        | USER1           |     |
| Account         | MARKETING       |     |
| ApplicationName |                 |     |
| TypeOfRule      | Logging enabled |     |
| Explain         | F               |     |
| Object          | F               |     |
| SQL             | F               |     |
| Step            | T               |     |
| XMLPlan         | F               |     |
| Summary         | F               |     |
| Threshold       | F               |     |
| TextSize        |                 | 200 |

```

Summary//Low      ?
      Med          ?
      High         ?
TypeOfCriterion   NO CRITERION

```

**4** BEGIN QUERY LOGGING ON user1 ACCOUNT = 'hr';

This request creates a logging rule for *user1* when that user is logged on under account name *hr* using default logging.

The row for Rule 4 in *DBC.DBQLRuleTbl* is as follows.

```

UserName  USER1
Account   HR
ApplicationName
TypeOfRule Logging enabled
Explain   F
Object    F
SQL       F
Step      F
XMLPlan   F
Summary   F
Threshold F
TextSize          200
Summary//Low      ?
      Med          ?
      High         ?
TypeOfCriterion   NO CRITERION

```

**5** BEGIN QUERY LOGGING WITH SQL ON user1;

This request creates a logging rule for *user1* when that user is logged on under any account name and logs SQL.

The row for Rule 5 in *DBC.DBQLRuleTbl* is as follows:

```

UserName  USER1
Account
ApplicationName
TypeOfRule Logging enabled
Explain   F
Object    F
SQL       T
Step      F
XMLPlan   F

```

```
Summary F
Threshold F
TextSize 200
Summary//Low ?
Med ?
High ?
TypeOfCriterion NO CRITERION
```

6 BEGIN QUERY LOGGING WITH NONE ON APPLNAME = 'multload';  
This request creates a logging rule for the MultiLoad application with no logging.  
The row for Rule 6 in *DBC.DBQLRuleTbl* is as follows:

```
UserName All
Account
ApplicationName MULTILOAD
TypeOfRule WITH NONE (No logging)
Explain F
Object F
SQL F
Step F
XMLPlan F
Summary F
Threshold F
TextSize 200
Summary//Low ?
Med ?
High ?
TypeOfCriterion NO CRITERION
```

The hierarchy for these rules is the same as that for the first example set, as follows:

| Hierarchy Level | Rule Number |
|-----------------|-------------|
| 1               | 6           |
| 2               | 3           |
| 3               | 4           |
| 4               | 5           |
| 5               | 2           |
| 6               | 1           |



## Example 7

This example causes Teradata Database to search for a DBQL rule that logs all users for any account name using default logging. The system searches level 5 of the rules hierarchy and finds such a rule, Rule 1.

```
SHOW QUERY LOGGING ON ALL;
```

The system searches level 5 of the rules hierarchy and finds a match (because there is no rule for *user2* with any account, so Teradata Database defaults to the ALL user rule), and returns the *DBC.DBQRuleTbl* row for Rule 1, as follows.

```
Rule UserName  ALL (From an ALL rule)
Rule UserId    00000000
Account        (Rule for any account)

DBQL RULE:
  Explain      F
  Object       F
  SQL          F
  Step         F
  XMLPlan      F
  Summary      F
  Threshold    F
Text Size Limit 200
```

## Example 8

This example causes Teradata Database to search for a DBQL rule that logs *user2* for all accounts.

```
SHOW QUERY LOGGING ON user2;
```

The system finds possible matches at levels 3 and 5 of the rules hierarchy and determines that the best fit match is at level 5 (because there is no rule for *user2* with any account, so Teradata Database defaults to the ALL user rule, Rule 1), and returns the *DBC.DBQRuleTbl* row for Rule 1, as follows.

```
Rule UserName  ALL (From an ALL rule)
Rule UserId    00000000
Account        FINANCE

DBQL RULE:
  Explain      F
  Object       F
  SQL          F
  Step         F
```

```
XMLPlan F
Summary F
Threshold F
Text Size Limit 200
```

## Example 9

This example causes Teradata Database to search for a DBQL rule that logs *user3* for the *finance* account.

```
SHOW QUERY LOGGING ON user3 ACCOUNT = 'finance';
```

The system finds possible matches at levels 2, 3, 4 and 5 of the rules hierarchy and determines that the best fit match is at level 4 (because there is no rule for *user3*, but level 4 has a rule for ALL users and the *finance* account, so Teradata Database defaults to it), and returns the *DBC.DBQRuleTbl* row for Rule 2, as follows.

```
Rule UserName ALL (From an ALL rule)
Rule UserId 00000000
Account FINANCE

DBQL RULE:
Explain F
Object T
SQL F
Step F
XMLPlan F
Summary F
Threshold F
Text Size Limit 200
```

## Example 10

This example causes Teradata Database to search for a DBQL rule that logs all users for the *finance* account.

```
SHOW QUERY LOGGING ON ALL ACCOUNT = 'finance';
```

The system finds possible matches at levels 2, 3, 4 and 5 of the rules hierarchy and determines that the best fit match is at level 4 (because there is no rule for *user3*, but level 4 has a rule for ALL users and the *finance* account, so Teradata Database defaults to the that rule), and returns the *DBC.DBQRuleTbl* row for Rule 2, as follows.

```

Rule UserName  ALL (From an ALL rule)
Rule UserId    00000000
Account        FINANCE

DBQL RULE:
  Explain      F
  Object        T
  SQL           F
  Step          F
  XMLPlan       F
  Summary       F
  Threshold     F
Text Size Limit 200

```

## Example 11

This example causes Teradata Database to search for a DBQL rule that logs *user1* for the *marketing* account.

```
SHOW QUERY LOGGING ON user1 ACCOUNT = 'marketing';
```

The system finds possible matches at levels 2, 3, 4 and 5 of the rules hierarchy and determines that the best fit match is at level 2 (because it matches the *user1* specification and defaults to all accounts when an exact account match cannot be found), and returns the *DBC.DBQRuleTbl* row for Rule 3, as follows.

```

Rule UserName  user1
Rule UserId    00002668
Account        MARKETING

DBQL RULE:
  Explain      F
  Object        F
  SQL           F
  Step          T
  XMLPlan       F
  Summary       F
  Threshold     F
Text Size Limit 200

```

## Example 12

This example causes Teradata Database to search for a DBQL rule that logs *user1* for the *hr* account.

```
SHOW QUERY LOGGING ON user1 ACCOUNT = 'hr';
```

The system finds possible matches at levels 2, 3, 4 and 5 of the rules hierarchy, determines that level 2 is an exact match, and returns the *DBC.DBQRuleTbl* row for Rule 3, as follows.

```
Rule UserName  user1
Rule UserId    00002668
Account        MARKETING

DBQL RULE:
  Explain      F
  Object       F
  SQL          F
  Step         T
  XMLPlan      F
  Summary      F
  Threshold    F
Text Size Limit 200
```

## Example 13

This example causes Teradata Database to search for a DBQL rule that logs *user1* for any account.

```
SHOW QUERY LOGGING ON user1;
```

The system finds possible matches at levels 3 and 5 of the rules hierarchy and determines that the best fit match is at level 3, which logs the SQL text for *user1*, and returns the *DBC.DBQRuleTbl* row for Rule 5, as follows.

```

Rule UserName  USER1
Rule UserId    00002668
Account        (Rule for any account)

DBQL RULE:
  Explain      F
  Object        F
  SQL           T
  Step          F
  XMLPlan       F
  Summary       F
  Threshold     F
Text Size Limit 200

```

## Example 14

This example causes Teradata Database to search for a DBQL rule that logs all queries for the MultiLoad application.

```
SHOW QUERY LOGGING ON APPLNAME = 'multload';
```

The system finds a possible match at level 1 of the rules hierarchy and determines that the best fit is that rule, which excludes logging for all users, but logs queries for the MultiLoad application, and returns the *DBC.DBQRuleTbl* row for Rule 6, as follows.

```

Rule UserName  ALL (From an ALL rule)
Rule UserId    00000000
Account        (Rule for any Account)
ApplicationName MULTLOAD

WITH NONE (No DBQL Logging)

```

## Related Topics

For information related to query logging, see the following topics and manuals:

- [“BEGIN QUERY LOGGING” on page 86](#)
- [“END QUERY LOGGING” on page 603](#)
- *Database Administration*



## APPENDIX A Notation Conventions

---

This appendix describes the notation conventions used in this book.

Throughout this book, three conventions are used to describe the SQL syntax and code:

- Syntax diagrams, used to describe SQL syntax form, including options. See [“Syntax Diagram Conventions” on page 831](#).
- Square braces in the text, used to represent options. The indicated parentheses are required when you specify options.

For example:

- DECIMAL [(*n*[,*m*))] means the decimal data type can be defined optionally:
  - without specifying the precision value *n* or scale value *m*
  - specifying precision (*n*) only
  - specifying both values (*n*,*m*)
  - you cannot specify scale without first defining precision
- CHARACTER [(*n*)] means that use of (*n*) is optional.

The values for *n* and *m* are integers in all cases.

- Japanese character code shorthand notation, used to represent unprintable Japanese characters. See [“Character Shorthand Notation Used In This Book” on page 836](#).

Symbols from the predicate calculus are also used occasionally to describe logical operations. See [“Predicate Calculus Notation Used In This Book” on page 838](#).

## Syntax Diagram Conventions

### Notation Conventions

| Item   | Definition / Comments                                                                                |
|--------|------------------------------------------------------------------------------------------------------|
| Letter | An uppercase or lowercase alphabetic character ranging from A through Z.                             |
| Number | A digit ranging from 0 through 9.<br>Do not use commas when typing a number with more than 3 digits. |

| Item        | Definition / Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Word        | <p>Keywords and variables.</p> <ul style="list-style-type: none"><li>• UPPERCASE LETTERS represent a keyword.<br/>Syntax diagrams show all keywords in uppercase, unless operating system restrictions require them to be in lowercase.</li><li>• lowercase letters represent a keyword that you must type in lowercase, such as a UNIX command.</li><li>• <i>lowercase italic letters</i> represent a variable such as a column or table name.<br/>Substitute the variable with a proper value.</li><li>• <b>lowercase bold letters</b> represent an excerpt from the diagram. The excerpt is defined immediately following the diagram that contains it.</li><li>• <u>UNDERLINED LETTERS</u> represent the default value.<br/>This applies to both uppercase and lowercase words.</li></ul> |
| Spaces      | Use one space between items such as keywords or variables.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Punctuation | Type all punctuation exactly as it appears in the diagram.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

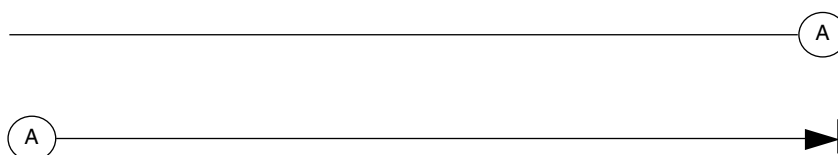
## Paths

The main path along the syntax diagram begins at the left with a keyword, and proceeds, left to right, to the vertical bar, which marks the end of the diagram. Paths that do not have an arrow or a vertical bar only show portions of the syntax.

The only part of a path that reads from right to left is a loop.

### Continuation Links

Paths that are too long for one line use continuation links. Continuation links are circled letters indicating the beginning and end of a link:



FE0CA002

When you see a circled letter in a syntax diagram, go to the corresponding circled letter and continue reading.



Required Entries

Required entries appear on the main path:

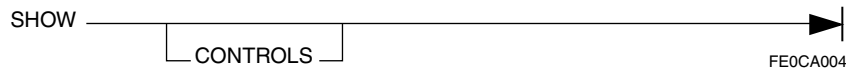


If you can choose from more than one entry, the choices appear vertically, in a stack. The first entry appears on the main path:

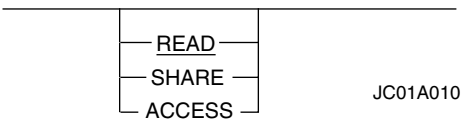


Optional Entries

You may choose to include or disregard optional entries. Optional entries appear below the main path:



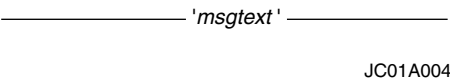
If you can optionally choose from more than one entry, all the choices appear below the main path:



Some commands and statements treat one of the optional choices as a default value. This value is UNDERLINED. It is presumed to be selected if you type the command or statement without specifying one of the options.

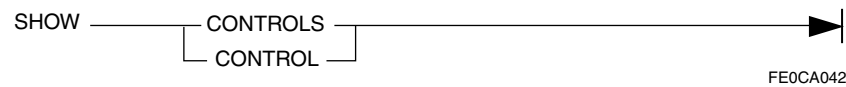
Strings

String literals appear in single quotes:



Abbreviations

If a keyword or a reserved word has a valid abbreviation, the unabbreviated form always appears on the main path. The shortest valid abbreviation appears beneath.

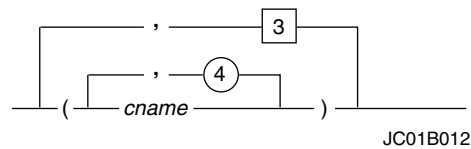


In the above syntax, the following formats are valid:

- `SHOW CONTROLS`
- `SHOW CONTROL`

Loops

A loop is an entry or a group of entries that you can repeat one or more times. Syntax diagrams show loops as a return path above the main path, over the item or items that you can repeat:



Read loops from right to left.  
The following conventions apply to loops:

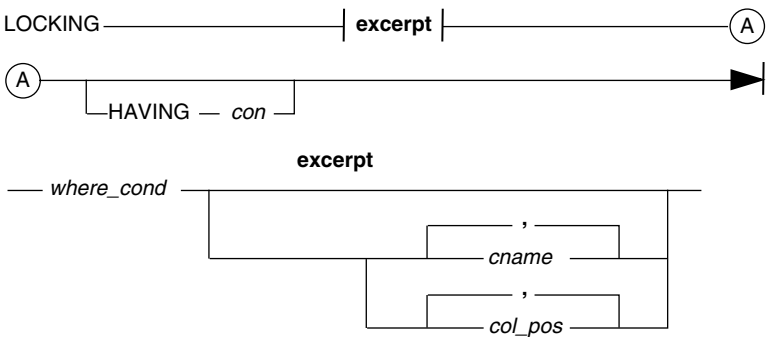
| IF...                                             | THEN...                                                                                                                                                                      |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| there is a maximum number of entries allowed      | the number appears in a circle on the return path.<br>In the example, you may type <i>cname</i> a maximum of 4 times.                                                        |
| there is a minimum number of entries required     | the number appears in a square on the return path.<br>In the example, you must type at least three groups of column names.                                                   |
| a separator character is required between entries | the character appears on the return path.<br>If the diagram does not show a separator character, use one blank space.<br>In the example, the separator character is a comma. |

| IF...                                            | THEN...                                                                                                                                                                                                                        |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| a delimiter character is required around entries | the beginning and end characters appear outside the return path.<br>Generally, a space is not needed between delimiter characters and entries.<br>In the example, the delimiter characters are the left and right parentheses. |

Excerpts

Sometimes a piece of a syntax phrase is too large to fit into the diagram. Such a phrase is indicated by a break in the path, marked by (|) terminators on each side of the break. The name for the excerpted piece appears between the terminators in boldface type.

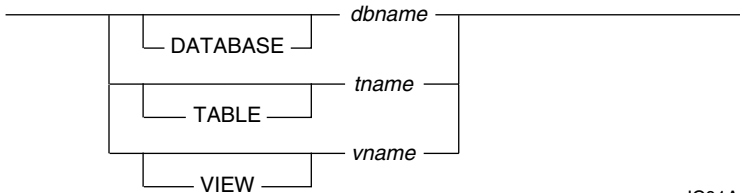
The boldface excerpt name and the excerpted phrase appears immediately after the main diagram. The excerpted phrase starts and ends with a plain horizontal line:



JC01A014

Multiple Legitimate Phrases

In a syntax diagram, it is possible for any number of phrases to be legitimate:



JC01A016

In this example, any of the following phrases are legitimate:

- *dbname*
- *DATABASE dbname*
- *tname*

- TABLE *tname*
- *vname*
- VIEW *vname*

Sample Syntax Diagram

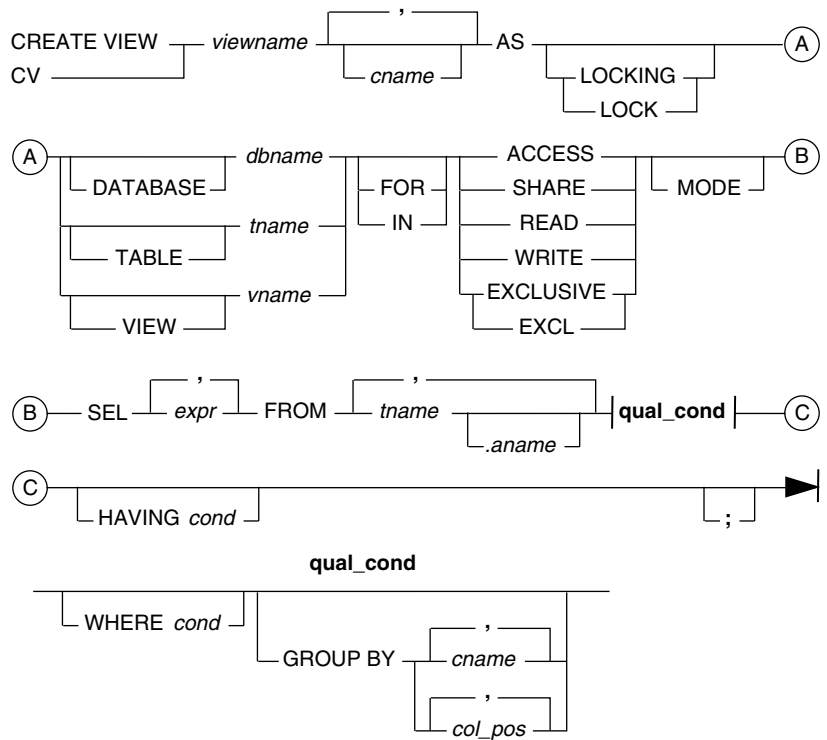


Diagram Identifier

The alphanumeric string that appears in the lower right corner of every diagram is an internal identifier used to catalog the diagram. The text never refers to this string.

Character Shorthand Notation Used In This Book

Introduction

This book uses the Unicode naming convention for characters. For example, the lowercase character ‘a’ is more formally specified as either LATIN SMALL LETTER A or U+0041. The

U+xxxx notation refers to a particular code point in the Unicode standard, where xxxx stands for the hexadecimal representation of the 16-bit value defined in the standard.

In parts of the book, it is convenient to use a symbol to represent a special character, or a particular class of characters. This is particularly true in discussion of the following Japanese character encodings.

- KanjiEBCDIC
- KanjiEUC
- KanjiShift-JIS

These encodings are further defined in *International Character Set Support*.

## Character Symbols

The symbols, along with character sets with which they are used, are defined in the following table.

| Symbol                                                            | Encoding                   | Meaning                                                                                                                                                             |
|-------------------------------------------------------------------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| a–z<br>A–Z<br>0–9                                                 | Any                        | Any single byte Latin letter or digit.                                                                                                                              |
| <u>a</u> – <u>z</u><br><u>A</u> – <u>Z</u><br><u>0</u> – <u>9</u> | Unicode compatibility zone | Any fullwidth Latin letter or digit.                                                                                                                                |
| <                                                                 | KanjiEBCDIC                | Shift Out [SO] (0x0E).<br>Indicates transition from single to multibyte character in KanjiEBCDIC.                                                                   |
| >                                                                 | KanjiEBCDIC                | Shift In [SI] (0x0F).<br>Indicates transition from multibyte to single byte KanjiEBCDIC.                                                                            |
| <b>T</b>                                                          | Any                        | Any multibyte character.<br>The encoding depends on the current character set.<br>For KanjiEUC, code set 3 characters are sometimes preceded by “ss <sub>3</sub> ”. |
| <b>I</b>                                                          | Any                        | Any single byte Hankaku Katakana character.<br>In KanjiEUC, it must be preceded by “ss <sub>2</sub> ”, forming an individual multibyte character.                   |
| <u>Δ</u>                                                          | Any                        | Represents the graphic pad character.                                                                                                                               |
| Δ                                                                 | Any                        | Represents a single or multibyte pad character, depending on context.                                                                                               |
| ss <sub>2</sub>                                                   | KanjiEUC                   | Represents the EUC code set 2 introducer (0x8E).                                                                                                                    |

| Symbol          | Encoding | Meaning                                          |
|-----------------|----------|--------------------------------------------------|
| ss <sub>3</sub> | KanjiEUC | Represents the EUC code set 3 introducer (0x8F). |

For example, string “TEST”, where each letter is intended to be a fullwidth character, is written as **TEST**. Occasionally, when encoding is important, hexadecimal representation is used.

For example, the following mixed single byte/multibyte character data in KanjiEBCDIC character set

LMN<**TEST**>QRS

is represented as:

D3 D4 D5 0E 42E3 42C5 42E2 42E3 0F D8 D9 E2

## Pad Characters

The following table lists the pad characters for the various character data types.

| Server Character Set | Pad Character Name | Pad Character Value |
|----------------------|--------------------|---------------------|
| LATIN                | SPACE              | 0x20                |
| UNICODE              | SPACE              | U+0020              |
| GRAPHIC              | IDEOGRAPHIC SPACE  | U+3000              |
| KANJISJIS            | ASCII SPACE        | 0x20                |
| KANJII1              | ASCII SPACE        | 0x20                |

## Predicate Calculus Notation Used In This Book

Relational databases are based on the theory of relations as developed in set theory. Predicate calculus is often the most unambiguous way to express certain relational concepts.

Occasionally this book uses the following predicate calculus notation to explain concepts.

| This symbol ... | Represents this phrase ... |
|-----------------|----------------------------|
| iff             | If and only if             |
| ∀               | For all                    |
| ∃               | There exists               |

# Glossary

**ACM** Association for Computing Machinery

**AMP** Access Module Processor vproc

The set of software services that controls the file system and data management components of a Teradata Database.

**ANSI** American National Standards Institute (<http://www.ansi.org>)

A US-based umbrella standards organization based in Washington, D.C., that defines, certifies, and administers the SQL standard.

The ANSI SQL standards are available for purchase at the following web site: <http://webstore.ansi.org/default.aspx>.

The ANSI SQL standard is also recognized by the [ISO](#).

**API** Application Programming Interface.

A set of software services with a well-defined program interface.

**Application User** Application users are proxies for middle tier applications that access Teradata Database by means of a session logged onto by a [Trusted User](#).

An application proxy user can be anything that represents a client connecting to the middle tier such as a client name or an Automated Teller Machine ID.

Application proxy user names are not defined in Teradata Database, so the system does not valid their names, but the names must follow Teradata object naming conventions.

Along with the category of [Permanent User](#) application users are more broadly referred to as a [Proxy User](#).

**ASCII** American Standard Code for Information Interchange

A standard seven-bit code designed to establish compatibility between various types of data processing equipment. Originally proposed in 1963, ASCII is documented by the following standards: ISO-14962-1997 and ANSI-X3.4-1986(R1997).

The standard ASCII character set defines 128 decimal numbers ranging from 0 through 127, inclusive. The individual characters are assigned to alphanumerics, punctuation marks, and a set of commonly used special characters.

There is also an extended ASCII character set consisting of an additional 128 decimal numbers ranging from 128 through 255, inclusive. These characters are assigned to additional special, mathematical, graphic, and “foreign” characters.

Because ASCII uses only 7 bits, it is possible to use the 8th bit for parity checking.

Compare with [EBCDIC](#).

**BFS** Breadth First Search

A search methodology from graph theory in which the leaves of a tree are searched across each node level before beginning again at the next lower leaf of the leftmost node.

**BLOB** Binary Large Object

A data object, usually larger than 64K, that contains only binary data such as pictures, movies, or music.

Compare with [CLOB](#).

**BNF** Backus-Naur Form or Backus Normal Form

A metalanguage used to specify computer languages.

**BTEQ** Basic Teradata Query facility

A client interface to the Teradata Database that permits users to submit SQL requests interactively or in batch mode, to format result sets, to build and perform scripts, and to import and export data.

BTEQ is based on the CLIv2 API, while the somewhat similar facility, SQL Assistant, is based on the ODBC API. As a result, there are several significant differences in the behavior of the two facilities.

**BYNET** Banyan Network - A proprietary high speed hybrid hardware and software communications network that handles the data flow between the PEs and AMPs running on the various [SMP](#) nodes in a Teradata system.

**C** A general-purpose programming language developed by Dennis Ritchie of AT&T Bell Laboratories.

**C++** An object-oriented programming language developed by Bjarne Stroustrup of AT&T Bell Laboratories as an extension to the [C](#) language.

**CJK** Chinese, Japanese, and Korean

A common abbreviation used to represent the multibyte character sets used to write the Chinese, Japanese, and Korean languages.

**CLIv2** Call Level Interface Version 2

CLIv2 is the API for most client-server interactions in the Teradata Database. The applications that do not use CLIv2, such as SQL Assistant, use the ODBC API to communicate between the client and the Teradata platform.

**CLOB** Character Large Object

A data object, usually larger than 64K, that contains only character data such as XML or other text files.

Compare with [BLOB](#).



**Compression** The term *compression* is used to mean two entirely different things for the Teradata system. Both forms are lossless, meaning that the original data can be reconstructed exactly from their compressed forms.

When describing compression of hash and join indexes, compression refers to a logical row compression in which multiple sets of nonrepeating column values are appended to a single set of repeating column values. This allows the system to store the repeating value set only once, while any nonrepeating column values are stored as logical segmental extensions of the base repeating set.

When describing compression of column values, compression refers to the storage of those values one time only in the table header, not in the row itself, and pointing to them by means of an array of presence bits in the row header. The method is called Dictionary Indexing, and it can be viewed as a variation of Run-Length Encoding.

**Cover** A condition in which all the column data requested by a query can be obtained by index-only access.

**cs0, cs1, cs2, cs3** The four code sets (codeset 0, 1, 2, and 3) used in EUC encoding. cs0 always contains an ISO-646 character set.

All of the other sets must have the most-significant bit set to 1, and they can use any number of bytes to encode the characters. In addition, all characters within a set must have:

- The same number of bytes to encode all characters
- The same column display width (number of columns on a fixed-width terminal)

Each character in cs2 is preceded by the control character ss2 (single-shift 2, 0x8E). Code sets that conform to EUC do not use the ss2 control character other than to identify the third set.

Each character in cs3 is preceded by the control character ss3 (single-shift 3, 0x8F). Code sets that conform to EUC do not use the ss3 control character other than to identify the fourth set.

The EUC for Japanese consists of single-byte and multibyte characters (2 and 3 bytes). The encoding conforms to ISO-2022 and is based on JIS and EUC definitions as follows:

| Code Set | Encoding               | Character Set  |
|----------|------------------------|----------------|
| cs0      | 0xxxxxxx               | ASCII          |
| cs1      | 1xxxxxxx 1xxxxxxx      | JIS X0208-1990 |
| cs2      | 0x8E 1xxxxxxx          | JIS X0201-1976 |
| cs3      | 0x8F 1xxxxxxx 1xxxxxxx | JIS X0212-1990 |

## E2I External-to-Internal

Character set transformation from client format to Teradata Database format.

**EBCDIC** Extended Binary-Coded Decimal Interchange Code

An 8-bit code for alphanumeric, punctuation marks, and special characters devised by IBM Corporation as an alternative to [ASCII](#). EBCDIC and ASCII use different coding schemes to define their respective character sets, and EBCDIC defines some special characters that are not defined in ASCII. EBCDIC is only used by IBM computing equipment.

Because EBCDIC is an 8-bit coding scheme, it is not possible to perform parity checks using the 8th bit.

Compare with [ASCII](#).

**EUC** Extended UNIX Code

A character encoding scheme specified by ISO standard ISO-2022.

The EUC code set uses control characters to identify characters in some of the character sets. The encoding rules are based on the ISO-2022 definition for the encoding of 7-bit and 8-bit data. The EUC code set uses control characters to separate some of the character sets.

The various UTF-*n* formats are defined partly by the EUC standard and partly by the various parts of ISO standard ISO-8859.

**External Routine** A generic term to describe stored procedures, user-defined functions, and user-defined methods.

**FIFO** First-In-First-Out

A type of queue in which the first entries placed in the sequence are also the first read from it.

**FK** See [Foreign Key](#).

**Foreign Key** A means of establishing referential integrity between tables in a relational database. A foreign key in a child table is typically the logical primary key of its parent table. If it is not the primary key for the parent table, then it is one of its alternate keys.

Compare with [Primary Key](#).

**Global Temporary Table** A type of table whose definition persists across sessions, but whose contents typically do not. You can materialize only one instance of a global temporary table within the same session, but up to 2 000 different global temporary table instances within the same session, and there is no limit to the number of sessions that can materialize an instance of the same global temporary table definition. Global temporary tables are also limited by not being indexable, not eligible to have statistics collected on their columns, not being compressible, not eligible for permanent journaling (though global temporary table updates can optionally be logged), not eligible to define most types of constraints, and so on. See “Global Temporary Tables” in *SQL Data Definition Language Syntax and Examples* for a complete definition of global temporary tables and a listing of their restrictions.

Compare with [Volatile Table](#).

**GLOP** An initialism for GLObal and Persistent memory.

GLOPs enable external routines to access global shared memory that contains data of your choosing. GLOPs make it possible to use this data to make configurable business decisions without the need to externalize the information by means of parameters or other methods of passing data to external routines.

A GLOP persists beyond a single invocation of an external routine, enabling it to be referenced by subsequent external routines either in either its original, or modified, form.

**GLOP Set** A GLOP set is the GLOP mapping that is accessed when referenced by a UDF, method, or external procedure.

A GLOP set consists of up to 8 GLOP data sections of various types.

**GTT** See [Global Temporary Table](#).

**GUI** Acronym for Graphical User Interface.

**Hash Index** A vertical partition of a base table having properties similar to a single-table [Join Index](#).

Unlike the primary index, which is stored in-line with the row it indexes, hash indexes are stored in separate subtables that must be maintained by the system. Hash index subtables also consume disk space, so you should monitor your queries periodically using EXPLAIN modifiers to determine whether the Optimizer is using any of the hash indexes you designed for them. If not, you should either drop those indexes or rewrite your queries in such a way that the Optimizer does use them.

**HI** See [Hash Index](#).

**Intermediary** A component of the [RSG](#) software that is provided by GoldenGate Software, Inc. The intermediary uses a call-level interface defined by GoldenGate for fetching replication data from a source database system. Also see [TAM](#).

**ISO** International Organization for Standardization <http://www.iso.org>

An international umbrella standards organization based in Geneva, Switzerland, that also certifies the ANSI SQL standard.

The following passage from the ISO web site explains why the name of the organization does not match its (apparent) initialism: "Because "International Organization for Standardization" would have different abbreviations in different languages ("IOS" in English, "OIN" in French for Organisation internationale de normalisation), it was decided at the outset to use a word derived from the Greek isos, meaning "equal". Therefore, whatever the country, whatever the language, the short form of the organization's name is always ISO."

The ISO packaging of the SQL standard can be obtained from the following web site: <http://www.iso.org/iso/search.htm>.

**JAR File** JAR is an initialism for Java ARchive.

A JAR file is an archive of a collection of Java classes in a zip file format.

**Java™** A class-based, object-oriented programming language developed by Sun Microsystems.

**JDBC** Java DataBase Connectivity. An [API](#) used to convert SQL function calls embedded within [Java%o](#) applications into SQL requests.

**JI** See [Join Index](#).

**JIS** Japanese Industrial Standards

A subset of the standards defined, certified, and administered by the Japanese Standards Organization (see [http://www.jsa.or.jp/default\\_english.asp](http://www.jsa.or.jp/default_english.asp) or <http://www.jsa.or.jp>). The relevant standards for computer language processing are represented by Division X, “Information Processing,” of the JIS standards (see <http://www.webstore.jsa.or.jp/webstore/JIS/FlowControl.jsp?lang=en&bumon=X&viewid=JIS/html/en/CategoryListEn.htm>).

**Join Index** A vertical partition of one or more base tables that can, depending on how it is defined, create various types of prejoins of tables, including sparse and aggregate forms. Join indexes cannot be queried directly by an SQL request; instead, they are used by the Optimizer to enhance the performance of any queries they [Cover](#).

A join index that only vertically partitions a base table is referred to as a single-table join index.

A join index that prejoins two or more base tables is referred to as a multitable join index.

Both types of join index can be created in sparse or aggregate forms and can have a subset of their columns compressed.

Unlike the primary index, which is stored in-line with the row it indexes, join indexes are stored in separate subtables that must be maintained by the system. Join index subtables also consume disk space, so you should monitor your queries periodically using EXPLAIN modifiers to determine whether the Optimizer is using any of the join indexes you designed for them. If not, you should either drop those indexes or rewrite your queries in such a way that the Optimizer does use them.

**JTA** Java Transaction API

**LAN** Local Area Network

A data communications network that uses wire or cable links to connect its remote and local nodes over a local geographical area.

Compare with [WAN](#).

**LOB** Large Object

Any data object that is larger than the maximum row size for the Teradata Database. There are two types of LOB: the [BLOB](#) and the [CLOB](#).

**Logical Row** For compressed hash and join indexes, a logical row is defined as one of multiple sets of nonrepeating column values appended to a single set of repeating column values. This allows the system to store the repeating value set only once, while any nonrepeating column values are stored as logical segmental extensions of the base repeating set.

**MLPPI** Multilevel Partitioned Primary Index

A [PPI](#) defined with multiple partitioning expressions and an equal number of subpartitioning levels, hence multiple levels.

Compare with [SLPPI](#).

**MPP** Multiple Parallel Processors. A configuration of Teradata [SMP](#) nodes linked together by a [BYNET](#).

**NOPI Table** A table defined with no primary index.

**NPARC** Named Pipes Archive

**NPPI** Nonpartitioned Primary Index

A [Primary Index](#) that is not partitioned into range buckets by means of a partitioning expression.

**NUPI** Non-Unique Primary Index

A [Primary Index](#) that is not uniquely constrained. NUPIs are often used to position rows from multiple tables on the same AMP to facilitate join operations on those tables.

**NUPI Table** A table defined with a nonunique primary index, or [NUPI](#).

**NUSI** Non-Unique Secondary Index

An AMP-local [Secondary Index](#) designed to be used for set (multirow) selection rather than single-row selection.

**ODBC** Open DataBase Connectivity

A de facto standard API for communicating between client applications and relational databases using SQL.

The ANSI SQL standard API, referred to as CLI (sometimes as SQL/CLI), or Call-Level Interface, is based on the ODBC specification. Beginning with ODBC version 3.0, the ODBC standard and the ANSI SQL Call Level Interface standards became identical.

See <http://www.sqlsummit.com/ODBCPORT.HTM>.

**OLTP** On-Line Transaction Processing

A category of workload processing that typically deals with very brief update transactions.

A typical application of OLTP technology is automated teller machines.

**OS** Operating System

A level of software that provides services to permit higher level software to interact with system hardware.

UNIX, Linux, Windows, and z/OS are examples of operating systems.

**PE** Parsing Engine vproc

The set of software services that controls the query processing and session management components of a Teradata Database.

**Permanent User** Permanent users are proxies for users who access Teradata Database by means of a session logged onto by a [Trusted User](#). In contrast to an [Application User](#), trusted users are always defined within Teradata Database.

The privileges for a permanent proxy user are either those that have been defined for that permanent user or those defined by the roles assigned to the proxy user in the GRANT CONNECT privileges for the [Trusted User](#) under whose session the permanent user is logged onto Teradata Database.

Along with the category of [Application User](#), application users are more broadly referred to as a [Proxy User](#).

**PI** See [Primary Index](#).

**PK** See [Primary Key](#).

**PPI** Partitioned Primary Index

A [Primary Index](#) that is used to first distribute rows to the AMPs as they would be by an [NPPI](#), then partitioned into a set of ranges determined by the DBA and specified using a PARTITION BY clause in the table definition statement.

PPIs are particularly useful for supporting various types of range queries.

**Primary Index** Primary Index

A set of columns in a table whose values are hashed to create a code used to distribute its rows to, and retrieve them from, the AMPs.

Each table in a Teradata database can have zero or one (never more than one), primary index, which might or might not be unique.

Compare with [Primary Key](#).

**Primary Key** A set of columns in a table whose values make each row in that table unique.

Primary keys are a logical, not physical, concept that are often, but not necessarily, used as the primary index for a table when it is physically designed.

A table can have multiple candidate keys, but only one primary key can be defined for it. Those candidate keys that are not used as the primary key for a table are referred to as alternate keys.

Relationships between primary and foreign keys are often used to establish referential integrity between tables. These relationships are also frequently exploited by the Optimizer to enhance query performance.

**Primary Platform** A database server from which changes are captured by an [Intermediary](#) and applied to tables that duplicate the tables of the primary platform on a [Subscriber Platform](#). [Replication Services](#) executing on the primary and subscriber servers provide the capture and application functions.

**Proxy Connection** A connection in which the user being validated for privileges and logging is a [Proxy User](#).

### **Proxy Role**

If a proxy connection specifies a `PROXYROLE=role_name` string, *role\_name* must be one of the role names specified in the `WITH ROLE` clause of the `GRANT CONNECT THROUGH` request that grants the `CONNECT THROUGH` privilege to a user.

`PROXYROLE` is a reserved query band name used to enable asserting a proxy role by means of a `SET QUERY_BAND` request.

**Proxy User** A user that connects to Teradata Database using the session of a [Trusted User](#). Application users and permanent users are collectively referred to as proxy users.

`PROXYUSER` is a reserved query band name used to enable asserting a proxy user by means of a `SET QUERY_BAND` request.

**Pseudoindex** A type of histogram in *DBC.Indexes* that stores statistics for multiple columns. Single-column statistics are stored in histograms in *DBC.TVFields*. See *Data Dictionary* for information about these dictionary tables and the system views you can use to query them.

**QITS** Queue Insertion TimeStamp

A required, user-defined column that must be defined for all queue tables.

**QSN** Queue Sequence Number

A useful, but not required, column that can be defined for queue tables.

**RDBMS** Relational Database Management System

A database management system based on relational set theory and the theorems, axioms, and operators provided by set theory. The set theoretic foundation for an RDBMS provides a scientific, predictable, set of tools for managing data.

**Referential Integrity** A method of ensuring that no data is ever orphaned in a relational database. Referential integrity uses the parent-child relationships between a [Primary Key](#) and a [Foreign Key](#) to prevent child table rows from ever being orphaned from deleted parent table rows.

Teradata Database supports three different kinds of relational integrity constraints:

- **Referential Integrity constraints**  
This is the standard RI constraint defined by the ANSI SQL standard.
- **Batch Referential Integrity constraints**  
This is a special Teradata Database form of RI that is less expensive to enforce in terms of system resources than standard referential integrity because it is enforced as an all-or-nothing operation (the entire transaction must complete successfully) rather than on a row-by-row basis, as standard referential integrity is checked.
- **Referential Constraints**  
This is a special Teradata Database form of RI, sometimes informally referred to as *soft RI*, that specifies constraints the Optimizer can use to optimize queries, but are not enforced by the system. In other words, their referential constraint is logical *only* and is not enforced physically.

Referential integrity relationships are often used by the Optimizer to enhance query performance.

**Replication Group** A set of Teradata Database tables for which changed data is either captured on a primary platform or applied on a subscriber platform.

**Replication Services** Software implemented in Teradata Database that interact with an Intermediary to capture or apply changed data to the tables of a [Replication Group](#).

**Replication System** A system composed of all the components, both internal and external to Teradata Database, that provides the capability of replicating and synchronizing database elements between two or more database servers.

**Request** One or more SQL statements submitted to Teradata Database as a single unit of work.

**RI** See [Referential Integrity](#).

**RSG** Relay Services Gateway vproc.

A virtual processor residing on a node on which the [Replication Services](#) software executes.

**SDF** Specification for Data Formatting.

**Secondary Index** A vertically partitioned subset of base table columns used to facilitate data manipulation operations.

Unlike the primary index, which is stored in-line with the row it indexes, secondary indexes are stored in separate subtables that must be maintained by the system. Secondary index subtables also consume disk space, so you should monitor your queries periodically using EXPLAIN modifiers to determine whether the Optimizer is using any of the secondary indexes you designed for them. If not, you should either drop those indexes or rewrite your queries in such a way that the Optimizer does use them.

Secondary indexes come in two types: [USI](#) and [NUSI](#).

**SI** See [Secondary Index](#).



**SIGACT** ACM Special Interest Group for Algorithms and Computation Theory, the ACM SIG devoted to theoretical computer science (including theoretical issues of importance to database management).

**SIGART** ACM Special Interest Group for ARTificial Intelligence

**SIGFIDET** ACM Special Interest Group for File DEscription and Translation, the predecessor organization to ACM SIGMOD.

**SIGKDD** ACM Special Interest Group for Knowledge Discovery and Data Mining

**SIGMOD** ACM Special Interest Group for MODification of Data, the ACM SIG devoted to database management issues.

**SLPPI** Single-Level Partitioned Primary Index

A [PPI](#) that has only one partitioning expression, hence a single level.

Compare with [MLPPI](#).

**SMP** Symmetric MultiProcessor. In the Teradata system architecture, an SMP is represented by a single node.

**SOAP** Simple Object Access Protocol

SOAP is an element of Microsoft .NET architecture that provides a way to communicate between applications running under different operating systems, different technologies, and different programming languages.

**SQL** The programming language used to create relational database objects (Data Definition Language, or DDL), to manipulate their contents (Data Manipulation Language, or DML), and to define their security attributes (Data Control Language, or DCL).

Now preferably pronounced ess-kew-ell, the language was originally named SEQUEL (Structured English QUery Language) and was pronounced as it was spelled. According to the ANSI SQL standard, SQL does *not* stand for Structured Query Language, as is commonly thought. The name is neither an acronym nor does it represent anything other than the characters S, Q, and L.

**Subscriber Platform** A database server to which changes captured from a primary platform by an [Intermediary](#) are applied to tables that duplicate the tables of the primary platform. [Replication Services](#) executing on the primary and subscriber platforms provide the capture and application functions.

**TAM** The [Intermediary](#) uses a call-level interface that has been defined by GoldenGate Software, Inc. for fetching replication data from a source database system. TAM is a dynamic library module provided by Teradata that implements that interface. TAM communicates with Teradata Database via TCP/IP connections to one or more [RSGs](#).

**TLE** Target Level Emulation

A set of tools used to emulate the characteristics of a production environment on a smaller, differently configured test system. See *Teradata System Emulation Tool User Guide* and *SQL Request and Transaction Processing* for further information.

**TPA** Trusted Parallel Application

A TPA is an application that Teradata has certified to run safely on the Teradata Database. The Teradata Database software itself is a TPA.

**Trusted User** A user who has been granted the privilege to assume the identity of a [Proxy User](#).

**UDT** User-Defined Type

A data type defined by someone other than Teradata. UDTs come in two variations: Distinct and Structured. See “CREATE TYPE (Distinct Form)” and “CREATE TYPE (Structured Form)” in *SQL Data Definition Language Syntax and Examples*, and *SQL External Routine Programming* for additional information.

**UPI** Unique Primary Index

A [Primary Index](#) that is uniquely constrained. The rows from a table defined with a UPI tend to be distributed more evenly across the AMPs than rows from a table defined with a [NUPI](#).

**UPI Table** A table defined with a unique primary index, or [UPI](#).

**USI** Unique Secondary Index

A [Secondary Index](#) designed to facilitate single-row access.

**UTC** Universal Coordinated Time or Coordinated Universal Time. Formerly known as Greenwich Mean Time. The initials UTC were made the standard by the International Telecommunication Union, coming from the French words *Universel Temps Coordonné*, which itself is not proper French. The correct French phrase is *Temps Universel Coordonné*. The initialism UTC is the result of a compromise between English-speaking and French-speaking interests, each of whom wanted the term to be expressed in their own language.

**UTF-8** UTF-8 (8-bit Unicode Transformation Format) is a variable-length character encoding for Unicode. UTF-8 can represent the Unicode repertoire while retaining consistency with ASCII.

Quoting the Unicode FAQ (see [http://www.unicode.org/faq/utf\\_bom.html#2](http://www.unicode.org/faq/utf_bom.html#2)), the definition of UTF-8 is as follows: “UTF-8 is the byte-oriented encoding form of Unicode ... There is only one definition of UTF-8. It is the precisely the same, whether the data were converted from ASCII or EBCDIC based character sets. However, byte sequences from standard UTF-8 won’t interoperate well in an EBCDIC system, because of the different arrangements of control codes between ASCII and EBCDIC.”

**UTF-16** UTF-16 (16-bit Unicode Transformation Format) is a variable-length character encoding for Unicode that can represent the entire Unicode repertoire. For characters in the Basic Multilingual Plane, the resulting encoding is a single 16-bit word, while for characters in the other planes, the encoding results in a pair of 16-bit words.

Quoting the Unicode FAQ (see [http://www.unicode.org/faq/utf\\_bom.html#2](http://www.unicode.org/faq/utf_bom.html#2)), the definition of UTF-16 is as follows: “UTF-16 uses a single 16-bit code unit to encode the most common 63K characters, and a pair of 16-bit code units, called surrogates, to encode the 1M less commonly used characters in Unicode. ... Surrogates are code points from two special ranges of Unicode values, reserved for use as the leading, and trailing values of paired code units in UTF-16. Leading, also called high, surrogates are from D800<sub>16</sub> to DBFF<sub>16</sub>, and trailing, or low, surrogates are from DC00<sub>16</sub> to DFFF<sub>16</sub>. They are called surrogates, since they do not represent characters directly, but only as a pair.

“Originally, Unicode was designed as a pure 16-bit encoding, aimed at representing all modern scripts. (Ancient scripts were to be represented with private-use characters.) Over time, and especially after the addition of over 14,500 composite characters for compatibility with legacy sets, it became clear that 16-bits were not sufficient for the user community. Out of this arose UTF-16.”

**Volatile Table** A type of table that is private to the session in which it is created and persists only for the duration of that session. Volatile tables are also limited by not being indexable, not being compressible, not eligible for journaling, not eligible to define most types of constraints, and so on. See “Volatile Tables” in *SQL Data Definition Language Syntax and Examples* for a complete definition of volatile tables and a listing of their restrictions.

Compare with [Global Temporary Table](#).

**vproc** Virtual Process

The Version 1 Teradata architecture used several different specialized node types to process data, including the following node types:

- IFP (InterFace Processor)
- COP (Communications Processor)
- APP (Application Processor)
- [AMP](#)

The Version 2 Teradata architecture is based on a common node configuration. Each [TPA](#) node can run one or more [PE](#) and [AMP](#) vprocs that emulate the functions of the Version 1 hardware nodes. The functions IFP and COP nodes of the Version 1 architecture are consolidated in the PE vproc, while the analogous functionality of an APP node of the Version 1 architecture is running Teradata Tools and Utilities software on a non-TPA node in a Teradata MPP system.

**VT** See [Volatile Table](#).

**WAN** Wide Area Network

A data communications network that uses telephone, microwave, or satellite links to connect its remote and local nodes over a diffuse geographical area.

Compare with [LAN](#).

**XSP** EXternal Stored Procedure

A stored procedure whose procedural code is contained in an external routine that is written in a language other than SQL such as C, C++, or Java.

Compare with SQL stored procedure, in which the procedural code is contained in a routine internal to Teradata Database and written in the SQL language.

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