

Db2 11.1 for Linux, UNIX, and Windows



Commands

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Commands

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Commands

Command line processor (CLP)

Command line processor features

This section provides information about the command line processor features.

The command line processor operates as follows:

- The CLP command (in either case) is typed at the command prompt.
- The command is sent to the command shell by pressing the ENTER key.
- Output is automatically directed to the standard output device.
- Piping and redirection are supported.
- The user is notified of successful and unsuccessful completion.
- Following execution of the command, control returns to the operating system command prompt, and the user can enter more commands.
- When the CLP is called with a file input option, it will automatically set the CLIENT APPLNAME special register to CLP *filename*.

You can start the command line processor by either:

- typing the **db2** command, or,
- on Linux operating systems, click **Main Menu** and, select **IBM Db2 > Command Line Processor**.

Certain CLP commands and SQL statements require that the server instance is running and a database connection exists. Connect to a database by performing one of the following actions:

- Issue the SQL statement:
`db2 connect to database`
- Establish an implicit connection to the default database defined by the Db2® registry variable **DB2DBDFT**.

If a command exceeds the character limit allowed at the command prompt, a backslash (\) can be used as the line continuation character. When the command line processor encounters the line continuation character, it reads the next line and concatenates the characters contained on both lines. Alternatively, the **-t** option can be used to set a different line termination character.

The command line processor recognizes a string called NULL as a null string. Fields that have been set previously to some value can later be set to NULL. For example,

```
db2 update database manager configuration using tm_database NULL
```

sets the **tm_database** field to NULL. This operation is case sensitive. A lowercase **null** is not interpreted as a null string, but rather as a string containing the letters **null**.

Customizing the Command Line Processor

It is possible to customize the interactive input prompt by using the **DB2_CLPPROMPT** registry variable. This registry variable can be set to any text string of maximum

length 100 and can contain the tokens %i, %ia, %d, %da and %n. Specific values will be substituted for these tokens at run time.

Table 1. DB2_CLPPROMPT tokens and runtime values

DB2_CLPPROMPT token	Value at run time
%ia	Authorization ID of the current instance attachment
%i	Local alias of the currently attached instance. If no instance attachment exists, the value of the DB2INSTANCE registry variable. On Windows platforms only, if the DB2INSTANCE registry variable is not set, the value of the DB2INSTDEF registry variable.
%da	Authorization ID of the current database connection
%d	Local alias of the currently connected database. If no database connection exists, the value of the DB2DBDFT registry variable.
%n	New line

- If any token has no associated value at runtime, the empty string is substituted for that token.
- The interactive input prompt will always present the authorization IDs, database names, and instance names in uppercase, so as to be consistent with the connection and attachment information displayed at the prompt.
- If the **DB2_CLPPROMPT** registry variable is changed within CLP interactive mode, the new value of **DB2_CLPPROMPT** will not take effect until CLP interactive mode has been closed and reopened.

You can specify the number of commands to be stored in the command history by using the **DB2_CLPHISTSIZE** registry variable. The **HISTORY** command lets you access the contents of the command history that you run within a CLP interactive mode session.

You can also specify the editor that is opened when you issue the **EDIT** command by using the **DB2_CLP_EDITOR** registry variable. From a CLP interactive session, the **EDIT** command opens an editor preloaded with a user-specified command which can then be edited and run.

Examples

If **DB2_CLPPROMPT** is defined as (%ia@%i, %da@%d), the input prompt will have the following values:

- No instance attachment and no database connection. **DB2INSTANCE** set to DB2. **DB2DBDFT** is not set.
(@DB2, @)
- (Windows) No instance attachment and no database connection. **DB2INSTANCE** and **DB2DBDFT** not set. **DB2INSTDEF** set to DB2.
(@DB2, @)
- No instance attachment and no database connection. **DB2INSTANCE** set to DB2. **DB2DBDFT** set to "SAMPLE".
(@DB2, @SAMPLE)
- Instance attachment to instance "Db2" with authorization ID "keon14". **DB2INSTANCE** set to DB2. **DB2DBDFT** set to "SAMPLE".
(KEON14@DB2, @SAMPLE)

- Database connection to database "sample" with authorization ID "horton7".
DB2INSTANCE set to DB2. **DB2DBDFT** set to SAMPLE.
(@DB2, HORTON7@SAMPLE)
- Instance attachment to instance "Db2" with authorization ID "keon14". Database connection to database "sample" with authorization ID "horton7". **DB2INSTANCE** set to DB2. **DB2DBDFT** not set.
(KEON14@DB2, HORTON7@SAMPLE)

Using the Command Line Processor in command files

CLP requests to the database manager can be imbedded in a shell script command file. The following example shows how to enter the CREATE TABLE statement in a shell script command file:

```
db2 "create table mytable (name VARCHAR(20), color CHAR(10))"
```

For more information about commands and command files, see the appropriate operating system manual.

Command Line Processor design

The command line processor consists of two processes: the front-end process (the Db2 command), which acts as the user interface, and the back-end process (**db2bp**), which maintains a database connection.

Maintaining database connections

Each time that **db2** is invoked, a new front-end process is started. The back-end process is started by the first **db2** invocation, and can be explicitly terminated with **TERMINATE**. All front-end processes with the same parent are serviced by a single back-end process, and therefore share a single database connection.

For example, the following **db2** calls from the same operating system command prompt result in separate front-end processes sharing a single back-end process, which holds a database connection throughout:

- db2 'connect to sample',
- db2 'select * from org',
- . test01 (where test01 is a shell script containing Db2 commands), and
- db2 -tf myfile.clp

The following invocations from the same operating system prompt result in separate database connections because each has a distinct parent process, and therefore a distinct back-end process:

- test01
- . test01 &
- test01 &
- sh test01

Communication between front-end and back-end processes

The front-end process and back-end processes communicate through three message queues: a request queue, an input queue, and an output queue.

Environment variables

The following environment variables offer a means of configuring communication between the two processes:

Table 2. Environment Variables

Variable	Minimum	Maximum	Default
DB2BQTIME	1 second	5294967295	1 second
DB2BQTRY	0 tries	5294967295	60 tries
DB2RQTIME	1 second	5294967295	5 seconds
DB2IQTIME	1 second	5294967295	5 seconds

DB2BQTIME

When the command line processor is invoked, the front-end process checks if the back-end process is already active. If it is active, the front-end process reestablishes a connection to it. If it is not active, the front-end process activates it. The front-end process then idles for the duration specified by the **DB2BQTIME** variable, and checks again. The front-end process continues to check for the number of times specified by the **DB2BQTRY** variable, after which, if the back-end process is still not active, it times out and returns an error message.

DB2BQTRY

Works in conjunction with the **DB2BQTIME** variable, and specifies the number of times the front-end process tries to determine whether the back-end process is active.

The values of **DB2BQTIME** and **DB2BQTRY** can be increased during peak periods to optimize query time.

DB2RQTIME

Once the back-end process has been started, it waits on its request queue for a request from the front-end. It also waits on the request queue between requests initiated from the command prompt.

The **DB2RQTIME** variable specifies the length of time the back-end process waits for a request from the front-end process. At the end of this time, if no request is present on the request queue, the back-end process checks whether the parent of the front-end process still exists, and terminates itself if it does not exist. Otherwise, it continues to wait on the request queue.

DB2IQTIME

When the back-end process receives a request from the front-end process, it sends an acknowledgment to the front-end process indicating that it is ready to receive input via the input queue. The back-end process then waits on its input queue. It also waits on the input queue while a batch file (specified with the **-f** option) is executing, and while the user is in interactive mode.

The **DB2IQTIME** variable specifies the length of time the back-end process waits on the input queue for the front-end process to pass the commands. After this time has elapsed, the back-end process checks whether the front-end process is active, and returns to wait on the request queue if the front-end process no longer exists. Otherwise, the back-end process continues to wait for input from the front-end process.

To view the values of these environment variables, use **LIST COMMAND OPTIONS**.

The back-end environment variables inherit the values set by the front-end process at the time the back-end process is initiated. However, if the front-end environment variables are changed, the back-end process will not inherit these changes. The back-end process must first be terminated, and then restarted (by issuing the **db2** command) to inherit the changed values.

An example of when the back-end process must be terminated is provided by the following scenario:

1. User A logs on, issues some CLP commands, and then logs off without issuing **TERMINATE**.
2. User B logs on using the same window.
3. When user B issues certain CLP commands, they fail with message DB21016 (system error).

The back-end process started by user A is still active when user B starts using the CLP, because the parent of user B's front-end process (the operating system window from which the commands are issued) is still active. The back-end process attempts to service the new commands issued by user B; however, user B's front-end process does not have enough authority to use the message queues of the back-end process, because it needs the authority of user A, who created that back-end process. A CLP session must end with a **TERMINATE** command before a user starts a new CLP session using the same operating system window. This creates a fresh back-end process for each new user, preventing authority problems, and setting the correct values of environment variables (such as **DB2INSTANCE**) in the new user's back-end process.

CLP usage notes

Commands can be entered either in uppercase or in lowercase from the command prompt. However, parameters that are case sensitive to Db2 must be entered in the exact case required. For example, the *comment-string* in the **WITH** clause of the **CHANGE DATABASE COMMENT** command is a case sensitive parameter.

Delimited identifiers are allowed in SQL statements.

Special characters, or metacharacters (such as \$ & * () ; < > ? \ ' ") are allowed within CLP commands. If they are used outside the CLP interactive mode, or the CLP batch input mode, these characters are interpreted by the operating system shell. Quotation marks or an escape character are required if the shell is not to take any special action.

For example, when executed inside an AIX® Korn shell environment,

```
db2 select * from org where division > 'Eastern'
```

is interpreted as "select <the names of all files> from org where division". The result, an SQL syntax error, is redirected to the file Eastern. The following syntax produces the correct output:

```
db2 "select * from org where division > 'Eastern'"
```

Special characters vary from platform to platform. In the AIX Korn shell, the previous example could be rewritten using an escape character (\), such as *, \>, or \'.

Most operating system environments allow input and output to be redirected. For example, if a connection to the SAMPLE database has been made, the following request queries the STAFF table, and sends the output to a file named staflist.txt in the mydata directory:

```
db2 "select * from staff" > mydata/staflist.txt
```

For environments where output redirection is not supported, CLP options can be used. For example, the request can be rewritten as

```
db2 -r mydata\staflist.txt "select * from staff"
```

```
db2 -z mydata\staflist.txt "select * from staff"
```

The command line processor is not a programming language. For example, it does not support host variables, and the statement,

```
db2 connect to :HostVar in share mode
```

is syntactically incorrect, because :HostVar is not a valid database name.

The command line processor represents SQL NULL values as hyphens (-). If the column is numeric, the hyphen is placed at the right of the column. If the column is not numeric, the hyphen is at the left.

To correctly display the national characters for single byte (SBCS) languages from the Db2 command line processor window, a True Type font must be selected. For example, in a Windows environment, open the command window properties notebook and select a font such as Lucinda Console. Non-printable characters such as bell (0x7) are printed without substitution, so special consideration must be given for the ASCII null character (0x0). Even though it is acceptable to have an ASCII null character (0x0) within a VARCHAR string, the display of the string ends at the first ASCII null character that is found within the string.

For example,

```
db2 "insert into sample values (x'410041')"
db2 "insert into sample values (x'410741')"
```

```
db2 "select CHARACTER_LENGTH(DATA, OCTETS) LENGTH,
      DATA,
      hex(DATA) HEX_VALUE
   from sample"
```

LENGTH	DATA	HEX_VALUE
3	A	410041
3	AA	410741

The command line processor does not support national language support (NLS) characters in file path names. This particularly affects commands such as **IMPORT**, **EXPORT**, and **REGISTER XMLSCHEMA**, where problematic file path names would most frequently be encountered.

Piping the output of a command line processor command into another command line processor command is supported. For example: **db2 -x <SQL_statement> | db2 +p -tv**. This support is limited only by the pipe buffer size. Pipe buffer sizes are not configurable. If the pipe buffer size is exceeded by the first command, the command line processor might hang or fail when attempting to write the output to

the pipe buffer. If the second command is not a command line processor command, for example a UNIX shell command, a hang or failure will not occur due to the pipe buffer size limitation.

The command line processor supports the db2dsdriver.cfg configuration file for database connections. You can use db2dsdriver.cfg keywords that are supported by embedded SQL with the command line processor.

db2 - Command line processor invocation

The **db2** command starts the command line processor (CLP). The CLP is used to execute database utilities, SQL statements and online help.

It offers a variety of command options, and can be started in:

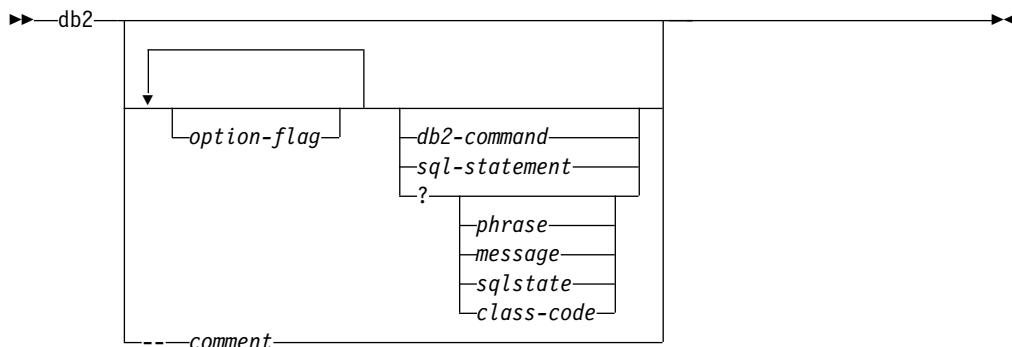
- Interactive input mode, characterized by the db2 => input prompt
- Command mode, where each command must be prefixed by **db2**
- Batch mode, which uses the **-f** file input option.

On Windows operating systems, **db2cmd** command opens the CLP-enabled Db2 window, and initializes the Db2 command line environment. Issuing this command is equivalent to clicking on the **Db2 Command Window** icon.

The **QUIT** command stops the command line processor. The **TERMINATE** command also stops the command line processor but also removes the associated backend process and frees any memory that is being used. You should issue the **TERMINATE** command before issuing every **STOP DATABASE MANAGER** or **db2stop** command. You might also need to issue the **TERMINATE** command after changing the values of database configuration parameters, so that these changes take effect. You should reset connections before terminating the CLP.

The shell command, (!), allows operating system commands to be executed from the interactive or the batch mode on Linux and UNIX operating systems, and on Windows operating systems (!ls on UNIX, and !dir on Windows operating systems, for example).

Command Syntax



option-flag

Specifies a CLP option flag.

db2-command

Specifies a Db2 command.

sql-statement

Specifies an SQL statement.

? Requests CLP general help.

? phrase

Requests the help text associated with a specified command or topic. If the database manager cannot find the requested information, it displays the general help screen.

? **options** requests a description and the current settings of the CLP options. ? **help** requests information about reading the online help syntax diagrams.

? message

Requests help for a message specified by a valid SQLCODE (? sql10007n, for example).

? sqlstate

Requests help for a message specified by a valid SQLSTATE.

? class-code

Requests help for a message specified by a valid class-code.

-- comment

Input that begins with the comment characters -- is treated as a comment by the command line processor.

In each case, a blank space must separate the question mark (?) from the variable name.

Command line processor options

The CLP command options can be specified by setting the command line processor **DB2OPTIONS** environment variable (which must be in uppercase), or with command line flags.

Users can set options for an entire session using **DB2OPTIONS**.

View the current settings for the option flags and the value of **DB2OPTIONS** using **LIST COMMAND OPTIONS**. Change an option setting from the interactive input mode or a command file using **UPDATE COMMAND OPTIONS**.

The command line processor sets options in the following order:

1. Sets up default options.
2. Reads **DB2OPTIONS** to override the defaults.
3. Reads the command line to override **DB2OPTIONS**.
4. Accepts input from **UPDATE COMMAND OPTIONS** as a final interactive override.

Table 3 on page 9 summarizes the CLP option flags. These options can be specified in any sequence and combination. To turn an option on, prefix the corresponding option letter with a minus sign (-). To turn an option off, either prefix the option letter with a minus sign and follow the option letter with another minus sign, or prefix the option letter with a plus sign (+). For example, -c turns the autocommit option on, and either -c- or +c turns it off. These option letters are not case sensitive, that is, -a and -A are equivalent.

Table 3. CLP Command Options

Option Flag	Description	Default Setting
-a	This option tells the command line processor to display SQLCA data.	OFF
-b	This option tells the command line processor to automatically create any missing or invalid packages necessary to execute SQL statements.	ON
-c	This option tells the command line processor to automatically commit SQL statements.	ON
-d	This option tells the command line processor to retrieve and display XML declarations of XML data.	OFF
-e{c s}	This option tells the command line processor to display SQLCODE or SQLSTATE. These options are mutually exclusive.	OFF
-f <i>filename</i>	This option tells the command line processor to read command input from a file instead of from standard input.	OFF
-i	This option tells the command line processor to 'pretty print' the XML data with proper indentation. This option will only affect the result set of XQuery statements.	OFF
-l <i>filename</i>	This option tells the command line processor to log commands in a history file.	OFF
-m	This option tells the command line processor to print the number of rows affected for INSERT, DELETE, UPDATE, and MERGE statements.	OFF
-n	Removes the new line character within a single delimited token. If this option is not specified, the new line character is replaced with a space. This option must be used with the -t option.	OFF
-o	This option tells the command line processor to display output data and messages to standard output.	ON
-p	This option tells the command line processor to display a command line processor prompt when in interactive input mode.	ON
-q	This option tells the command line processor to preserve whitespaces and linefeeds in strings delimited with single or double quotation marks. When option q is ON, option n is ignored.	OFF
-r <i>filename</i>	This option tells the command line processor to write the report generated by a command to a file.	OFF
-s	This option tells the command line processor to stop execution if errors occur while executing commands in a batch file or in interactive mode.	OFF
-t	This option tells the command line processor to use a semicolon (;) as the statement termination character.	OFF
-tdx or -tdxx	This option tells the command line processor to define and to use x or xx as the statement termination character or characters (1 or 2 characters in length).	OFF
-v	This option tells the command line processor to echo command text to standard output.	OFF

Table 3. CLP Command Options (continued)

Option Flag	Description	Default Setting
-w	This option tells the command line processor to display FETCH and SELECT warning messages.	ON
-x	This option tells the command line processor to return data without any headers, including column names. This flag will not affect all commands. It applies to SQL statements and some commands that are based on SQL statements such as LIST TABLES .	OFF
-y	This option tells the command line processor to retrieve SQL message text from the connected database server if the CLP does not find any message text corresponding to an SQLCODE in a local message file.	ON
-z <i>filename</i>	This option tells the command line processor to redirect all output to a file. It is similar to the -r option, but includes any messages or error codes with the output.	OFF

The AIX command:

```
export DB2OPTIONS='+a -c +ec -o -p'
```

sets the following default settings for the session:

```
Display SQLCA - off
Auto Commit - on
Display SQLCODE - off
Display Output - on
Display Prompt - on
```

The following is a detailed description of these options:

Show SQLCA Data Option (-a):

Displays SQLCA data to standard output after executing a Db2 command or an SQL statement. The SQLCA data is displayed instead of an error or success message.

The default setting for this command option is OFF (+a or -a-).

The -o and the -r options affect the -a option; see the option descriptions for details.

Autobind Option (-b):

Creates missing or invalid packages that are necessary to execute SQL statements. If set OFF (+b), command line processor will not attempt to rebind the package when server throws package not found error or timestamp conflict error to command line processor.

The default setting for this command option is ON.

This new command line option can also be set via DB2OPTIONS environment variable.

Use case scenario:

```
# explicitly dropping db2clpcs.bnd from a database
db2 drop package NULLID.SQLC2J24
...
# turning off autobind ("+b") results in SQL0805N
# as db2clpcs.bnd is dropped now
db2 +b "create table a (c1 int)"
```

```

# bind needed file explicitly now
db2 bind db2c1pcs.bnd

# now same SQL will be successful as binding is done explicitly
db2 +b "create table a (c1 int)"

# again explicitly dropping db2c1pcs.bnd from a database
db2 drop package NULLID.SQLC2J24
...
# keeping default autobind ("‐b") results autobinding of
# missing packages and SQL execution is success now

db2 -b "create table a (c1 int)"
-OR-
db2 "create table a (c1 int)"

```

Autocommit Option (-c):

This option specifies whether each command or statement is to be treated independently. If set ON (-c), each command or statement is automatically committed or rolled back. If the command or statement is successful, it and all successful commands and statements that were issued before it with autocommit OFF (+c or -c-) are committed. If, however, the command or statement fails, it and all successful commands and statements that were issued before it with autocommit OFF are rolled back. If set OFF (+c or -c-), COMMIT or ROLLBACK statements must be issued explicitly, or one of these actions will occur when the next command with autocommit ON (-c) is issued.

The default setting for this command option is ON.

The autocommit option does not affect any other command line processor option.

Example: Consider the following scenario:

1. db2 create database test
2. db2 connect to test
3. db2 +c "create table a (c1 int)"
4. db2 select c2 from a

The SQL statement in step 4 fails because there is no column named C2 in table A. Since that statement was issued with autocommit ON (default), it rolls back not only the statement in step 4, but also the one in step 3, because the latter was issued with autocommit OFF. The command:

db2 list tables

then returns an empty list.

XML Declaration Option (-d):

The -d option tells the command line processor whether to retrieve and display XML declarations of XML data.

If set ON (-d), the XML declarations will be retrieved and displayed. If set OFF (+d or -d-), the XML declarations will not be retrieved and displayed. The default setting for this command option is OFF.

The XML declaration option does not affect any other command line processor options.

Display SQLCODE/SQLSTATE Option (-e):

The -e{c|s} option tells the command line processor to display the

SQLCODE (-ec) or the SQLSTATE (-es) to standard output. Options -ec and -es are not valid in CLP interactive mode.

The default setting for this command option is OFF (+e or -e-).

The -o and the -r options affect the -e option; see the option descriptions for details.

The display SQLCODE/SQLSTATE option does not affect any other command line processor option.

Example: To retrieve SQLCODE from the command line processor running on AIX, enter:

```
sqlcode=~db2 -ec +o db2-command~
```

Read from Input File Option (-f):

The -f *filename* option tells the command line processor to read input from a specified file, instead of from standard input. *Filename* is an absolute or relative file name which can include the directory path to the file. If the directory path is not specified, the current directory is used.

When the CLP is called with a file input option, it will automatically set the CLIENT APPLNAME special register to CLP *filename*.

When other options are combined with option -f, option -f must be specified last. For example:

```
db2 -tvf filename
```

When you run a CLP script file using the **db2 -tvf** *filename* command, it sets the CLIENT APPLNAME special register to CLP *filename*. The next command you run, resets the CLIENT APPLNAME and CLIENT ACCTNG special registers to the old value before the **db2 -tvf** *filename* command was issued. If the next command you run is **db2 terminate** or the last command in *filename* is **TERMINATE**, then the special registers are not reset. This is useful for monitoring which batch job is currently running and differentiating the CLP workload.

This option cannot be changed from within the interactive mode.

The default setting for this command option is OFF (+f or -f-).

Commands are processed until the **QUIT** command or **TERMINATE** command is issued, or an end-of-file is encountered.

If both this option and a database command are specified, the command line processor does not process any commands, and an error message is returned.

Input file lines which begin with the comment characters -- are treated as comments by the command line processor. Comment characters must be the first non-blank characters on a line, unless the command input ends explicitly with the statement termination character after adding comment characters. If you explicitly end the command input with the termination character, your comments can be placed mid-line or at the end of the line.

Input file lines which begin with (= are treated as the beginning of a comment block. Lines which end with =) mark the end of a comment block. The block of input lines that begins at (= and ends at =) is treated as a continuous comment by the command line processor. Spaces before (= and after =) are allowed. Comments may be nested, and may be used nested in statements. The command termination character (;) cannot be used after =).

If the `-f filename` option is specified, the `-p` option is ignored.

The read from input file option does not affect any other command line processor option.

Note that the default termination character is one of the new line characters unless otherwise specified with the `-t` option or the end-of-file.

Pretty Print Option (-i):

The `-i` option tells the command line processor to 'pretty print' the XML data with proper indentation. This option will only affect the result set of XQuery statements.

The default setting for this command option is OFF (+i or -i-).

The pretty print option does not affect any other command line processor options.

Log Commands in History File Option (-l):

The `-l filename` option tells the command line processor to log commands to a specified file. This history file contains records of the commands executed and their completion status. *Filename* is an absolute or relative file name which can include the directory path to the file. If the directory path is not specified, the current directory is used. If the specified file or default file already exists, the new log entry is appended to that file.

When other options are combined with option `-l`, option `-l` must be specified last. For example:

```
db2 -tv1 filename
```

The default setting for this command option is OFF (+l or -l-).

The log commands in history file option does not affect any other command line processor option.

Display Number of Rows Affected Option (-m):

The `-m` option tells the command line processor whether or not to print the number of rows affected for INSERT, DELETE, UPDATE, or MERGE statements.

If set ON (-m), the number of rows affected will be displayed for the INSERT, DELETE, UPDATE, or MERGE statements. If set OFF (+m or -m-), the number of rows affected will not be displayed. For other statements, this option will be ignored. The default setting for this command option is OFF.

The `-o` and the `-r` options affect the `-m` option; see the option descriptions for details.

Remove New Line Character Option (-n):

Removes the new line character within a single delimited token. If this option is not specified, the new line character is replaced with a space. This option cannot be changed from within the interactive mode.

The default setting for this command option is OFF (+n or -n-).

This option must be used with the `-t` option; see the option description for details.

Display Output Option (-o):

The `-o` option tells the command line processor to send output data and messages to standard output.

The default setting for this command option is **ON**.

The interactive mode start-up information is not affected by this option. Output data consists of report output from the execution of the user-specified command, and SQLCA data (if requested).

The following options might be affected by the **+o** option:

- **-r filename**: Interactive mode start-up information is not saved.
- **-e**: SQLCODE or SQLSTATE is displayed on standard output even if **+o** is specified.
- **-a**: No effect if **+o** is specified. If **-a**, **+o** and **-rfilename** are specified, SQLCA information is written to a file.

If both **-o** and **-e** options are specified, the data and either the SQLCODE or the SQLSTATE are displayed on the screen.

If both **-o** and **-v** options are specified, the data is displayed, and the text of each command issued is echoed to the screen.

The display output option does not affect any other command line processor option.

Display Db2 Interactive Prompt Option (-p):

The **-p** option tells the command line processor to display the command line processor prompt when the user is in interactive mode.

The default setting for this command option is **ON**.

Turning the prompt off is useful when commands are being piped to the command line processor. For example, a file containing CLP commands could be executed by issuing:

```
db2 +p < myfile.clp
```

The **-p** option is ignored if the **-f filename** option is specified.

The display Db2 interactive prompt option does not affect any other command line processor option.

Preserve Whitespaces and Linefeeds Option (-q):

The **-q** option tells the command line processor to preserve whitespaces and linefeeds in strings delimited with single or double quotation marks.

The default setting for this command option is **OFF (+q or -q-)**.

If option **-q** is **ON**, option **-n** is ignored.

Save to Report File Option (-r):

The **-r filename** option causes any output data generated by a command to be written to a specified file, and is useful for capturing a report that would otherwise scroll off the screen. Messages or error codes are not written to the file. *Filename* is an absolute or relative file name which can include the directory path to the file. If the directory path is not specified, the current directory is used. New report entries are appended to the file.

The default setting for this command option is **OFF (+r or -r-)**.

If the **-a** option is specified, SQLCA data is written to the file.

The **-r** option does not affect the **-e** option. If the **-e** option is specified, SQLCODE or SQLSTATE is written to standard output, not to a file.

If **-r filename** is set in **DB2OPTIONS**, the user can set the **+r** (or **-r-**) option from the command line to prevent output data for a particular command invocation from being written to the file.

The save to report file option does not affect any other command line processor option.

Stop Execution on Command Error Option (-s):

When commands are issued in interactive mode, or from an input file, and syntax or command errors occur, the -s option causes the command line processor to stop execution and to write error messages to standard output.

The default setting for this command option is OFF (+s or -s-). This setting causes the command line processor to display error messages, continue execution of the remaining commands, and to stop execution only if a system error occurs (return code 8).

The following table summarizes this behavior:

Table 4. CLP Return Codes and Command Execution

Return Code	-s Option Set	+s Option Set
0 (success)	execution continues	execution continues
1 (0 rows selected)	execution continues	execution continues
2 (warning)	execution continues	execution continues
4 (Db2 or SQL error)	execution stops	execution continues
8 (System error)	execution stops	execution stops

Statement Termination Character Options (-t and -tdx or -tdxx):

The -t option tells the command line processor to use a semicolon (;) as the statement termination character, and disables the backslash (\) line continuation character. This option cannot be changed from within the interactive mode.

The default setting for this command option is OFF (+t or -t-).

Note: If you use the CLP to issue XQuery statements, it is best to choose a termination character other than the semicolon. This ensures that statements or queries that use namespace declarations are not misinterpreted, since namespace declarations are also terminated by a semicolon.

To define termination characters 1 or 2 characters in length, use -td followed by the chosen character or characters. For example, -td%% sets %% as the statement termination characters. Alternatively, use the --#SET TERMINATOR directive in an input file to set the statement termination characters. For example:

```
db2 -td%% -f file1.txt
```

or

```
db2 -f file2.txt
```

where file2.txt contains the following as the first statement in the file:

```
--#SET TERMINATOR %%
```

The default setting for this command option is OFF.

The termination character or characters cannot be used to concatenate multiple statements from the command line, since checks for a termination symbol are performed on only the last one or two non-blank characters of each input line.

The statement termination character options do not affect any other command line processor option.

Verbose Output Option (-v):

The **-v** option causes the command line processor to echo (to standard output) the command text entered by the user before displaying the output, and any messages from that command. ECHO is exempt from this option.

The default setting for this command option is OFF (+v or -v-).

The **-v** option has no effect if +o (or -o-) is specified.

The verbose output option does not affect any other command line processor option.

Show Warning Messages Option (-w):

The **-w** option instructs the command line processor on whether or not to display warning messages that may occur during a query (FETCH or SELECT statement). Warnings can occur during various stages of the query execution which may result in the messages being displayed before, during or after the data is returned. To ensure the data returned does not contain warning message text this flag can be used.

The default setting for this command option is ON.

SUPPRESS PRINTING OF COLUMN HEADINGS OPTION (-x):

The **-x** option tells the command line processor to return data without any headers, including column names. This flag will not affect all commands. It applies to SQL statements and some commands that are based on SQL statements such as **LIST TABLES**.

The default setting for this command option is OFF.

Get SQL message text from connected database Server (-y):

The **-y** option tells the command line processor to retrieve SQL message text from the connected database server if the CLP does not find any message text corresponding to an SQLCODE in the local message file. This flag will not affect all commands. It applies only to SQL statements that are executed on a remote database server.

This option will not affect Db2 help messages which return message text from local message files. For example, db2 -y ? SQL4742N will not go to the connected database server to bring the message detail.

To indicate that the received message text is from the connected database server, a keyword **[SERVER]** will appear just after SQLCODE for server messages as below:

```
$ db2 -y "<some sqlstatement>"  
SQL4742N [SERVER] THE STATEMENT CANNOT BE EXECUTED BY DB2  
OR IN THE ACCELERATOR  
(REASON 1). SQLSTATE=42704
```

The default setting for the **-y** option is ON.

Save all Output to File Option (-z):

The **-z filename** option causes all output generated by a command to be written to a specified file, and is useful for capturing a report that would otherwise scroll off the screen. It is similar to the **-r** option; in this case, however, messages, error codes, and other informational output are also written to the file. *filename* is an absolute or relative file name which can

include the directory path to the file. If the directory path is not specified, the current directory is used. New report entries are appended to the file.

The default setting for this command option is OFF (+z or -z-).

If the -a option is specified, SQLCA data is written to the file.

The -z option does not affect the -e option. If the -e option is specified, SQLCODE or SQLSTATE is written to standard output, not to a file.

If -z *filename* is set in **DB2OPTIONS**, the user can set the +z (or -z-) option from the command line to prevent output data for a particular command invocation from being written to the file.

The save all output to file option does not affect any other command line processor option.

Command line processor return codes

This section provides information about the command line processor return codes.

When the command line processor finishes processing a command or an SQL statement, it returns a return (or exit) code. These codes are transparent to users executing CLP functions from the command line, but they can be retrieved when those functions are executed from a shell script.

For example, the following Bourne shell script executes the GET DATABASE MANAGER CONFIGURATION command, then inspects the CLP return code:

```
db2 get database manager configuration
if [ "$?" = "0" ]
then echo "OK!"
fi
```

The return code can be one of the following values:

Code	Description
0	Db2 command or SQL statement executed successfully
1	SELECT or FETCH statement returned no rows
2	Db2 command or SQL statement warning
4	Db2 command or SQL statement error
8	Command line processor system error

Code	Description
0	Db2 command or SQL statement executed successfully
1	SELECT or FETCH statement returned no rows
2	Db2 command or SQL statement warning
4	Db2 command or SQL statement error
8	Command line processor system error

The command line processor does not provide a return code while a user is executing statements from interactive mode, or while input is being read from a file (using the -f option).

When a CLP command is used with the +w option, warnings are suppressed, 1 and 2 codes are never returned, and 0 is returned in such cases.

A return code is available only after the user quits interactive mode, or when processing of an input file ends. In these cases, the return code is the logical OR of the distinct codes returned from the individual commands or statements executed to that point.

For example, if a user in interactive mode issues commands resulting in return codes of 0, 1, and 2, a return code of 3 will be returned after the user quits interactive mode. The individual codes 0, 1, and 2 are not returned. Return code 3

tells the user that during interactive mode processing, one or more commands returned a 1, and one or more commands returned a 2.

A return code of 4 results from a negative SQLCODE returned by aDb2 command or an SQL statement. A return code of 8 results only if the command line processor encounters a system error.

If commands are issued from an input file or in interactive mode, and the command line processor experiences a system error (return code 8), command execution is halted immediately. If one or more Db2 commands or SQL statements end in error (return code 4), command execution stops if the **-s** (Stop Execution on Command Error) option is set; otherwise, execution continues.

Invoking command help from the command line processor

Command help explains the syntax of commands in the command line processor.

Procedure

To invoke command help, open the command line processor and enter:

? *command*

where *command* represents a keyword or the entire command.

For example, ? catalog displays help for all of the **CATALOG** commands, while ? catalog database displays help only for the **CATALOG DATABASE** command.

Issuing message help from the command line processor

The message help command provides full message text that is associated with the unique message identifier. The message help command must be issued from the Db2 command line processor (CLP).

Procedure

- To issue message help command for a unique message identifier, open the command line processor and enter one of the following commands:
 - ? XXXnnnnn

where XXX represents a valid message identifier prefix and nnnnn represents a valid message number.

For example, when you issue the ? **SQL30081** command, the full SQL30081N message text is returned.

– ? nnnnn

where nnnnn represents a valid message number.

For example, when you issue the ? **30081** command, the full SQL30081N message text is returned.

- To issue message help command for an SQLSTATE message, open the command line processor and enter one of the following commands:
 - ? nnnnn

where nnnnn is a five-digit SQLSTATE (alphanumeric) value.

For example, when you issue the ? **58005** command, the message text that is associated with the SQLSTATE code 58005 is returned.

– ? nn

The *nn* represents the two-digit SQLSTATE class code (first two digits of the SQLSTATE value).

For example, when you issue the **? 58** command, the message text that is associated with the SQLSTATE class 58 is returned.

Using command line SQL statements and XQuery statements

This section provides information about using Structured Query Language (SQL) statements from the command line.

These statements can be executed directly from an operating system command prompt, and can be used to define and manipulate information stored in a database table, index, or view in much the same way as if the commands were written into an application program. Information can be added, deleted, or updated, and reports can be generated from the contents of tables.

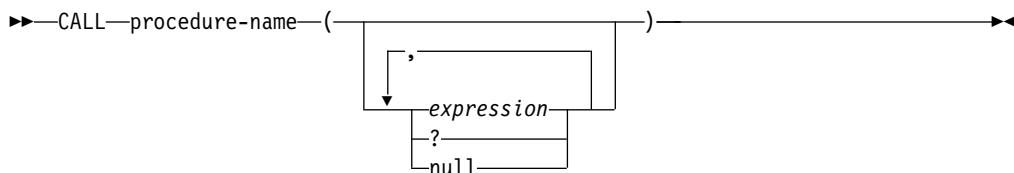
You can use SQL statements from the command line, and you can use a stored procedure (SYSPROC.ADMIN_CMD()) to run some CLP commands through SQL. For more information about how to use this stored procedure, refer to the SQL Administrative Routines.

To issue XQuery statements in CLP, prefix the statements with the XQUERY keyword.

Note: If you use the CLP to issue XQuery statements, it is best to choose a termination character other than the semicolon (-t option). This ensures that statements or queries that use namespace declarations are not misinterpreted, since namespace declarations are also terminated by a semicolon.

All SQL statements that can be executed through the command line processor are listed in the CLP column of Table 5 on page 23. The syntax of all the SQL statements, whether executed from the command line or embedded in a source program, is described in the SQL Reference. The syntax of many embedded SQL statements and CLP SQL statements is identical. However, host variables, parameter markers, descriptor names, and statement names are applicable only to embedded SQL. The syntax of CALL, CLOSE, CONNECT, DECLARE CURSOR, FETCH, and OPEN does depend on whether these statements are embedded or executed through the CLP. The CLP syntax of these statements is provided in the following section:

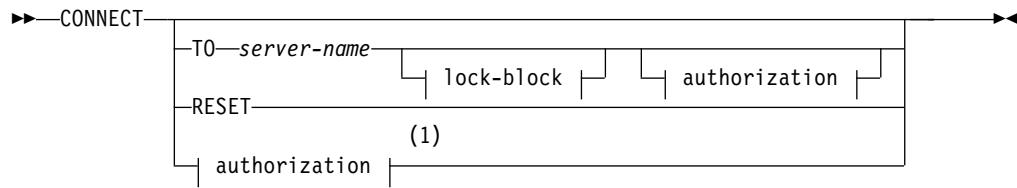
CALL



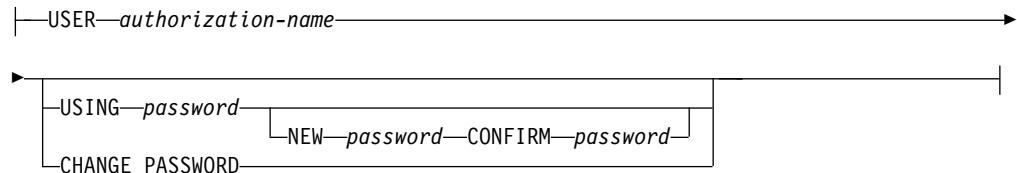
CLOSE

➡➡CLOSE—cursor-name—➡➡

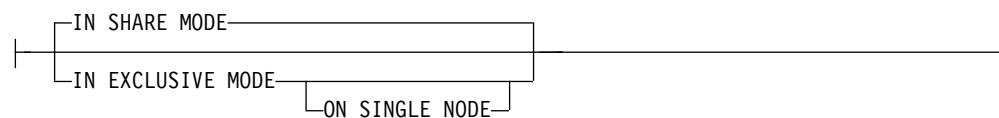
CONNECT



authorization:



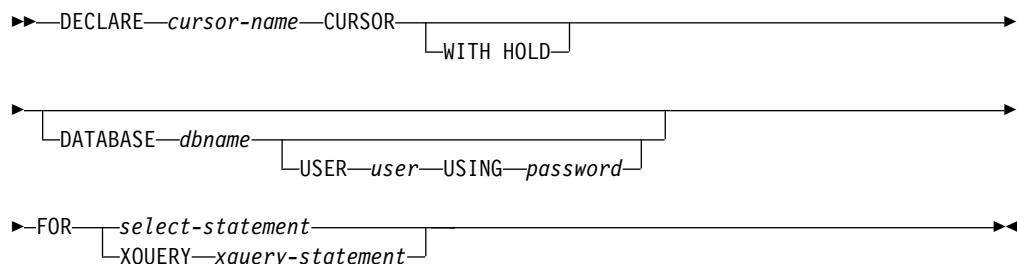
lock-block:



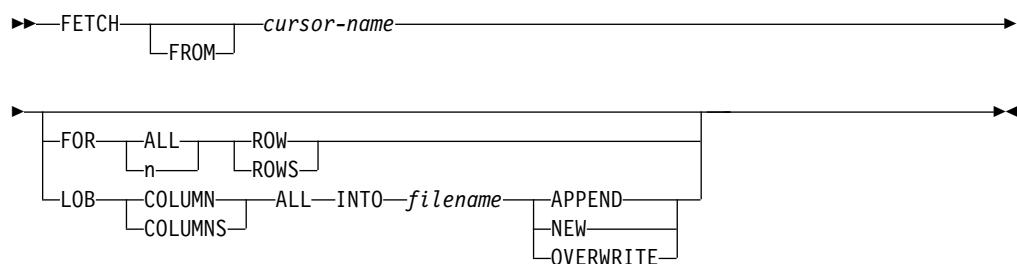
Notes:

- 1 This form is only valid if implicit connect is enabled.

DECLARE CURSOR



FETCH



OPEN

Note:

1. When CALL is issued:

- An expression must be used for each IN or INOUT parameter of the procedure. For an INOUT parameter, the expression must be a single literal value. The INOUT XML parameters must be either NULL (if nullable) or in the following format: XMLPARSE(DOCUMENT *string*). Note that the *string* in the argument for XMLPARSE must be a string literal and is subject to the CURRENT IMPLICIT XMLPARSE OPTION special register. It cannot be an expression.
- A question mark (?) must be used for each OUT parameter of the procedure.
- The stored procedure must be cataloged. If an uncataloged procedure is called, a SQL0440N error message is returned.

The following CLP script creates a procedure called PROC4 after it creates a table with an XML column C1. It uses three XML parameters: IN (PARM1), INOUT (PARM2) and OUT (PARM3), and returns a result set with XML data.

```
CREATE TABLE TAB4(C1 XML)
CREATE PROCEDURE PROC4(IN PARM1 XML, INOUT PARM2 XML, OUT PARM3 XML)
LANGUAGE SQL
BEGIN
  DECLARE STMT CLOB(1M) DEFAULT '';
  DECLARE C1 CURSOR WITH RETURN FOR S1;
  SET STMT = 'SELECT C1 FROM TAB4';

  /* INSERT PARM1 */
  INSERT INTO TAB4 VALUES(PARM1);

  /* MANIPULATE PARM2 */

  /* SET PARM3 AND INSERT */
  SET PARM3 = XMLPARSE(DOCUMENT '<a>333</a>');
  INSERT INTO TAB4 VALUES(PARM3);

  /* RETURN A RESULT SET WITH XML DATA */
  PREPARE S1 FROM STMT;
  OPEN C1;
END
```

To call the procedure PROC4 from the command line processor, issue a CALL statement:

```
CALL PROC4(XMLPARSE(DOCUMENT '<a>111</a>'), XMLPARSE(DOCUMENT '<a>222</a>'), ?)
```

2. The CLP version of CONNECT permits the user to change the password, using the following parameters:

NEW *password*

Specifies the new password that is to be assigned to the user name. Passwords can be up to 18 characters in length. The system on which the password will be changed depends on how user authentication has been set up.

CONFIRM *password*

A string that must be identical to the new password. This parameter is used to catch entry errors.

CHANGE PASSWORD

If this option is specified, the user is prompted for the current

- password, a new password, and for confirmation of the new password. Passwords are not displayed at entry.
3. The DATABASE clause in the DECLARE CURSOR statement is only applicable when the cursor is being used for a subsequent load from cursor operation.
 4. To use the DECLARE CURSOR statement with an XQuery statement, users must prefix the XQuery statement with the keyword XQUERY explicitly.
 5. When FETCH is issued through the command line processor, decimal and floating-point numbers are displayed with the territory's decimal delimiter, that is, a period (.) in the U.S., Canada, and the U.K.; a comma (,) in most other countries/regions. However, when INSERT, UPDATE, CALL, and other SQL statements are issued through the command line processor to update tables, a period must be used as the decimal delimiter, even in countries/regions that use a comma for that purpose.
 6. When FETCH is issued through the command line processor, null values are typically displayed as a hyphen (-). For databases configured with DFT_SQLMATHWARN YES, expressions that result in an arithmetic error are processed as null values. Such arithmetic error nulls are displayed as a plus (+).

For example, create and populate table t1 as follows:

```
create table t1 (i1 int , i2 int);
insert into t1 values (1,1),(2,0),(3,null);
```

The statement: select i1/i2 from t1 generates the following result:

```
1
---
1
+
-
3 records selected
```

7. A new LOB option has been added to FETCH. If the LOB clause is specified, only the next row is fetched:
 - When SELECT is issued through the command line processor to query tables containing LOB columns, all columns are truncated to 8KB in the output.
 - Each LOB column value is fetched into a file with the name *filename.xxx*, where *filename* is specified in the LOB clause, and *xxx* is a file extension from 001 to 999 (001 is the first LOB column in the select list of the corresponding DECLARE CURSOR statement, 002 is the second LOB column, and 999 is the 999th column). The maximum number of LOB columns that can be fetched into files is 999.
 - Names of the files containing the data are displayed in the LOB columns.
8. The command line processor displays BLOB columns in hexadecimal representation.
9. SQL statements that contain references to structured type columns cannot be issued if an appropriate transform function is not available.
10. A CLP imposed limit of 64K for SQL statements and for CLP commands that contain SQL statement components has now been removed. However there is a limitation of 64K on the CLP output size for each row.
11. XML data, retrieved via SELECT, CALL or XQuery, is truncated to 4000 bytes in the output.

To change the way that the CLP displays data (when querying databases using SQL statements through the CLP), rebind the CLP bind files against the database being queried. For example, to display date and time in ISO format, do the following:

1. Create a text file containing the names of the CLP bind files. This file is used as the list file for binding multiple files with one BIND command. In this example the file is named `clp.lst`, and its contents are:

```
db2c1pcs.bnd +
db2c1prr.bnd +
db2c1pur.bnd +
db2c1prs.bnd +
db2c1pns.bnd
```

2. Connect to the database.

3. Issue the following command:

```
db2 bind @clp.lst collection nullid datetime iso
```

Table 5. SQL Statements (Db2)

SQL Statement	Dynamic ¹	Command Line Processor (CLP)	Call Level Interface ³ (CLI)	SQL Procedure
ALLOCATE CURSOR				X
assignment statement				X
ASSOCIATE LOCATORS				X
ALTER { BUFFERPOOL, DATABASE PARTITION GROUP, NICKNAME, ⁹ SERVER, ⁹ TABLE, TABLESPACE, USER MAPPING, ⁹ TYPE, VIEW }	X	X	X	
BEGIN DECLARE SECTION ²				
CALL	X	X	X	X
CASE statement				X
CLOSE		X	SQLCloseCursor(), SQLFreeStmt()	X
COMMENT ON	X	X	X	X
COMMIT	X	X	SQLEndTran(), SQLTransact()	X
Compound SQL (Embedded)			X ⁴	
compound statement				X
CONNECT (Type 1)		X	SQLBrowseConnect(), SQLConnect(), SQLDriverConnect()	
CONNECT (Type 2)		X	SQLBrowseConnect(), SQLConnect(), SQLDriverConnect()	

Table 5. SQL Statements (Db2) (continued)

SQL Statement	Dynamic ¹	Command Line Processor (CLP)	Call Level Interface ³ (CLI)	SQL Procedure
CREATE { ALIAS, BUFFERPOOL, DATABASE PARTITION GROUP, DISTINCT TYPE, EVENT MONITOR, FUNCTION, FUNCTION MAPPING ⁹ , GLOBAL TEMPORARY TABLE, INDEX, INDEX EXTENSION, METHOD, NICKNAME ⁹ , PROCEDURE, SCHEMA, SERVER, TABLE, TABLESPACE, TRANSFORM, TYPE MAPPING ⁹ , TRIGGER, USER MAPPING ⁹ , TYPE, VIEW, WRAPPER ⁹ }	X	X	X	X ¹⁰
DECLARE CURSOR ²		X	SQLAllocStmt()	X
DECLARE GLOBAL TEMPORARY TABLE	X	X	X	X
DELETE	X	X	X	X
DESCRIBE ⁸		X	SQLColAttributes(), SQLDescribeCol(), SQLDescribeParam() ⁶	
DISCONNECT		X	SQLDisconnect()	
DROP	X	X	X	X ¹⁰
END DECLARE SECTION ²				
EXECUTE			SQLExecute()	X
EXECUTE IMMEDIATE			SQLExecDirect()	X
EXPLAIN	X	X	X	X
FETCH		X	SQLExtendedFetch(), SQLFetch(), SQLFetchScroll()	X
FLUSH EVENT MONITOR	X	X	X	
FOR statement				X
FREE LOCATOR			X ⁴	X
GET DIAGNOSTICS				X
GOTO statement				X
GRANT	X	X	X	X
IF statement				X
INCLUDE ²				
INSERT	X	X	X	X
ITERATE				X
LEAVE statement				X
LOCK TABLE	X	X	X	X
LOOP statement				X
OPEN		X	SQLExecute(), SQLExecDirect()	X
PREPARE			SQLPrepare()	X

Table 5. SQL Statements (Db2) (continued)

SQL Statement	Dynamic ¹	Command Line Processor (CLP)	Call Level Interface ³ (CLI)	SQL Procedure
REFRESH TABLE	X	X	X	
RELEASE		X		X
RELEASE SAVEPOINT	X	X	X	X
RENAME TABLE	X	X	X	
RENAME TABLESPACE	X	X	X	
REPEAT statement				X
RESIGNAL statement				X
RETURN statement				X
REVOKE	X	X	X	
ROLLBACK	X	X	SQLEndTran(), SQLTransact()	X
SAVEPOINT	X	X	X	X
select-statement	X	X	X	X
SELECT INTO				X
SET CONNECTION		X	SQLSetConnection()	
SET CURRENT DEFAULT TRANSFORM GROUP	X	X	X	X
SET CURRENT DEGREE	X	X	X	X
SET CURRENT EXPLAIN MODE	X	X	X, SQLSetConnectAttr()	X
SET CURRENT EXPLAIN SNAPSHOT	X	X	X, SQLSetConnectAttr()	X
SET CURRENT PACKAGESET				
SET CURRENT QUERY OPTIMIZATION	X	X	X	X
SET CURRENT REFRESH AGE	X	X	X	X
SET EVENT MONITOR STATE	X	X	X	X
SET INTEGRITY	X	X	X	
SET PASSTHRU ⁹	X	X	X	X
SET PATH	X	X	X	X
SET SCHEMA	X	X	X	X
SET SERVER OPTION ⁹	X	X	X	X
SET transition-variable ⁵	X	X	X	X
SIGNAL statement				X
SIGNAL SQLSTATE ⁵	X	X	X	
UPDATE	X	X	X	X
VALUES INTO				X
WHENEVER ²				
WHILE statement				X

Table 5. SQL Statements (Db2) (continued)

SQL Statement	Dynamic ¹	Command Line Processor (CLP)	Call Level Interface ³ (CLI)	SQL Procedure
---------------	----------------------	------------------------------	---	---------------

Notes:

1. You can code all statements in this list as static SQL, but only those marked with X as dynamic SQL.
2. You cannot execute this statement.
3. An X indicates that you can execute this statement using either SQLExecDirect() or SQLPrepare() and SQLExecute(). If there is an equivalent CLI function, the function name is listed.
4. Although this statement is not dynamic, with CLI you can specify this statement when calling either SQLExecDirect(), or SQLPrepare() and SQLExecute().
5. You can only use this within CREATE TRIGGER statements.
6. You can only use the SQL DESCRIBE statement to describe output, whereas with CLI you can also describe input (using the SQLDescribeParam() function).
7. You can only use the SQL FETCH statement to fetch one row at a time in one direction, whereas with the CLI SQLExtendedFetch() and SQLFetchScroll() functions, you can fetch into arrays. Furthermore, you can fetch in any direction, and at any position in the result set.
8. The DESCRIBE SQL statement has a different syntax than that of the CLP **DESCRIBE** command.
9. Statement is supported only for federated database servers.
10. SQL procedures can only issue CREATE and DROP statements for indexes, tables, and views.

How to read command syntax help

From time to time, you might forget the options that are valid for a command. You can invoke useful command help screen output which uses a syntax convention which is explained here.

All Command Line Processor (CLP) commands can invoke a help screen at the CLP prompt by preceding the command keyword(s) with a question mark (?). For many of the system commands, a summarizing help screen can be displayed by issuing the command keyword followed by a **help** parameter.

Invoking help

CLP commands

To display a CLP command help screen, preface the command keyword(s) with a question mark at the db2 interactive mode prompt (db2 =>), as shown in the following example for the **BACKUP DATABASE** command:

```
db2 => ? backup database
```

or, outside the 'db2' interactive mode, preface each command help screen invocation with db2, as shown for the **BACKUP DATABASE** command:

```
=> db2 ? backup database
```

System commands

Most of the system commands can display a command help screen by entering the system command keyword followed by a *help* option. Many system commands use a common *help* option, while other system commands may use different and/or additional *help* options. For the first attempts, without having to search for a command's forgotten *help* option just yet, try the following most common options which are likely to result in successfully invoking the command help screen:

Help options

- -h
- -?
- -help
- nothing entered after the command keyword.

Note: When nothing is entered after the command keyword, in some cases this could actually execute the command if options are not required.

Help screen syntax conventions

[] Encloses optional parameters
{ } Encloses mandatory parameters
| Separates two or more items, only one of which may be chosen
... Indicates a repeatable parameter
() Repeatable parameter delimiter (not always used)
Command KEYWORDS appear in uppercase
variables, that require you to determine and enter the appropriate input,
appear in lowercase

Example command help screen output

The following is the CLP command help screen for the **UPDATE MONITOR SWITCHES** command:

```
db2 => ? update monitor
UPDATE MONITOR SWITCHES USING {switch-name {ON | OFF} ...}
[AT DBPARTITIONNUM db-partition-number | GLOBAL]

switch-name:
  BUFFERPOOL, LOCK, SORT, STATEMENT, TABLE, TIMESTAMP, UOW
```

The following is the system command help screen for the **db2look** command which, in this case, was not invoked by its specified **-h** help option:

```
C:\Program Files\IBM\SQLLIB\BIN>db2look

Syntax: db2look -d DBname [-e] [-xs] [-xdir Path] [-u Creator] [-z Schema]
        [-t Tname1 Tname2...TnameN] [-tw Tname] [-h]
        [-o Fname] [-a] [-m] [-c] [-r] [-l] [-x] [-xd] [-f]
        [-fd] [-td x] [-noview] [-i userID] [-w password]
        [-v Vname1 Vname2 ... VnameN] [-dp] [-ct]
        [-wrapper WrapperName] [-server ServerName] [-nofed]
        [-wlm] [-ap]

        [-wrapper WrapperName] [-server ServerName] [-fedonly] [-nofed]
```

```
db2look [-h]
```

-d: Database Name: This must be specified

-e: Extract DDL file needed to duplicate database

-xs: Export XSR objects and generate a script containing DDL statements

-xdir: Path name: the directory in which XSR objects will be placed

-u: Creator ID: If -u and -a are both not specified then \$USER will be used

-z: Schema name: If -z and -a are both specified then -z will be ignored

-t: Generate statistics for the specified tables

-tw: Generate DDLs for tables whose names match the pattern criteria (wildcard characters) of the table name

-ap: Generate AUDIT USING Statements

-wlm: Generate WLM specific DDL Statements

```

-h: More detailed help message
-o: Redirects the output to the given file name
-a: Generate statistics for all creators
-m: Run the db2look utility in mimic mode
  -c: Do not generate COMMIT statements for mimic
  -r: Do not generate RUNSTATS statements for mimic
-l: Generate Database Layout: Database partition groups, Bufferpools and Tablespaces
-x: Generate Authorization statements DDL excluding the original definer of the object
-xd: Generate Authorization statements DDL including the original definer of the object
-f: Extract configuration parameters and environment variables
-td: Specifies x to be statement delimiter (default is semicolon(,))
-i: User ID to log on to the server where the database resides
-w: Password to log on to the server where the database resides
-noview: Do not generate CREATE VIEW ddl statements
-wrapper: Generates DDLs for federated objects that apply to this wrapper
-server: Generates DDLs for federated objects that apply to this server
-FEDONLY: Only created Federated DDL Statements
-nofed: Do not generate Federated DDL
  -fd: Generates db2fopt statements for opt_buffpage and opt_sortheap along with other
    cfg and env parameters.
  -v: Generate DDL for view only, this option is ignored when -t is specified
-dp: Generate DROP statement before CREATE statement
-ct: Generate DDL Statements by object creation time

```

Note: In general, a system command help screen tends to provide more detailed information than a CLP command help screen.

Example command inputs

Using the **UPDATE MONITOR SWITCHES** command help screen as an example,

```

db2 => ? update monitor
UPDATE MONITOR SWITCHES USING {switch-name {ON | OFF} ...}
[AT DBPARTITIONNUM db-partition-number | GLOBAL]

switch-name:
  BUFFERPOOL, LOCK, SORT, STATEMENT, TABLE, TIMESTAMP, UOW

```

the following command inputs are valid,

```

UPDATE MONITOR SWITCHES USING LOCK OFF
UPDATE MONITOR SWITCHES USING LOCK OFF TIMESTAMP ON
UPDATE MONITOR SWITCHES USING STATEMENT ON AT DBPARTITIONNUM 1
UPDATE MONITOR SWITCHES USING SORT ON GLOBAL

```

while the following command inputs are invalid:

```

UPDATE MONITOR SWITCHES LOCK OFF
UPDATE MONITOR SWITCHES USING LOCK GLOBAL
UPDATE MONITOR SWITCHES USING STATEMENT ON AT DBPARTITIONNUM 1 GLOBAL

```

Reminder

To remind yourself about the command help screen syntax conventions without searching the online Information Center, issue the following command at the CLP prompt:

```
db2 => ? help
```

or, at the system command prompt, enter the following query:

```
=> db2 ? help
```

CLP commands

ACTIVATE DATABASE

Activates the specified database and starts up all necessary database services so that the database is available for connection and use by any application.

Scope

This command activates the target database on all members in the instance. In a Db2 pureScale® environment, if the command was issued by a client using the TCP/IP protocol, this command activates only the members included in the member subset that is associated with the database alias. If one or more of these members encounters an error during activation, a warning is returned. The database remains activated on all members on which the command succeeds.

A database is activated either implicitly or explicitly. The activation of a database driven by a first user connection is known as implicit activation. Activation of a database that is based on issuing the activate database command is known as explicit activation.

Authorization

One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT

Required connection

None

Command syntax

```
►—ACTIVATE—[DATABASE—database-alias]—►  
          | [DB]  
          |————►  
          | [USER—username]—[USING—password]  
          |————►
```

Command parameters

DATABASE | DB *database-alias*

Specifies the alias of the database to be started.

USER *username*

Specifies the user starting the database.

USING *password*

Specifies the password for the user name.

Usage notes

Database administrators can use the **ACTIVATE DATABASE** command to start the selected databases. This eliminates any application time spent on database initialization. The **ACTIVATE DATABASE** command is the only way to explicitly activate a database.

In a Db2 pureScale environment, when the **ACTIVATE DATABASE** command is issued by a client using the TCP/IP protocol, the command is assigned to a member subset which includes a set of members in the instance. If the database alias used is not associated with any user defined member subset, the command is assigned to the default member subset which includes all members in the instance. Database administrators can use this functionality to activate a database on a subset of the members in the instance.

Databases initialized by the **ACTIVATE DATABASE** command can be shut down by using the **DEACTIVATE DATABASE** or **db2stop** command.

The application issuing the **ACTIVATE DATABASE** command cannot have an active database connection to any database.

If a database is started by issuing a CONNECT statement (or an implicit connect) and subsequently an **ACTIVATE DATABASE** command is issued for that same database, then the **DEACTIVATE DATABASE** command must be used to shut down that database. If the **ACTIVATE DATABASE** command was not used to start the database, the database will shut down when the last application disconnects. However, in a Db2 pureScale environment, an active database on a member can only be deactivated on that member by issuing a **DEACTIVATE DATABASE** command.

In a Db2 pureScale environment, neither the **ACTIVATE DATABASE** command nor the CONNECT statement can be used to restart a database. In this case, the database is automatically restarted depending on the **autorestart** database configuration parameter. See the **autorestart** configuration parameter for database connection behavior when the target database is in an inconsistent state.

ADD CONTACT

Adds a contact to the contact list which can be either defined locally on the system or in a global list. Contacts are users to whom processes such as the Scheduler and Health Monitor send messages.

The setting of the Database Administration Server (DAS) **contact_host** configuration parameter determines whether the list is local or global.

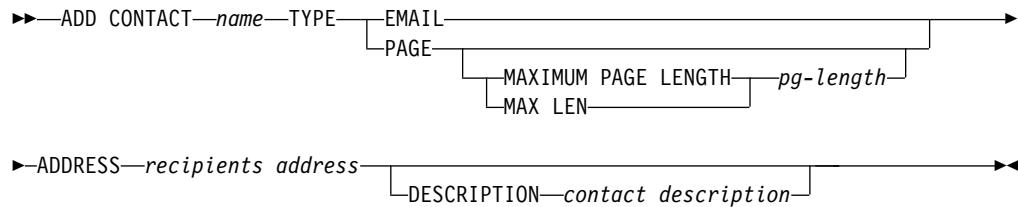
Authorization

None

Required connection

None. Local execution only: this command cannot be used with a remote connection.

Command syntax



Command parameters

ADD CONTACT *name*

The name of the contact that will be added. By default the contact will be added in the local system, unless the Db2 administration server configuration parameter **contact_host** points to another system.

TYPE Method of contact, which must be one of the following two:

EMAIL This contact wants to be notified by email at (**ADDRESS**).

PAGE This contact wants to be notified by a page sent to **ADDRESS**.

MAXIMUM PAGE LENGTH *pg-length*

If the paging service has a message-length restriction, it is specified here in characters.

The notification system uses the SMTP protocol to send the notification to the mail server specified by the Db2 Administration Server configuration parameter **smtp_server**. It is the responsibility of the SMTP server to send the email or call the pager.

ADDRESS *recipients-address*

The SMTP mailbox address of the recipient. For example, joe@somewhere.org. The **smtp_server** DAS configuration parameter must be set to the name of the SMTP server.

DESCRIPTION *contact description*

A textual description of the contact. This has a maximum length of 128 characters.

ADD CONTACTGROUP

Adds a new contact group to the list of groups defined on the local system. A contact group is a list of users and groups to whom monitoring processes such as the Scheduler and Health Monitor can send messages.

The setting of the Database Administration Server (DAS) **contact_host** configuration parameter determines whether the list is local or global.

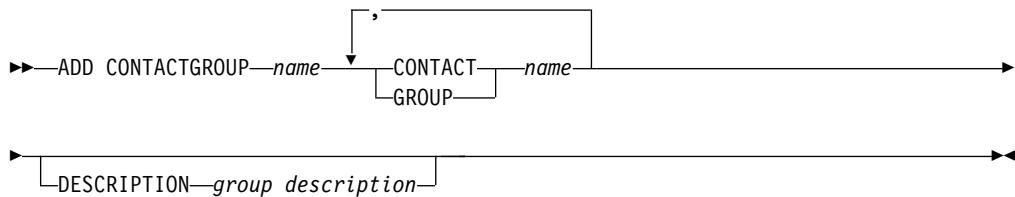
Authorization

None

Required connection

None. Local execution only: this command cannot be used with a remote connection.

Command Syntax



Command Parameters

ADD CONTACTGROUP *name*

Name of the new contact group, which must be unique among the set of groups on the system.

CONTACT *name*

Name of the contact which is a member of the group. A contact can be defined with the **ADD CONTACT** command after it has been added to a group.

GROUP *name*

Name of the contact group of which this group is a member.

DESCRIPTION *group description*

Optional. A textual description of the contact group.

ADD DBPARTITIONNUM

Adds a database partition to a database partition server.

Scope

This command only affects the database partition server on which it is executed.

Authorization

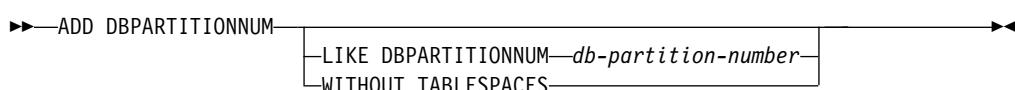
One of the following authorities:

- SYSADM
- SYSCTRL

Required connection

None

Command syntax



Command parameters

LIKE DBPARTITIONNUM *db-partition-number*

Specifies that the containers for the new system temporary table spaces are the same as the containers of the database at the database partition server

specified by *db-partition-number*. The database partition server specified must already be defined in the db2nodes.cfg file.

For system temporary table spaces that are defined to use automatic storage (this refers to system temporary table spaces that were created with the MANAGED BY AUTOMATIC STORAGE clause of the CREATE TABLESPACE statement or where no MANAGED BY CLAUSE was specified at all), the containers will not necessarily match those from the partition specified. Instead, containers will automatically be assigned by the database manager based on the storage paths that are associated with the table space's storage group. This may or may not result in the same containers being used on these two partitions.

WITHOUT TABLESPACES

Specifies that containers for the system temporary table spaces are not created for any of the database partitions. The ALTER TABLESPACE statement must be used to add system temporary table space containers to each database partition before the database can be used.

If no option is specified, containers for the system temporary table spaces will be the same as the containers on the catalog partition for each database. The catalog partition can be a different database partition for each database in the partitioned database environment. This option is ignored for system temporary table spaces that are defined to use automatic storage (this refers to system temporary table spaces that were created with the MANAGED BY AUTOMATIC STORAGE clause of the CREATE TABLESPACE statement or where no MANAGED BY CLAUSE was specified at all). For these table spaces, there is no way to defer container creation. Containers will automatically be assigned by the database manager based on the storage paths that are associated with the database.

Usage notes

This command should only be used if a database partition server is added to an environment that has one database and that database is not cataloged at the time of the add partition operation. In this situation, because the database is not cataloged, the add partition operation does not recognize the database, and does not create a database partition for the database on the new database partition server. Any attempt to connect to the database partition on the new database partition server results in an error. The database must first be cataloged before the **ADD DBPARTITIONNUM** command can be used to create the database partition for the database on the new database partition server.

This command should not be used if the environment has more than one database and at least one of the databases is cataloged at the time of the add partition operation. In this situation, use the **AT DBPARTITIONNUM** parameter of the **CREATE DATABASE** command to create a database partition for each database that was not cataloged at the time of the add partition operation. Each uncataloged database must first be cataloged before the **CREATE DATABASE** command can be used to create the database partition for the database on the new database partition server.

Before adding a new database partition, ensure that there is sufficient storage for the containers that must be created.

The add database partition server operation creates an empty database partition for every database that exists in the instance. The configuration parameters for the new database partitions are set to the default values.

Note: Any uncataloged database is not recognized when adding a new database partition. The uncataloged database will not be present on the new database partition. An attempt to connect to the database on the new database partition returns the error message SQL1013N.

If an add database partition server operation fails while creating a database partition locally, it enters a clean-up phase, in which it locally drops all databases that have been created. This means that the database partitions are removed only from the database partition server being added. Existing database partitions remain unaffected on all other database partition servers. If the clean-up phase fails, no further clean up is done, and an error is returned.

The database partitions on the new database partition cannot contain user data until after the ALTER DATABASE PARTITION GROUP statement has been used to add the database partition to a database partition group.

This command will fail if a create database or a drop database operation is in progress. The command can be reissued once the competing operation has completed.

To determine whether or not a database is enabled for automatic storage, **ADD DBPARTITIONNUM** has to communicate with the catalog partition for each of the databases in the instance. If automatic storage is enabled then the storage group definitions are retrieved as part of that communication. Likewise, if system temporary table spaces are to be created with the database partitions, **ADD DBPARTITIONNUM** might have to communicate with another database partition server to retrieve the table space definitions for the database partitions that reside on that server. The **start_stop_time** database manager configuration parameter is used to specify the time, in minutes, by which the other database partition server must respond with the automatic storage and table space definitions. If this time is exceeded, the command fails. If this situation occurs, increase the value of **start_stop_time**, and reissue the command.

When the **ADD DBPARTITIONNUM** command is issued there cannot be any storage group entries that are not transaction consistent.

ADD XMLSCHEMA DOCUMENT

Adds one or more XML schema documents to an existing but incomplete XML schema before completing registration.

Authorization

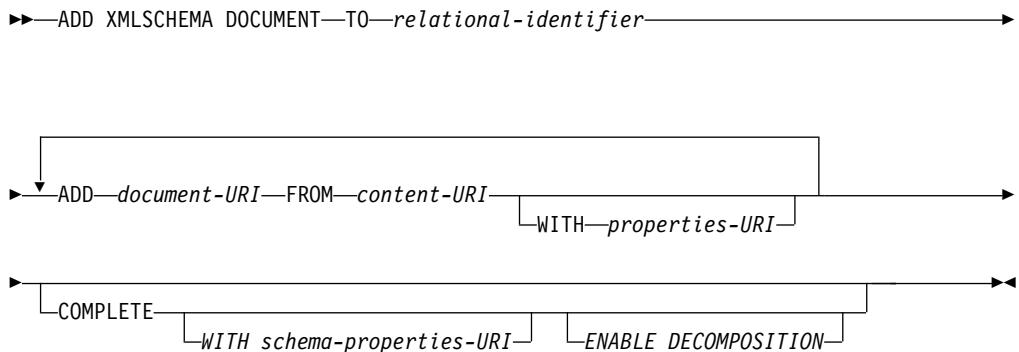
The following authority is required:

- The user ID must be the owner of the XSR object as recorded in the catalog view SYSCAT.XSROBJECTS.

Required connection

Database

Command syntax



Description

TO *relational-identifier*

Specifies the relational name of a registered but incomplete XML schema to which additional schema documents are added.

ADD *document-URI*

Specifies the uniform resource identifier (URI) of an XML schema document to be added to this schema, as the document would be referenced from another XML document.

FROM *content-URI*

Specifies the URI where the XML schema document is located. Only a file scheme URI is supported.

WITH *properties-URI*

Specifies the URI of a properties document for the XML schema. Only a file scheme URI is supported.

COMPLETE

Indicates that there are no more XML schema documents to be added. If specified, the schema is validated and marked as usable if no errors are found.

WITH *schema-properties-URI*

Specifies the URI of a properties document for the XML schema. Only a file scheme URI is supported.

ENABLE DECOMPOSITION

Specifies that this schema is to be used for decomposing XML documents.

Example

```
ADD XMLSCHEMA DOCUMENT TO JOHNDOE.PRODSHEMA  
ADD 'http://myPOschema/address.xsd'  
FROM 'file:///c:/TEMP/address.xsd'
```

ARCHIVE LOG

Closes and truncates the active log file for a recoverable database.

Authorization

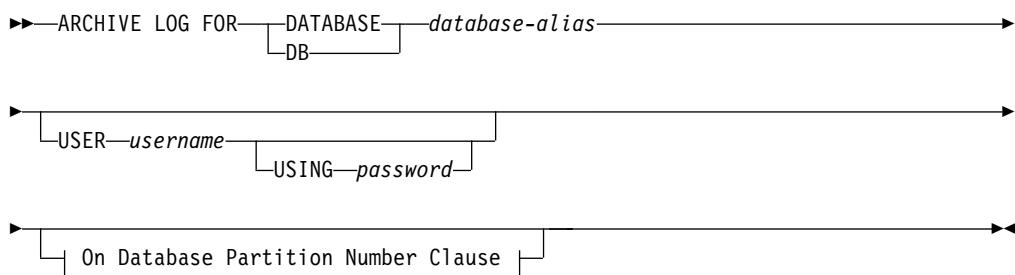
One of the following authorities:

- SYSADM
 - SYSCTRL
 - SYSMAINT
 - DBADM

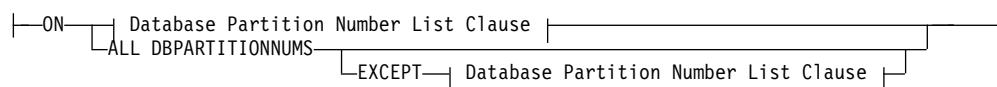
Required connection

None. This command establishes a database connection for the duration of the command.

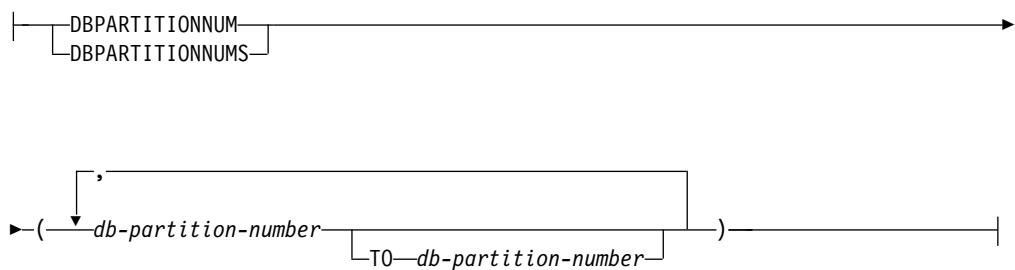
Command syntax



On Database Partition Number Clause:



Database Partition Number List Clause:



Command parameters

DATABASE *database-alias*

Specifies the alias of the database whose active log is to be archived.

USER *username*

Specifies the user name under which a connection will be attempted.

USING *password*

password Specifies the password to authenticate the user name.

ON ALL DBPARTITIONNUMS

Specifies that the command should be issued on all database partitions in the db2nodes.cfg file. This is the default if a database partition number clause is not specified.

EXCEPT

Specifies that the command should be issued on all database partitions in the db2nodes.cfg file, except those specified in the database partition number list.

ON DBPARTITIONNUM | ON DBPARTITIONNUMS

Specifies that the logs should be archived for the specified database on a set of database partitions.

db-partition-number

Specifies a database partition number in the database partition number list.

TO *db-partition-number*

Used when specifying a range of database partitions for which the logs should be archived. All database partitions from the first database partition number specified up to and including the second database partition number specified are included in the database partition number list.

Usage notes

This command can be used to collect a complete set of log data up to a known point. The log data can then be used to update a standby database.

If log data up to the time the **ARCHIVE LOG** command is issued is in the middle of a log file, this log file will be truncated and logging will continue on the next file.

This command can only be executed when the invoking application or shell does not have a database connection to the specified database. This prevents a user from executing the command with uncommitted transactions. As such, the **ARCHIVE LOG** command will not forcibly commit the user's incomplete transactions. If the invoking application or shell already has a database connection to the specified database, the command will terminate and return an error. If another application has transactions in progress with the specified database when this command is executed, there will be a slight performance degradation since the command flushes the log buffer to disk. Any other transactions attempting to write log records to the buffer will have to wait until the flush is complete.

If used in a partitioned database environment, a subset of database partitions can be specified by using a database partition number clause. If the database partition number clause is not specified, the default behavior for this command is to close and archive the active log on all database partitions.

Using this command will use up a portion of the active log space due to the truncation of the active log file. The active log space will resume its previous size when the truncated log becomes inactive. Frequent use of this command can drastically reduce the amount of the active log space available for transactions. The command may fail with SQL0964C if not enough log space is available.

The **ARCHIVE LOG** command is asynchronous. When you issue the **ARCHIVE LOG** command, the log is closed, making it available for archiving. The log is not archived immediately; there might be a delay between the time when you submit the command and the time when the log is archived. This delay is particularly

apparent if you deactivate a database immediately after issuing the **ARCHIVE LOG** command. Archiving of the log is done by the **db2logmgr** process. The log may not archive until the next database activation.

The command is distributed to every member the database has access to when issuing the **ARCHIVE LOG** command or invoking the db2ArchiveLog API in a Db2 pureScale environment. If a member is consistent (either online or offline), then **ARCHIVE LOG** will skip that member, since its last log file would have already been truncated when the member had last shut down cleanly. If an offline member is not consistent, then **ARCHIVE LOG** waits for MCR to complete before truncation.

ATTACH

Enables an application to specify the instance at which instance-level commands (**CREATE DATABASE** and **FORCE APPLICATION**, for example) are to be executed. This instance can be the current instance, another instance on the same workstation, or an instance on a remote workstation.

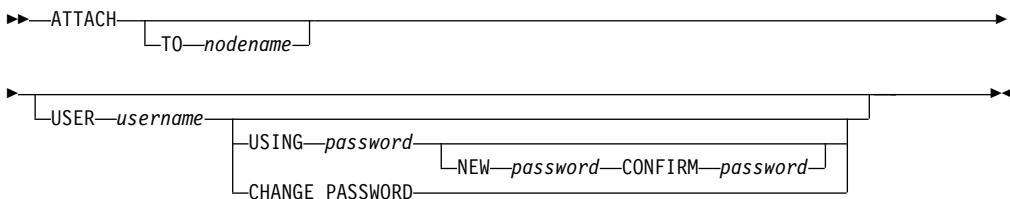
Authorization

None

Required connection

None. This command establishes an instance attachment.

Command syntax



Command parameters

TO nodename

Alias of the instance to which the user wants to attach. This instance must have a matching entry in the local node directory. The only exception to this is the local instance (as specified by the **DB2INSTANCE** environment variable) which can be specified as the object of an attach, but which cannot be used as a node name in the node directory.

USER username

Specifies the authentication identifier. When attaching to a Db2 database instance on a Windows operating system, the user name can be specified in a format compatible with Microsoft Security Account Manager (SAM). The qualifier must be a flat-style name, which has a maximum length of 15 characters. For example, *domainname\username*.

USING password

Specifies the password for the user name. If a user name is specified, but a password is *not* specified, the user is prompted for the current password. The password is not displayed at entry.

NEW password

Specifies the new password that is to be assigned to the user name. The system on which the password will be changed depends on how user authentication has been set up. The Db2 database system provides support for changing passwords on AIX, Linux and Windows operating systems, and supports up to 255 characters for your own written plugins. For more information about passwords, see *Password rules*.

CONFIRM password

A string that must be identical to the new password. This parameter is used to catch entry errors.

CHANGE PASSWORD

If this option is specified, the user is prompted for the current password, a new password, and for confirmation of the new password. Passwords are not displayed at entry.

Examples

Catalog two remote nodes:

```
db2 catalog tcpip node node1 remote freedom server server1  
db2 catalog tcpip node node2 remote flash server server1
```

Attach to the first node, force all users, and then detach:

```
db2 attach to node1  
db2 force application all  
db2 detach
```

Attach to the second node, and see who is on:

```
db2 attach to node2  
db2 list applications
```

After the command returns agent IDs 1, 2 and 3, force 1 and 3, and then detach:

```
db2 force application (1, 3)  
db2 detach
```

Attach to the current instance (not necessary, is implicit), force all users, then detach (AIX only):

```
db2 attach to $DB2INSTANCE  
db2 force application all  
db2 detach
```

Usage notes

If *nodename* is omitted from the command, information about the current state of attachment is returned.

If **ATTACH** was not executed, instance-level commands are executed against the current instance, specified by the **DB2INSTANCE** environment variable.

AUTOCONFIGURE

Calculates and displays initial values for the buffer pool size, database configuration and database manager configuration parameters, with the option of applying these reported values.

Authorization

SYSADM

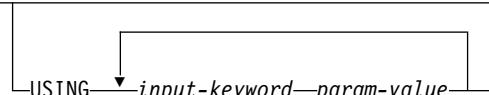
Required connection

Database

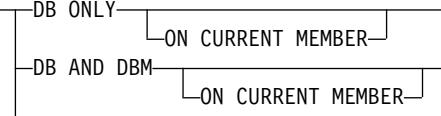
Command syntax

►►—AUTOCONFIGURE——autoconfigure-clause————►►

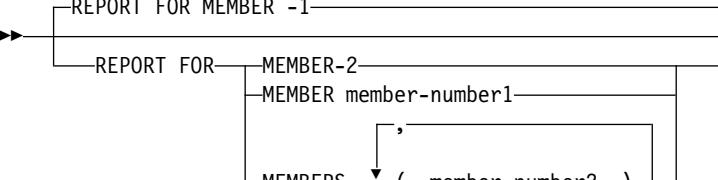
autoconfigure-clause:

►►—apply-clause————►►

apply-clause:

►►—APPLY—report-clause————►►

report-clause

►►—————►►

Command parameters

USING *input-keyword param-value*

Table 6. Valid input keywords and parameter values

Keyword	Valid values	Default value	Explanation
mem_percent	1-100	<ul style="list-style-type: none"> When analytics is not enabled, the default value is 25 When analytics is enabled, mem_percent defaults to the higher of the following values: <ul style="list-style-type: none"> 25 80% divided by the number of database instances 	Percentage of instance memory that is assigned to the database. However, if the CREATE DATABASE command invokes the configuration advisor and you do not specify a value for mem_percent , the percentage is calculated based on memory usage in the instance and the system up to a maximum of 25% of the instance memory.
workload_type	simple, mixed, complex	mixed	Simple workloads tend to be I/O intensive and mostly transactions, whereas complex workloads tend to be CPU intensive and mostly queries.
num_stmts	1-1 000 000	10	Number of statements per unit of work
tpm	1-200 000	60	Transactions per minute
admin_priority	performance, recovery, both	both	Optimize for better performance (more transactions per minute) or better recovery time
is_populated	yes, no	yes	Is the database populated with data?
num_local_apps	0-5 000	0	Number of connected local applications
num_remote_apps	0-5 000	10	Number of connected remote applications
isolation	RR, RS, CS, UR	RR	Maximum isolation level of applications connecting to this database (Repeatable Read, Read Stability, Cursor Stability, Uncommitted Read). It is only used to determine values of other configuration parameters. Nothing is set to restrict the applications to a particular isolation level and it is safe to use the default value.
bp_resizeable	yes, no	yes	Are buffer pools resizeable?
grp_tolerance_percent	1-100	5	Percentage of plus or minus tolerance to be used for the Summary Report when comparing configuration variable values to determine what group a member belongs.

Table 6. Valid input keywords and parameter values (continued)

Keyword	Valid values	Default value	Explanation
analytics_env	automatic, yes, no	automatic	<p>Make recommendations for an analytic environment?</p> <p>Yes The Configuration Advisor will ignore the DB2_WORKLOAD registry variable and use this hint to determine recommendations for an analytics environment.</p> <p>No The Configuration Advisor will not make recommendations.</p> <p>Automatic The Db2 Configuration Advisor will use the value specified for the DB2_WORKLOAD registry variable to determine recommendations for an analytics environment.</p>

APPLY

DB ONLY

Displays the recommended values for the database configuration and the buffer pool settings based on the current database manager configuration. Applies the recommended changes to the database configuration and the buffer pool settings.

DB AND DBM

Displays and applies the recommended changes to the database manager configuration, the database configuration, and the buffer pool settings.

NONE Displays the recommended changes, but does not apply them.

ON CURRENT MEMBER

In a partitioned database environment or Db2 pureScale environment, the Configuration Advisor updates the database configuration on all members by default. Specifying the **ON CURRENT MEMBER** option causes the Configuration Advisor to set the member-level configuration parameters on the current member determined by your connection, while the global-level configuration parameters, that can be configured to be functional at only the global level, are set and affect all members.

The buffer pool changes are always applied to the system catalogs. Thus, all members are affected. The **ON CURRENT MEMBER** option is ignored for buffer pool recommendations.

REPORT FOR

Specifies the members to include in the report when used in a partitioned database environment or Db2 pureScale environment.

MEMBER -1

In a partitioned database environment or Db2 pureScale environment, the Configuration Advisor will report the member level configuration parameters computed changes recommended or made on the current member determined by your connection. This is the default if the REPORT FOR clause is not specified.

MEMBER -2

Indicates that the Configuration Advisor is to report the computed recommendations or changes for all members.

MEMBER member-number1

Specifies the number of the member the Configuration Advisor is to report the computed recommendations or changes for.

MEMBERS (member-number2...)

Specifies the numbers for each of the members the Configuration Advisor is to report the computed recommendations or changes for.

Usage notes

- This command makes configuration recommendations for the currently connected database and assumes that the database is the only active database on the instance. If you have not enabled the self tuning memory manager and you have more than one active database on the instance, specify a **mem_percent** value that reflects the database memory distribution. For example, if you have two active databases on the instance that should use 80% of the instance memory and should share the resources equally, specify 40% (80% divided by 2 databases) as the **mem_percent** value.
- If you have multiple instances on the same computer and the self tuning memory manager is not enabled, you should set a fixed value for **instance_memory** on each instance or specify a **mem_percent** value that reflects the database memory distribution. For example, if all active databases should use 80% of the computer memory and there are 4 instances each with one database, specify 20% (80% divided by 4 databases) as the **mem_percent** value.
- When explicitly invoking the Configuration Advisor with the **AUTOCONFIGURE** command, the setting of the **DB2_ENABLE_AUTOCONFIG_DEFAULT** registry variable will be ignored.
- Running the **AUTOCONFIGURE** command on a database will recommend enablement of the Self Tuning Memory Manager. However, if you run the **AUTOCONFIGURE** command on a database in an instance where **sheapthres** is not zero, sort memory tuning (**sortheap**) will not be enabled automatically. To enable sort memory tuning (**sortheap**), you must set **sheapthres** equal to zero using the **UPDATE DATABASE MANAGER CONFIGURATION** command. Note that changing the value of **sheapthres** may affect the sort memory usage in your previously existing databases.

Compatibilities

For compatibility with previous versions:

- **NODE** and **DBPARTITIONNUM** can be specified in place of **MEMBER**, except when the **DB2_ENFORCE_MEMBER_SYNTAX** registry variable is set to ON.

BACKUP DATABASE

Creates a backup copy of a database or a table space. A backup of your Db2 database and related stored data must be created to prevent data loss if a database service outage occurs.

For information about the backup operations that are supported by Db2 database systems between different operating systems and hardware platforms, see “Backup and restore operations between different operating systems and hardware platforms”.

Scope

In a partitioned database environment, if no database partitions are specified, this command affects only the database partition on which it is run.

If the option to perform a partitioned backup is specified, the command can be called only on the catalog database partition. If the option specifies that all database partition servers are to be backed up, it affects all database partition servers that are listed in the db2nodes.cfg file. Otherwise, it affects the database partition servers that are specified on the command.

Authorization

One of the following authorities:

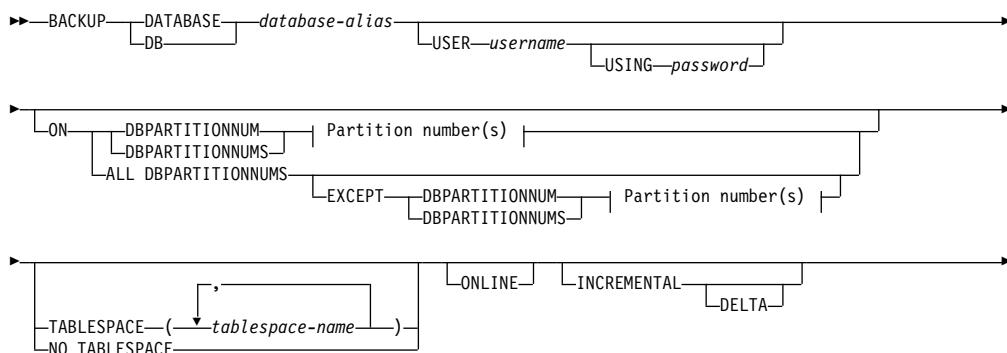
- SYSADM
- SYSCTRL
- SYSMAINT

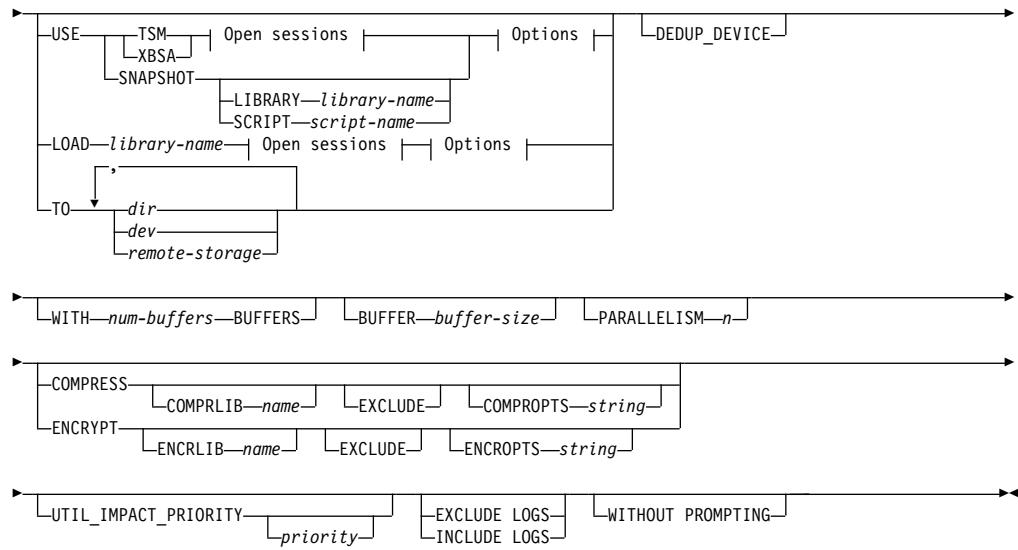
Required connection

Database. This command automatically establishes an exclusive connection to the specified database.

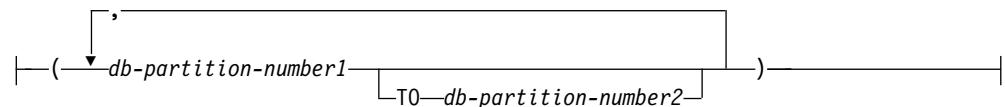
Note: If a connection to the specified database exists, that connection is terminated and a new connection established specifically for the backup operation. The connection is stopped at the completion of the backup operation.

Command syntax





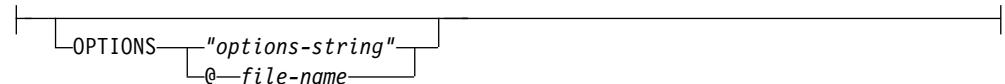
Partition number(s):



Open sessions:



Options:



Command parameters

DATABASE | DB *database alias*

Specifies the alias of the database to back up.

USER *username*

Identifies the user name under which to back up the database.

USING *password*

The password that is used to authenticate the user name. If the password is omitted, the user is prompted to enter it.

ON

Back up the database on a set of database partitions.

DBPARTITIONNUM *db-partition-number1*

Specifies a database partition number in the database partition list.

DBPARTITIONNUMS *db-partition-number1* TO *db-partition-number2*

Specifies a range of database partition numbers so that all

partitions from *db-partition-number1* up to and including *db-partition-number2* are included in the database partition list.

ALL DBPARTITIONNUMS

Specifies that the database is to be backed up on all partitions that are specified in the db2nodes.cfg file.

EXCEPT Specifies that the database is to be backed up on all partitions that are specified in the db2nodes.cfg file, except those specified in the database partition list.

DBPARTITIONNUM *db-partition-number1*

Specifies a database partition number in the database partition list.

DBPARTITIONNUMS *db-partition-number1* TO *db-partition-number2*

Specifies a range of database partition numbers so that all partitions from *db-partition-number1* up to and including *db-partition-number2* are included in the database partition list.

TABLESPACE *tablespace-name*

A list of names that are used to specify the table spaces to be backed up.

NO TABLESPACE

Specifies a no tablespace backup. A no tablespace backup does not contain tablespace, but in particular, the history file that can be restored by using the **HISTORY FILE** options with the **RESTORE DATABASE** command.

ONLINE

Specifies online backup. The default is offline backup. Online backups are only available for databases that are configured with **logarchmeth1** enabled. During an online backup, Db2 obtains IN (Intent None) locks on all tables that exist in SMS table spaces as they are processed. S (share locks) is no longer held on LOB data in SMS table spaces during online backup.

INCREMENTAL

Specifies a cumulative (incremental) backup image. An incremental backup image is a copy of all database data that changed since the most recent successful, full backup operation.

DELTA Specifies a noncumulative (delta) backup image. A delta backup image is a copy of all database data that changed since the most recent successful backup operation of any type.

USE

TSM Specifies that the backup is to use Tivoli® Storage Manager (TSM) as the target device.

XBSA Specifies that the XBSA interface is to be used. Backup Services APIs (XBSA) are an open application programming interface for applications or facilities that need data storage management for backup or archiving purposes.

SNAPSHOT

Specifies that a snapshot backup is to be taken.

You cannot use the **SNAPSHOT** parameter with any of the following parameters:

- **TABLESPACE**
- **INCREMENTAL**
- **WITH num-buffers BUFFERS**
- **BUFFER**
- **PARALLELISM**
- **COMPRESS**
- **UTIL_IMPACT_PRIORITY**
- **SESSIONS**

The default behavior for a snapshot backup is a full database offline backup of all paths that make up the database. This backup includes all containers, local volume directory, database path (**DBPATH**), and primary log and mirror log paths (**INCLUDE LOGS** is the default for all snapshot backups unless **EXCLUDE LOGS** is explicitly stated).

LIBRARY *library-name*

Integrated into IBM® Db2 Server is a Db2 ACS API driver for the following storage hardware:

- IBM TotalStorage SAN Volume Controller
- IBM Enterprise Storage Server® Model 800
- IBM Storwize® V7000
- IBM System Storage® DS6000™
- IBM System Storage DS8000®
- IBM System Storage N Series
- IBM XIV®

If you have other storage hardware, and a Db2 ACS API driver for that storage hardware, you can use the **LIBRARY** parameter to specify the Db2 ACS API driver.

The value of the **LIBRARY** parameter is a fully qualified library file name.

SCRIPT *script-name*

The name of the executable script capable of performing a snapshot backup operation. The script name must be a fully qualified file name.

OPTIONS

"*options-string*"

Specifies options to be used for the backup operation. The string is passed exactly as it was entered, without the double quotation marks.

@ *file-name*

Specifies that the options to be used for the backup operation are contained in a file on the Db2 server. The string is passed to the vendor support library. The file must be a fully qualified file name.

You cannot use the **vendoropt** database configuration parameter to specify vendor-specific options for snapshot backup operations. You must use the **OPTIONS** parameter of the backup utilities instead.

OPEN *num-sessions* **SESSIONS**

The number of I/O sessions to create between the Db2 product and the

TSM product or another backup vendor product. This parameter has no effect when you back up to tape, disk, or other local device. If you specify the **INCLUDE LOGS** parameter for an online backup, an extra session is created for the **OPEN num-sessions SESSIONS** parameter after the initial sessions are closed. If you are creating a Single System View (SSV) online backup, for each node that is backed up, an extra session is created for the **OPEN num-sessions SESSIONS** parameter after the initial sessions are closed. If you use this parameter with the TSM option, the number of entries that are created in the history file is equal to the number of sessions created.

TO *dir* | *dev* | *remote-storage*

A list of directory or tape device names. The full path on which the directory resides must be specified. If **USE TSM**, **TO**, and **LOAD** are omitted, the default target directory for the backup image is the current working directory of the client computer. This target directory or device must be locally addressable on the database server.

To back up to remote storage, such as IBM SoftLayer® Object Storage or Amazon Simple Storage Service (S3), specify a remote storage location by using a storage access alias. Local staging space is needed to temporarily store the backup image that is to be transferred to the remote storage server. Each backup session for the remote storage has a maximum size of 5 GB, which can produce a total database backup image size of 1 TB; refer to Remote storage requirements. The syntax of specifying a remote storage location is:

`DB2REMOTE://<alias>//<storage-path>`

In a partitioned database, the target directory or device must exist on all database partitions, and can optionally be a shared path. The directory or device name can be specified by using a database partition expression. For more information about database partition expressions, see “Automatic storage databases”.

This parameter can be repeated to specify the target directories and devices that the backup image spans. If more than one target is specified (target1, target2, and target3, for example), target1 is opened first. The media header and special files (including the configuration file, table space table, and history file) are placed in target1. All remaining targets are opened, and are then used in parallel during the backup operation. Because there is no general tape support on Windows operating systems, each type of tape device requires a unique device driver.

Use of tape devices or floppy disks might generate messages and prompts for user input. Valid response options are:

- c** Continue. Continue using the device that generated the warning message (for example, when a new tape has been mounted)
- d** Device terminate. Stop using only the device that generated the warning message (for example, when there are no more tapes)
- t** Terminate. Abort the backup operation.

If the tape system does not support the ability to uniquely reference a backup image, multiple backup copies of the same database must not be kept on the same tape.

LOAD *library-name*

The name of the shared library (DLL on Windows operating systems)

containing the vendor backup and restore I/O functions to be used. It can contain the full path. If the full path is not given, it defaults to the path on which the user exit program resides.

DEDUP_DEVICE

Optimizes the format of the backup images for target storage devices that support data deduplication.

WITH *num-buffers* BUFFERS

The number of buffers to be used. If the number of buffers that you specify is not enough to create a successful backup, then the minimum value necessary to complete the backup is automatically chosen for this parameter. If you are backing up to multiple locations, you can specify a larger number of buffers to improve performance. If you specify the **COMPRESS** parameter, to help improve performance, you can add an extra buffer for each table space that you specify for the **PARALLELISM** parameter.

BUFFER *buffer-size*

The size, in 4 KB pages, of the buffer used when building the backup image. Db2 automatically chooses an optimal value for this parameter unless you explicitly enter a value. The minimum value for this parameter is eight pages.

If using tape with variable block size, reduce the buffer size to within the range that the tape device supports. Otherwise, the backup operation might succeed, but the resulting image might not be recoverable.

With most versions of Linux, using the default buffer size included with Db2 for backup operations to a SCSI tape device results in error SQL2025N, reason code 75. To prevent the overflow of Linux internal SCSI buffers, use this formula:

```
bufferpages <= ST_MAX_BUFFERS * ST_BUFFER_BLOCKS / 4
```

where *bufferpages* is the value you want to use with the **BUFFER** parameter, and ST_MAX_BUFFERS and ST_BUFFER_BLOCKS are defined in the Linux kernel under the drivers/scsi directory.

PARALLELISM *n*

Determines the number of table spaces that can be read in parallel by the backup utility. Db2 automatically chooses an optimal value for this parameter unless you explicitly enter a value.

UTIL_IMPACT_PRIORITY *priority*

Specifies that the backup runs in throttled mode, with the priority specified. Throttling allows you to regulate the performance impact of the backup operation. Priority can be any number between 1 and 100, with 1 representing the lowest priority, and 100 representing the highest priority. If the **UTIL_IMPACT_PRIORITY** keyword is specified with no priority, the backup runs with the default priority of 50. If **UTIL_IMPACT_PRIORITY** is not specified, the backup runs in unthrottled mode. An impact policy must be defined by setting the **util_impact_lim** configuration parameter for a backup to run in throttled mode.

COMPRESS | ENCRYPT

Indicates that the backup is to be compressed or encrypted. You cannot specify both parameters simultaneously. The **COMPRESS** and **ENCRYPT** parameters are synonyms and can be used interchangeably only when either **COMPRLIB** or **ENCRLIB** is specified too. If you specify **COMPRESS** without **COMPRLIB**, the default compression library libbdb2compr.so is used for compression. If you specify **ENCRYPT** without **ENCRLIB**, the default

encryption library `libdb2encr.so` is used for encryption. If you want to specify another library, you can use **COMPRESS** and **ENCRYPT** interchangeably. You can use either **COMPRLIB** or **ENCRLIB** to specify the `libdb2compr_encr.so` library. If the **encrlib** and **encropts** database configuration parameters are set to a non-NULL value, neither **COMPRLIB** or **ENCRLIB** nor **COMPROPTS** or **ENCRYPTS** can be specified.

COMPRLIB | ENCRLIB *name*

Indicates the name of the library that is used during the compression or encryption process. For example, `db2compr.dll` for Windows; `libdb2compr.so` for Linux and UNIX operating systems. The name must be a fully qualified path that refers to a file on the server. If this parameter is not specified, the default Db2 compression library is used. If the specified library cannot be loaded, the backup operation fails.

EXCLUDE

Indicates that the library is not stored in the backup image.

COMPROPTS | ENCRYPTS *string*

Describes a block of binary data that is passed to the initialization routine in the library. The database manager passes this string directly from the client to the server. Any issues of byte reversal or code page conversion are handled by the compression library. If the first character of the data block is '@', the rest of the data is interpreted as the name of a file on the server. The database manager then replaces the contents of the string with the contents of this file and passes this new value to the initialization routine. The maximum length for *string* is 1024 bytes.

For the default Db2 libraries `libdb2compr_encr.so` (compression and encryption) or `libdb2encr.so` (encryption only), the format of the **ENCRYPTS** *string* is as follows:

*Cipher=cipher-name:Mode=mode-name:Key Length=key-length:
Master Key Label=label-name-1...:Master Key Label=label-name-n*

- Cipher is optional. Valid values are AES and 3DES (the default is AES).
- Mode is optional. The default is CBC.
- Key length is optional. Valid values for AES are 128, 192, and 256 (the default is 256), and the only valid value for 3DES is 168.
- Master key label is optional. The default is the database master key label.

If you are using other libraries, the format of the **ENCRYPTS** *string* depends on those libraries.

EXCLUDE LOGS

Specifies that the backup image must not include any log files. When you performe an offline backup operation, logs are excluded whether this option is specified, except for snapshot backups. Logs are excluded by default in the following backup scenarios:

- Offline backup of a single-partitioned database.
- Online or offline backup of a multi-partitioned database, when not using a single system view backup.

If you specify the **EXCLUDE LOGS** with a snapshot backup, writes to log files are allowed during the backup. These log files are included by default in the snapshot backup, but are not usable for recovery. If this backup is

restored, the log files must not be extracted from the backup. If the log path was set to the default when the backup was taken, then it is not possible to exclude the log files from being restored and they must be deleted manually after the backup is restored. If the log path was not the default, then the log files can be excluded at restore time by using the **LOGTARGET EXCLUDE** options with the **RESTORE DATABASE** command.

INCLUDE LOGS

Specifies that the backup image must include the range of log files that are required to restore and roll forward this image to some consistent point in time. This option is not valid for an offline backup, except for snapshot backups. **INCLUDE LOGS** always the default option for any online backup operation, except a multi-partitioned online backup where each database partition is backed up independently (that is, a non-single system view backup).

If any of the log files that are required for the backup have previously been backed up and are no longer in the log path, then the Db2 database manager retrieves them for backup from the overflow log path, if the path has been set. Otherwise, the database manager retrieves them for backup from the current log path or mirror log path. These log files are removed from the log path after the backup is complete.

WITHOUT PROMPTING

Specifies that the backup runs unattended, and that any actions that normally require user intervention returns an error message.

Note:

1. If the backup command indicates which partitions in a partitioned database are to be backed up, the backup operation is implicitly performed **WITHOUT PROMPTING**.
2. Options that are specified on the **BACKUP DATABASE** command in a partitioned database environment are applied on each partition individually. For example, if a backup operation is specified to **USE TSM OPEN 3 SESSIONS**, Db2 opens three TSM sessions on each partition.

Examples

1. In the following example, the database WSDB is defined on all four database partitions, numbered 0 - 3. The path /dev3/backup is accessible from all database partitions. Database partition 0 is the catalog partition. To perform an offline backup of all the WSDB database partitions to /dev3/backup, issue the following command from database partition 0:

```
db2 BACKUP DATABASE wsdb ON ALL DBPARTITIONNUMS TO /dev3/backup
```

The backup is performed simultaneously on all partitions. All four database partition backup images are stored in the /dev3/backup directory. This directory can be a shared directory that is accessible from more than one partition, or a locally mounted directory accessible from each partition individually, or a combination of both.

2. In the following example database SAMPLE is backed up to a TSM server that uses two concurrent TSM client sessions. Db2 calculates the optimal buffer size for this environment.

```
db2 backup database sample use tsm open 2 sessions with 4 buffers
```

3. In the following example, a table space-level backup of table spaces (syscatspace, userspace1) of database payroll is done to tapes.

- ```
db2 backup database payroll tablespace (syscatspace, userspace1) to
 /dev/rmt0, /dev/rmt1 with 8 buffers without prompting
```
4. The **USE TSM OPTIONS** keywords can be used to specify the TSM information to use for the backup operation. The following example shows how to use the **USE TSM OPTIONS** keywords to specify a fully qualified file name:
 

```
db2 backup db sample use TSM options @/u/dmcinnis/myoptions.txt
```

The file myoptions.txt contains the following information: -fromnode=bar  
-fromowner=dmcinnis
  5. Following is a sample weekly incremental backup strategy for a recoverable database. It includes a weekly full database backup operation, a daily noncumulative (delta) backup operation, and a midweek cumulative (incremental) backup operation:
 

```
(Sun) db2 backup db sample use tsm
(Mon) db2 backup db sample online incremental delta use tsm
(Tue) db2 backup db sample online incremental delta use tsm
(Wed) db2 backup db sample online incremental use tsm
(Thu) db2 backup db sample online incremental delta use tsm
(Fri) db2 backup db sample online incremental delta use tsm
(Sat) db2 backup db sample online incremental use tsm
```
  6. In the following example, three identical target directories are specified for a backup operation on database SAMPLE. This is suitable if the target file system is made up of multiple physical disks.
 

```
db2 backup database sample to /dev3/backup, /dev3/backup, /dev3/backup
```

The data is concurrently backed up to the three target directories, and three backup images are generated with extensions .001, .002, and .003.

7. In the following example, the database WSDB is defined on all four database partitions, numbered 0 - 3. Database partition 0 is the catalog partition. To perform an online backup of table space USERSPACE1 on database partitions 1 and 2, with the backup image to be stored on a TSM server, issue the following command from partition 0:
 

```
db2 BACKUP DATABASE wsdb ON DBPARTITIONNUMS (1, 2) TABLESPACE (USERSPACE1)
ONLINE USE TSM
```
8. Sample output that is generated to indicate the sqlcode returned by each partition.

#### **Example 1**

```
All partitions are successful (sqlcode >= 0)
$ db2 backup db foo on all dbpartitionnums tablespace(T1)
Part Result

0000 DB20000I The BACKUP DATABASE command completed successfully.
0001 SQL2430W The database backup succeeded, but the following
table spaces do not exist on this database partition: "T1".

Backup successful. The timestamp for this backup image is :
20040908010203
```

#### **Example 2**

```
One or more partitions fail (sqlcode < 0)
$ db2 backup db foo on all dbpartitionnums to /backups
Part Result

0000 SQL2001N The utility was interrupted. The output data may be
incomplete.
0001 SQL2419N The target disk "/backups" has become full.
```

SQL2429N The database backup failed. The following database partitions returned errors: "1".

9. The following backups include the log directories in the image created:

```
db2 backup db sample use snapshot
db2 backup db sample online use snapshot
db2 backup db sample use snapshot INCLUDE LOGS
db2 backup db sample online use snapshot INCLUDE LOGS
```

10. The following backups will NOT include the log directories in the image created:

```
db2 backup db sample use snapshot EXCLUDE LOGS
db2 backup db sample online use snapshot EXCLUDE LOGS
```

11. The following command encrypts a backup image by using the default encryption options:

```
BACKUP DATABASE ccards ENCRYPT;
```

12. The following commands encrypt a backup image by using the default encryption library and explicitly provided encryption options:

```
BACKUP DATABASE ccards
 ENCRYPT ENCRLIB 'libdb2encr.so'
 ENCRYPTS 'Cipher=3DES';
```

```
BACKUP DATABASE ccards
 ENCRYPT ENCRLIB 'libdb2encr.so'
 ENCRYPTS 'Master Key Label=mylabel.mydb.myinstance.myserver';
```

13. The following command creates a backup image that is both compressed and encrypted:

```
BACKUP DATABASE ccards
 ENCRYPT ENCRLIB libdb2compr_encr.so;
```

## Usage notes

- The data in a backup cannot be protected by the database server. Make sure that backups are properly safeguarded, particularly if the backup contains LBAC-protected data.
- When backing up to tape, use of a variable block size is not supported. If you must use this option, ensure that you have tested procedures in place that enable you to recover successfully, using backup images that were created with a variable block size.
- The backup utility cannot be used with a Type 2 connection.
- When using a variable block size, you must specify a backup buffer size that is less than or equal to the maximum limit for the tape devices that you are using. For optimal performance, the buffer size must be equal to the maximum block size limit of the device being used.
- Snapshot backups should be complemented with regular disk backups in case of failure in the filer/storage system.
- As you regularly backup your database, you might accumulate large database backup images, many database logs, and load copy images, all of which might be taking up a large amount of disk space. Refer to "Managing recovery objects" for information about how to manage these recovery objects.
- You can use the **OPTIONS** parameter to enable backup operations in TSM environments that support proxy nodes. For more information, see the "Configuring a Tivoli Storage Manager client" topic.
- You can use the **DB2\_BCKP\_PAGE\_VERIFICATION** registry variable to enable DMS and AS page validation during the backup.

- You can use the **DB2\_BCKP\_INCLUDE\_LOGS\_WARNING** registry variable to specify that some online backups can now succeed even if they have not successfully included all of the required logs.
- After you issue a **BACKUP DATABASE** command with the **ONLINE** option and the **INCLUDE LOGS** option, the resulting backed-up database image includes all the log files necessary to roll forward to the end of backup.

## BIND

Invokes the bind utility, which prepares SQL statements stored in the bind file generated by the precompiler, and creates a package that is stored in the database.

### Scope

This command can be issued from any database partition in db2nodes.cfg. It updates the database catalogs on the catalog database partition. Its effects are visible to all database partitions.

### Authorization

One of the following authorizations:

- DBADM authority
- If EXPLAIN ONLY is specified, EXPLAIN authority or an authority that implicitly includes EXPLAIN is sufficient.
- If a package does not exist, BINDADD authority and:
  - If the schema name of the package does not exist, IMPLICIT\_SCHEMA authority on the database.
  - If the schema name of the package does exist, CREATEIN privilege on the schema.
- If the package exists, one of the following privileges:
  - ALTERIN privilege on the schema
  - BIND privilege on the package

In addition, if capturing explain information using the EXPLAIN or the EXPLSNAP clause, one of the following authorizations is required:

- INSERT privilege on the explain tables
- DATAACCESS authority

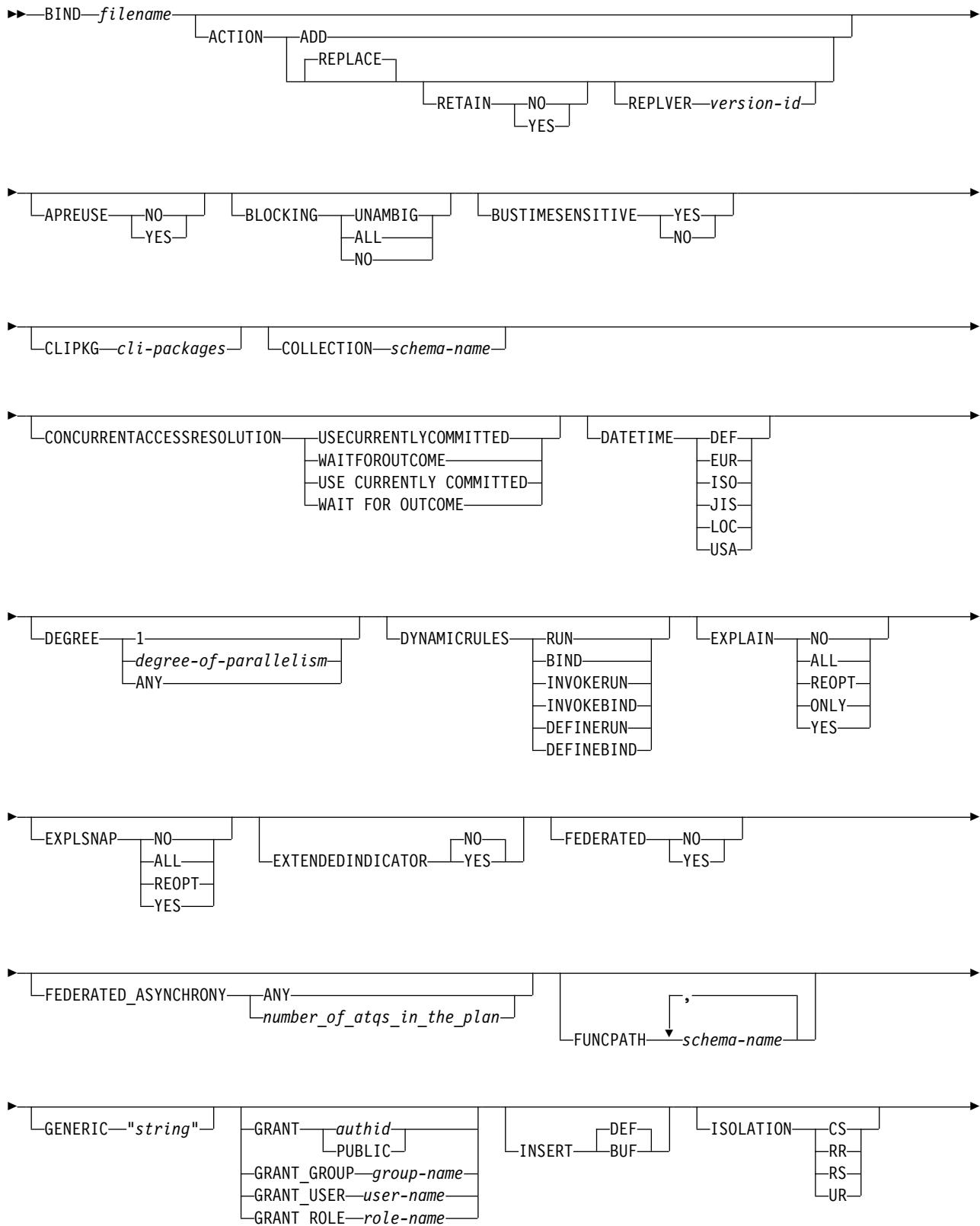
The user also needs all privileges required to compile any static SQL statements in the application. Privileges granted to groups are not used for authorization checking of static statements.

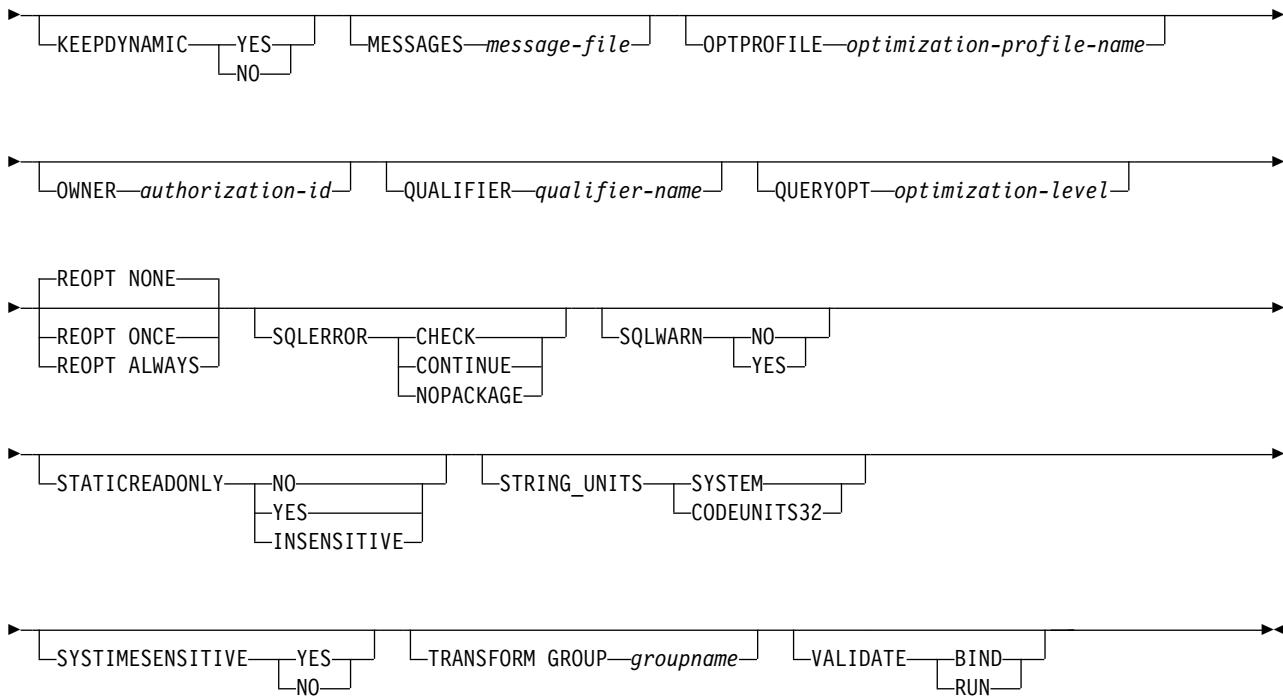
### Required connection

Database. If implicit connect is enabled, a connection to the default database is established.

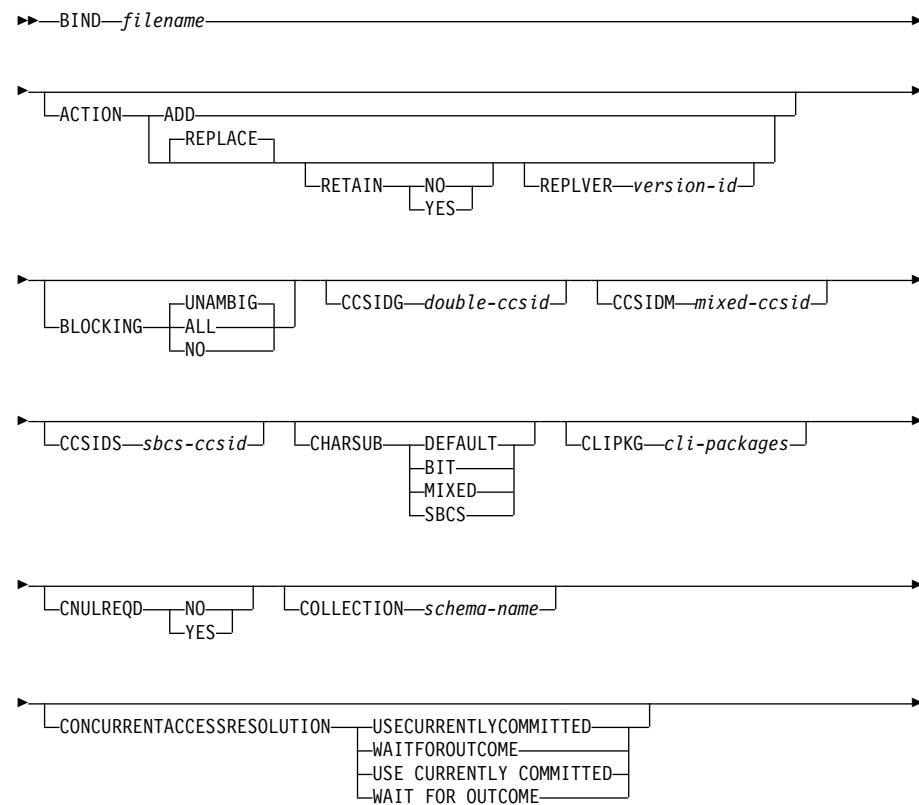
### Command syntax

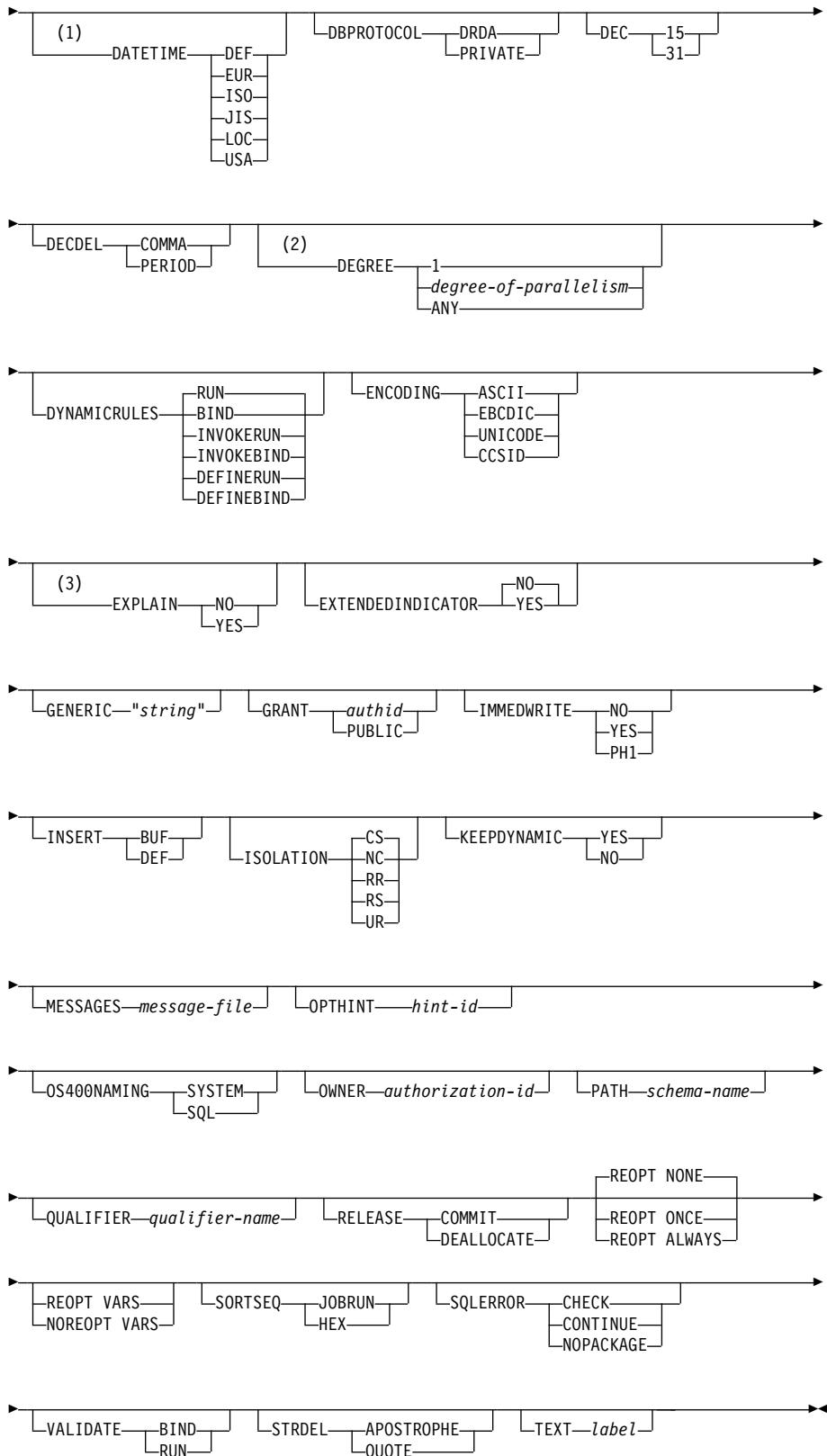
#### For Db2





**For Db2 on servers other than Linux, Windows and UNIX**





#### Notes:

- 1 If the server does not support the DATETIME DEF option, it is mapped to DATETIME ISO.

- 2 The DEGREE option is only supported by DRDA Level 2 Application Servers.
- 3 DRDA defines the EXPLAIN option to have the value YES or NO. If the server does not support the EXPLAIN YES option, the value is mapped to EXPLAIN ALL.

## Command parameters

### *filename*

Specifies the name of the bind file that was generated when the application program was precompiled, or a list file containing the names of several bind files. Bind files have the extension .bnd. The full path name can be specified.

If a list file is specified, the @ character must be the first character of the list file name. The list file can contain several lines of bind file names. Bind files listed on the same line must be separated by plus (+) characters, but a + cannot appear in front of the first file listed on each line, or after the last bind file listed. For example,

```
/u/smith/sql1lib/bnd@all.lst
```

is a list file that contains the following bind files:

```
mybind1.bnd+mybind.bnd2+mybind3.bnd+
mybind4.bnd+mybind5.bnd+
mybind6.bnd+
mybind7.bnd
```

When just the bind file name without any path is specified, the file would be first searched for in the current directory. If the file is found, it would be picked up and the package would be created. If the file is not found in the current directory, then the file would be automatically picked up from the instance or install path.

### ACTION

Indicates whether the package can be added or replaced.

**ADD** Indicates that the named package does not exist, and that a new package is to be created. If the package already exists, execution stops, and a diagnostic error message is returned.

### REPLACE

Indicates that the existing package is to be replaced by a new one with the same package name and creator. This is the default value for the **ACTION** option.

### RETAIN

Indicates whether BIND and EXECUTE authorities are to be preserved when a package is replaced. If ownership of the package changes, the new owner grants the BIND and EXECUTE authority to the previous package owner.

**NO** Does not preserve BIND and EXECUTE authorities when a package is replaced. This value is not supported by Db2.

**YES** Preserves BIND and EXECUTE authorities when a package is replaced. This is the default value.

### REPLVER *version-id*

Replaces a specific version of a package. The version identifier specifies which version of the package is to be

replaced. If the specified version does not exist, an error is returned. If the **REPLVER** option of **REPLACE** is not specified, and a package already exists that matches the package name, creator, and version of the package being bound, that package will be replaced; if not, a new package will be added.

#### **APREUSE**

Specifies whether static SQL access plans are to be reused. When this option is enabled, the query compiler will attempt to reuse the access plans for the statement in any existing packages during the bind and during future implicit and explicit rebinds.

- YES** The query compiler will attempt to reuse the access plans for the statements in the package. If there is an existing package, the query compiler will attempt to reuse the access plan for every statement that can be matched with a statement in the new bind file. For a statement to match, the statement text must be identical and the section number for the statement in the existing package must match what the section number will be for the statement in the new package.
- NO** The query compiler will not attempt to reuse access plans for the statements in the package. This is the default setting.

#### **BLOCKING**

Specifies the type of row blocking for cursors. The blocking of row data that contains references to LOB column data types is also supported in partitioned database environments.

- ALL** For cursors that are specified with the FOR READ ONLY clause or cursors not specified as FOR UPDATE, blocking occurs.  
Ambiguous cursors are treated as read-only.
- NO** Blocking does not occur for any cursor.  
For the definition of a read-only cursor and an ambiguous cursor, refer to *DECLARE CURSOR statement*.  
Ambiguous cursors are treated as updatable.

#### **UNAMBIG**

For cursors that are specified with the FOR READ ONLY clause, blocking occurs.

Cursors that are not declared with the FOR READ ONLY or FOR UPDATE clause which are not ambiguous and are read-only will be blocked. Ambiguous cursors will not be blocked.

Ambiguous cursors are treated as updatable.

#### **BUSTIMESENSITIVE**

Indicates whether references to application-period temporal tables in static and dynamic SQL statements are affected by the value of the CURRENT TEMPORAL BUSINESS\_TIME special register.

- YES** References to application-period temporal tables are affected by the value of the CURRENT TEMPORAL BUSINESS\_TIME special register. This value is the default value.

**NO** References to application-period temporal tables are not affected by the value of the CURRENT TEMPORAL BUSINESS\_TIME special register.

**CCSIDG** *double-ccsid*

An integer specifying the coded character set identifier (CCSID) to be used for double byte characters in character column definitions (without a specific CCSID clause) in CREATE and ALTER TABLE SQL statements. This option is not supported by the server for Db2. The DRDA server will use a built-in default value if this option is not specified.

**CCSIDM** *mixed-ccsid*

An integer specifying the coded character set identifier (CCSID) to be used for mixed byte characters in character column definitions (without a specific CCSID clause) in CREATE and ALTER TABLE SQL statements. This option is not supported by the server for Db2. The DRDA server will use a built-in default value if this option is not specified.

**CCSIDS** *sbc-s-ccsid*

An integer specifying the coded character set identifier (CCSID) to be used for single byte characters in character column definitions (without a specific CCSID clause) in CREATE and ALTER TABLE SQL statements. This option is not supported by Db2. The DRDA server will use a built-in default value if this option is not specified.

**CHARSUB**

Designates the default character sub-type that is to be used for column definitions in CREATE and ALTER TABLE SQL statements. This precompile/bind option is not supported by the server for Db2.

**BIT** Use the FOR BIT DATA SQL character sub-type in all new character columns for which an explicit sub-type is not specified.

**DEFAULT**

Use the target built-in default in all new character columns for which an explicit sub-type is not specified.

**MIXED**

Use the FOR MIXED DATA SQL character sub-type in all new character columns for which an explicit sub-type is not specified.

**SBCS** Use the FOR SBCS DATA SQL character sub-type in all new character columns for which an explicit sub-type is not specified.

**CLIPKG** *cli-packages*

An integer between 3 and 30 specifying the number of CLI large packages to be created when binding CLI bind files against a database.

**CNULREQD**

This option is related to the **LANGLEVEL** precompile option. It is valid only if the bind file is created from a C or a C++ application. This bind option is not supported by the server for Db2.

**NO** The application was coded on the basis of the **LANGLEVEL SAA1** precompile option with respect to the null terminator in C string host variables.

**YES** The application was coded on the basis of the **LANGLEVEL MIA** precompile option with respect to the null terminator in C string host variables.

**COLLECTION** *schema-name*

Specifies a 128-byte collection identifier for the package. If not specified, the authorization identifier for the user processing the package is used.

**CONCURRENTACCESSRESOLUTION**

Specifies the concurrent access resolution to use for statements in the package.

**USE CURRENTLY COMMITTED**

Specifies that the database manager can use the currently committed version of the data for applicable scans when it is in the process of being updated or deleted. Rows in the process of being inserted can be skipped. This clause applies when the isolation level in effect is Cursor Stability or Read Stability (for Read Stability it skips uncommitted inserts only) and is ignored otherwise. Applicable scans include read-only scans that can be part of a read-only statement as well as a non read-only statement. The settings for the registry variables **DB2\_EVALUNCOMMITTED**, **DB2\_SKIPDELETED**, and **DB2\_SKIPINSERTED** do not apply to scans using currently committed. However, the settings for these registry variables still apply to scans that do not use currently committed.

**WAIT FOR OUTCOME**

Specifies Cursor Stability and higher scans wait for the commit or rollback when encountering data in the process of being updated or deleted. Rows in the process of being inserted are not skipped. The settings for the registry variables **DB2\_EVALUNCOMMITTED**, **DB2\_SKIPDELETED**, and **DB2\_SKIPINSERTED** no longer apply.

**DATETIME**

Specifies the date and time format to be used.

**DEF** Use a date and time format associated with the territory code of the database.

**EUR** Use the IBM standard for Europe date and time format.

**ISO** Use the date and time format of the International Standards Organization.

**JIS** Use the date and time format of the Japanese Industrial Standard.

**LOC** Use the date and time format in local form associated with the territory code of the database.

**USA** Use the IBM standard for U.S. date and time format.

**DBPROTOCOL**

Specifies what protocol to use when connecting to a remote site that is identified by a three-part name statement. Supported by Db2 for z/OS® only. For a list of supported option values, refer to the documentation for Db2 for z/OS.

**DEC** Specifies the maximum precision to be used in decimal arithmetic operations. This precompile/bind option is not supported by the server for Db2. The DRDA server will use a built-in default value if this option is not specified.

**15** 15-digit precision is used in decimal arithmetic operations.

**31** 31-digit precision is used in decimal arithmetic operations.

**DECDEL**

Designates whether a period (.) or a comma (,) will be used as the decimal point indicator in decimal and floating point literals. This precompile/bind option is not supported by the server for Db2. The DRDA server will use a built-in default value if this option is not specified.

**COMMA**

Use a comma (,) as the decimal point indicator.

**PERIOD**

Use a period (.) as the decimal point indicator.

**DEGREE**

Specifies the degree of parallelism for the execution of static SQL statements in an SMP system. This option does not affect CREATE INDEX parallelism.

**1** The execution of the statement will not use parallelism.

*degree-of-parallelism*

Specifies the degree of parallelism with which the statement can be executed, a value between 2 and 32 767 (inclusive).

**ANY** Specifies that the execution of the statement can involve parallelism using a degree determined by the database manager.

**DYNAMICRULES**

Defines which rules apply to dynamic SQL at run time for the initial setting of the values used for authorization ID and for the implicit qualification of unqualified object references.

**RUN** Specifies that the authorization ID of the user executing the package is to be used for authorization checking of dynamic SQL statements. The authorization ID will also be used as the default package qualifier for implicit qualification of unqualified object references within dynamic SQL statements. This is the default value.

**BIND** Specifies that all of the rules that apply to static SQL for authorization and qualification are to be used at run time. That is, the authorization ID of the package owner is to be used for authorization checking of dynamic SQL statements, and the default package qualifier is to be used for implicit qualification of unqualified object references within dynamic SQL statements.

**DEFINERUN**

If the package is used within a routine context, the authorization ID of the routine definer is to be used for authorization checking and for implicit qualification of unqualified object references within dynamic SQL statements within the routine.

If the package is used as a stand-alone application, dynamic SQL statements are processed as if the package were bound with **DYNAMICRULES RUN**.

**DEFINEBIND**

If the package is used within a routine context, the authorization ID of the routine definer is to be used for authorization checking and for implicit qualification of unqualified object references within dynamic SQL statements within the routine.

If the package is used as a stand-alone application, dynamic SQL statements are processed as if the package were bound with **DYNAMICRULES BIND**.

#### INVOKERUN

If the package is used within a routine context, the current statement authorization ID in effect when the routine is invoked is to be used for authorization checking of dynamic SQL statements and for implicit qualification of unqualified object references within dynamic SQL statements within that routine.

If the package is used as a stand-alone application, dynamic SQL statements are processed as if the package were bound with **DYNAMICRULES RUN**.

#### INVOKEBIND

If the package is used within a routine context, the current statement authorization ID in effect when the routine is invoked is to be used for authorization checking of dynamic SQL statements and for implicit qualification of unqualified object references within dynamic SQL statements within that routine.

If the package is used as a stand-alone application, dynamic SQL statements are processed as if the package were bound with **DYNAMICRULES BIND**.

Because dynamic SQL statements will be using the authorization ID of the package owner in a package exhibiting bind behavior, the binder of the package should not have any authorities granted to them that the user of the package should not receive. Similarly, when defining a routine that will exhibit define behavior, the definer of the routine should not have any authorities granted to them that the user of the package should not receive since a dynamic statement will be using the authorization ID of the routine's definer.

The following dynamically prepared SQL statements cannot be used within a package that was not bound with **DYNAMICRULES RUN**: GRANT, REVOKE, ALTER, CREATE, DROP, COMMENT ON, RENAME, SET INTEGRITY, and SET EVENT MONITOR STATE.

#### ENCODING

Specifies the encoding for all host variables in static statements in the plan or package. Supported by Db2 for OS/390® only. For a list of supported option values, refer to the documentation for Db2 for OS/390.

#### EXPLAIN

Stores information in the Explain tables about the access plans chosen for each SQL statement in the package.

**NO** Explain information will not be captured.

**YES** Explain tables will be populated with information about the chosen access plan at prep/bind time for static statements and at run time for incremental bind statements.

If the package is to be used for a routine and the package contains incremental bind statements, then the routine must be defined as MODIFIES SQL DATA. If this is not done, incremental bind statements in the package will cause a run time error (SQLSTATE 42985).

#### **REOPT**

Explain information for each reoptimizable incremental bind SQL statement is placed in the explain tables at run time. In addition, explain information is gathered for reoptimizable dynamic SQL statements at run time, even if the CURRENT EXPLAIN MODE register is set to NO.

If the package is to be used for a routine, the routine must be defined as MODIFIES SQL DATA, otherwise incremental bind and dynamic statements in the package will cause a run time error (SQLSTATE 42985).

**ONLY** The **ONLY** option allows you to explain statements without having the privilege to execute them. The explain tables are populated but no persistent package is created. If an existing package with the same name and version is encountered during the bind process, the existing package is neither dropped nor replaced even if you specified **ACTION REPLACE**. If an error occurs during population of the explain tables, explain information is not added for the statement that returned the error and for any statements that follow it.

**ALL** Explain information for each eligible static SQL statement will be placed in the Explain tables at prep/bind time. Explain information for each eligible incremental bind SQL statement will be placed in the explain tables at run time. In addition, explain information will be gathered for eligible dynamic SQL statements at run time, even if the CURRENT EXPLAIN MODE register is set to NO.

If the package is to be used for a routine, the routine must be defined as MODIFIES SQL DATA, otherwise incremental bind and dynamic statements in the package will cause a run time error (SQLSTATE 42985).

#### **EXPLSNAP**

Stores Explain Snapshot information in the Explain tables.

**NO** An Explain Snapshot will not be captured.

**YES** An Explain Snapshot for each eligible static SQL statement will be placed in the Explain tables at prep/bind time for static statements and at run time for incremental bind statements.

If the package is to be used for a routine and the package contains incremental bind statements, then the routine must be defined as MODIFIES SQL DATA or incremental bind statements in the package will cause a run time error (SQLSTATE 42985).

#### **REOPT**

Explain snapshot information for each reoptimizable incremental bind SQL statement is placed in the explain tables at run time. In addition, explain snapshot information is gathered for reoptimizable dynamic SQL statements at run time, even if the CURRENT EXPLAIN SNAPSHOT register is set to NO.

If the package is to be used for a routine, the routine must be defined as MODIFIES SQL DATA, otherwise incremental bind and dynamic statements in the package will cause a run time error (SQLSTATE 42985).

**ALL** An Explain Snapshot for each eligible static SQL statement will be

placed in the Explain tables at prep/bind time. Explain snapshot information for each eligible incremental bind SQL statement will be placed in the Explain tables at run time. In addition, explain snapshot information will be gathered for eligible dynamic SQL statements at run time, even if the CURRENT EXPLAIN SNAPSHOT register is set to NO.

If the package is to be used for a routine, then the routine must be defined as MODIFIES SQL DATA, otherwise incremental bind and dynamic statements in the package will cause a run time error (SQLSTATE 42985).

#### EXTENDEDINDICATOR

Enables the recognition of extended indicator variable values during the execution of the associated plan or package.

- NO** Extended indicator variable values are not recognized. Indicator variables are normal indicator variables; negative indicator variable values imply null, and positive or zero values imply non-null. This is the default condition.
- YES** Extended indicator variable values are recognized. Using any non-recognized indicator variable values, or using the default or unassigned indicator variable-based values in a non-supported location will cause Db2 database manager to generate an error message during execution of the bound statement.

#### FEDERATED

Specifies whether a static SQL statement in a package references a nickname or a federated view. If this option is not specified and a static SQL statement in the package references a nickname or a federated view, a warning is returned and the package is created.

- NO** A nickname or federated view is not referenced in the static SQL statements of the package. If a nickname or federated view is encountered in a static SQL statement during the prepare or bind phase of this package, an error is returned and the package is *not* created.
- YES** A nickname or federated view can be referenced in the static SQL statements of the package. If no nicknames or federated views are encountered in static SQL statements during the prepare or bind of the package, no errors or warnings are returned and the package is created.

#### FEDERATED\_ASYNCNCHRONY

Specifies the maximum number of asynchrony table queues (ATQs) that the federated server supports in the access plan for programs that use embedded SQL.

- ANY** The optimizer determines the number of ATQs for the access plan. The optimizer assigns an ATQ to all eligible SHIP or remote pushdown operators in the plan. The value that is specified for **DB2\_MAX\_ASYNC\_REQUESTS\_PER\_QUERY** server option limits the number of asynchronous requests.

#### *number\_of\_atqs\_in\_the\_plan*

The number of ATQs in the plan. You specify a number in the range 0 to 32767.

## **FUNC PATH**

Specifies the function path to be used in resolving user-defined distinct types and functions in static SQL. If this option is not specified, the default function path is "SYSIBM","SYSFUN",USER where USER is the value of the USER special register.

### ***schema-name***

An SQL identifier, either ordinary or delimited, which identifies a schema that exists at the application server. No validation that the schema exists is made at precompile or at bind time. The same schema cannot appear more than once in the function path. The schema name SYSPUBLIC cannot be specified for the function path. The number of schemas that can be specified is limited by the length of the resulting function path, which cannot exceed 2048 bytes. The schema SYSIBM does not need to be explicitly specified; it is implicitly assumed to be the first schema if it is not included in the function path.

## **GENERIC "string"**

Supports the binding of packages with bind options that are supported by the target server, but that are not predefined in the **BIND PACKAGE** or **REBIND PACKAGE** command. Do not use the **GENERIC** bind option to specify bind options that are predefined in the **BIND** or **PRECOMPILE** command syntax. For example, do not specify predefined bind option such as **KEEPDYNAMIC** in the **GENERIC** bind option. The syntax for the **GENERIC** bind option is as follows:

```
generic "option1 value1 option2 value2 ..."
```

Each option and value must be separated by one or more blank spaces. For example, you can use the following **GENERIC** bind option syntax to bind a package with OPT1, OPT2, and OPT3 options values:

```
generic "opt1 value1 opt2 value2 opt3 value3"
```

The maximum length of the string is 4096 bytes. The maximum length of each option name in the string is 255 bytes.

The client passes the **BIND** command to the Db2 server without any client validation. The Db2 server processes the **BIND** command and returns an appropriate message.

In Version 10.5 Fix Pack 2 and later, you can specify the application compatibility special register setting (**APPLCOMPAT**) with the **GENERIC** option of the **BIND** command when you are connecting to Db2 for z/OS Version 11 and later servers.

For a list of **GENERIC** options that are supported by Db2 for z/OS servers, see "Specification of Db2 for z/OS bind options from Db2 clients" at [http://www.ibm.com/support/knowledgecenter/SSEPEK\\_12.0.0/comref/src/tpc/db2z\\_genericbindoptionsfromluw.html](http://www.ibm.com/support/knowledgecenter/SSEPEK_12.0.0/comref/src/tpc/db2z_genericbindoptionsfromluw.html).

For a list of **GENERIC** options that are supported by Db2 for IBM i servers, see Table 1 in "How can unlike clients override package options such as NLSS sort sequences, system naming, and separate date/time formats?" at [http://www.ibm.com/support/knowledgecenter/ssw\\_ibm\\_i\\_73/ddp/rbal1faquserofdb2connspecify.htm](http://www.ibm.com/support/knowledgecenter/ssw_ibm_i_73/ddp/rbal1faquserofdb2connspecify.htm).

## **GRANT**

**Note:** If more than one of the **GRANT**, **GRANT\_GROUP**, **GRANT\_USER**, and **GRANT\_ROLE** options are specified, only the last option specified is executed.

**authid** Grants EXECUTE and BIND privileges to a specified user name, role name or group ID. The SQL GRANT statement and its rules are used to determine the type of *authid* when none of USER, GROUP, or ROLE is provided to specify the type of the grantee on a GRANT statement. For the rules, see *GRANT (Role) statement*.

**PUBLIC**

Grants EXECUTE and BIND privileges to PUBLIC.

**GRANT\_GROUP** *group-name*

Grants EXECUTE and BIND privileges to a specified group name.

**GRANT\_USER** *user-name*

Grants EXECUTE and BIND privileges to a specified user name.

**GRANT\_ROLE** *role-name*

Grants EXECUTE and BIND privileges to a specified role name.

**INSERT**

Allows a program being precompiled or bound against a Db2 Enterprise Server Edition server to request that data inserts be buffered to increase performance.

**BUF** Specifies that inserts from an application should be buffered.

**DEF** Specifies that inserts from an application should not be buffered.

**ISOLATION**

Determines how far a program bound to this package can be isolated from the effect of other executing programs.

**CS** Specifies Cursor Stability as the isolation level.

**NC** No Commit. Specifies that commitment control is not to be used. This isolation level is not supported by Db2.

**RR** Specifies Repeatable Read as the isolation level.

**RS** Specifies Read Stability as the isolation level. Read Stability ensures that the execution of SQL statements in the package is isolated from other application processes for rows read and changed by the application.

**UR** Specifies Uncommitted Read as the isolation level.

**IMMEDWRITE**

Indicates whether immediate writes will be done for updates made to group buffer pool dependent page sets or database partitions. Supported by Db2 for OS/390 only. For a list of supported option values, refer to the documentation for Db2 for OS/390.

**KEEPDYNAMIC**

This parameter specifies whether dynamic SQL statements are to be kept after commit points.

For a list of supported option values supported for Db2 for z/OS, see documentation in the Db2 for z/OS Information Center.

Starting with Db2 Version 9.8 Fix Pack 2, you can modify the value of the **KEEPDYNAMIC** bind option for a package without requiring a fresh bind operation, thereby avoiding unnecessary recompilation until the next bind operation occurs. The **KEEPDYNAMIC** bind option controls how long the

statement text and section associated with a prepared statement are kept in the SQL context, specifying whether dynamic SQL statements are kept after a COMMIT or ROLLBACK.

#### YES

Instructs the SQL context to keep the statement text and section associated with prepared statements indefinitely. Dynamic SQL statements are kept across transactions. All packages bound with **KEEPDYNAMIC YES** are by default compatible with the existing package cache behavior.

#### No

Instructs the SQL context to remove the statement text and section associated with prepared statements at the end of each unit of work. Inactive dynamic SQL statements prepared in a package bound with **KEEPDYNAMIC NO** are removed from the SQL context during a COMMIT or ROLLBACK operation. The statements must be prepared again in a new transaction. The client, driver, or application needs to prepare any dynamic SQL statement it wants to reuse in a new unit of work again. If the package is executed by a remote application, executable versions for prepared statements are disassociated from the application SQL context when the transaction ends.

Active dynamic SQL statements must be kept until the next COMMIT or ROLLBACK operation where they are inactive. Here are some situations where dynamic SQL statements can be active at transaction boundaries:

- Cursors declared using the WITH HOLD option are open at a commit point.
- A dynamic SQL statement is executing a COMMIT or ROLLBACK operation.
- A dynamic SQL statement invokes a stored procedure or a user defined function that is executing COMMIT or ROLLBACK operation.

#### MESSAGES *message-file*

Specifies the destination for warning, error, and completion status messages. A message file is created whether the bind is successful or not. If a message file name is not specified, the messages are written to standard output. If the complete path to the file is not specified, the current directory is used. If the name of an existing file is specified, the contents of the file are overwritten.

#### OPTHINT

Controls whether query optimization hints are used for static SQL. Supported by Db2 for OS/390 only. For a list of supported option values, refer to the documentation for Db2 for OS/390.

#### OPTPROFILE *optimization-profile-name*

Specifies the name of an existing optimization profile to be used for all static statements in the package. The default value of the option is an empty string. The value also applies as the default for dynamic preparation of DML statements for which the CURRENT OPTIMIZATION PROFILE special register is null. If the specified name is unqualified, it is an SQL identifier, which is implicitly qualified by the **QUALIFIER** bind option.

The **BIND** command does not process the optimization file, but only validates that the name is syntactically valid. Therefore if the optimization profile does not exist or is invalid, an SQL0437W warning with reason code 13 will not occur until a DML statement is optimized using that optimization profile.

#### **OS400NAMING**

Specifies which naming option is to be used when accessing Db2 for System i® data. Supported by Db2 for System i only. For a list of supported option values, refer to the documentation for Db2 for IBM i.

Because of the slashes used as separators, a Db2 utility can still report a syntax error at execution time on certain SQL statements which use the System i system naming convention, even though the utility might have been precompiled or bound with the **OS400NAMING** SYSTEM option. For example, the Command Line Processor will report a syntax error on an SQL CALL statement if the System i system naming convention is used, whether or not it has been precompiled or bound using the **OS400NAMING** SYSTEM option.

#### **OWNER** *authorization-id*

Designates a 128-byte authorization identifier for the package owner. The owner must have the privileges required to execute the SQL statements contained in the package. Only a user with DBADM authority can specify an authorization identifier other than the user ID. The default value is the authorization ID of the invoker of the precompile/bind process. SYSIBM, SYSCAT, and SYSSTAT are not valid values for this option. The *authorization-id* must be a user. A role or a group cannot be specified using the **OWNER** option.

**PATH** Specifies the function path to be used in resolving user-defined distinct types and functions in static SQL. If this option is not specified, the default function path is "SYSIBM","SYSFUN",USER where USER is the value of the USER special register.

#### *schema-name*

An SQL identifier, either ordinary or delimited, which identifies a schema that exists at the application server. No validation that the schema exists is made at precompile or at bind time.

#### **QUALIFIER** *qualifier-name*

Provides a 128-byte implicit qualifier for unqualified objects contained in the package. The default is the owner's authorization ID, whether or not **OWNER** is explicitly specified.

#### **QUERYOPT** *optimization-level*

Indicates the required level of optimization for all static SQL statements contained in the package. The default value is 5. The SET CURRENT QUERY OPTIMIZATION statement describes the complete range of optimization levels available.

#### **RELEASE**

Indicates whether resources are released at each COMMIT point, or when the application terminates. This DRDA precompile/bind option is not supported by Db2. For Db2 for z/OS Version 10 servers or later, the default value is DEALLOCATE.

#### **COMMIT**

Release resources at each COMMIT point. Used for dynamic SQL statements.

**DEALLOCATE**

Release resources only when the application terminates.

**SORTSEQ**

Specifies which sort sequence table to use on System i. Supported by Db2 for IBM i only. For a list of supported option values, refer to the documentation for Db2 for System i.

**SQLERROR**

Indicates whether to create a package or a bind file if an error is encountered.

**CHECK**

Specifies that the target system performs all syntax and semantic checks on the SQL statements being bound. A package will not be created as part of this process. If, while binding, an existing package with the same name and version is encountered, the existing package is neither dropped nor replaced even if **ACTION REPLACE** was specified.

**CONTINUE**

Creates a package, even if errors occur when binding SQL statements. Those statements that failed to bind for authorization or existence reasons can be incrementally bound at execution time if **VALIDATE RUN** is also specified. Any attempt to execute them at run time generates an error (SQLCODE -525, SQLSTATE 51015).

**NOPACKAGE**

A package or a bind file is not created if an error is encountered.

**REOPT**

Specifies whether to have Db2 determine an access path at run time using values for host variables, parameter markers, global variables, and special registers. Valid values are:

**NONE**

The access path for a given SQL statement containing host variables, parameter markers, global variables, or special registers will not be optimized using real values. The default estimates for the these variables is used, and the plan is cached and will be used subsequently. This is the default value.

**ONCE** The access path for a given SQL statement will be optimized using the real values of the host variables, parameter markers, global variables, or special registers when the query is first executed. This plan is cached and used subsequently.

**ALWAYS**

The access path for a given SQL statement will always be compiled and reoptimized using the values of the host variables, parameter markers, global variables, or special registers that are known each time the query is executed.

**REOPT | NOREOPT VARS**

These options have been replaced by **REOPT ALWAYS** and **REOPT NONE**; however, they are still supported for previous compatibility. Specifies whether to have Db2 determine an access path at run time using values for host variables, global variables, parameter markers, and special registers. Supported by Db2 for OS/390 only. For a list of supported option values, refer to the documentation for Db2 for OS/390.

## **SQLWARN**

Indicates whether warnings will be returned from the compilation of dynamic SQL statements (via PREPARE or EXECUTE IMMEDIATE), or from describe processing (via PREPARE...INTO or DESCRIBE).

**NO** Warnings will not be returned from the SQL compiler.

**YES** Warnings will be returned from the SQL compiler.

SQLCODE +236, +237 and +238 are exceptions. They are returned regardless of the **SQLWARN** option value.

## **STATICREADONLY**

Determines whether static cursors will be treated as being READ ONLY or INSENSITIVE.

**NO** All static cursors will take on the attributes as would normally be generated given the statement text and the setting of the **LANGLEVEL** precompile option. This is the default value.

**YES** Any static cursor that does not contain the FOR UPDATE or FOR READ ONLY clause will be considered READ ONLY.

## **INSENSITIVE**

Any static cursor that does not contain the FOR UPDATE clause will be considered READ ONLY and INSENSITIVE.

## **STRDEL**

Designates whether an apostrophe ('') or double quotation marks ("") will be used as the string delimiter within SQL statements. This precompile/bind option is not supported by the server for Db2. The DRDA server will use a built-in default value if this option is not specified.

### **APOSTROPHE**

Use an apostrophe ('') as the string delimiter.

### **QUOTE**

Use double quotation marks ("") as the string delimiter.

## **STRING\_UNITS**

Specifies the string units when character and graphic data types are used without explicit string units in static SQL statements. The default is based on the *string\_units* database configuration parameter setting for the database.

## **SYSTEM**

In a Unicode database, the setting has the following effect:

- CHAR, VARCHAR, and CLOB data types defined without specifying the CODEUNITS32 keyword will default to OCTETS.
- GRAPHIC, VARGRAPHIC, and DBCLOB data types defined without specifying the CODEUNITS32 keyword will default to CODEUNITS16.

In a non-Unicode database, the setting has the following effect:

- CHAR, VARCHAR, and CLOB data types defined without specifying the CODEUNITS32 keyword will default to OCTETS.
- GRAPHIC, VARGRAPHIC, and DBCLOB data types have implicit string units of double bytes.

## **CODEUNITS32**

This setting is only valid for a Unicode database and has the following effect:

- CHAR, VARCHAR, and CLOB data types defined without specifying the BYTE or OCTETS keywords will default to CODEUNITS32.
- GRAPHIC, VARGRAPHIC, and DBCLOB data types defined without specifying the CODEUNITS16 keyword will default to CODEUNITS32.

## **SYSTIMESENSITIVE**

Indicates whether references to system-period temporal tables in static and dynamic SQL statements are affected by the value of the CURRENT TEMPORAL SYSTEM\_TIME special register.

**YES** References to system-period temporal tables are affected by the value of the CURRENT TEMPORAL SYSTEM\_TIME special register. This value is the default value.

**NO** References to system-period temporal tables are not affected by the value of the CURRENT TEMPORAL SYSTEM\_TIME special register.

## **TEXT *label***

The description of a package. Maximum length is 255 characters. The default value is blanks. This precompile/bind option is not supported by the server for Db2.

## **TRANSFORM GROUP**

Specifies the transform group name to be used by static SQL statements for exchanging user-defined structured type values with host programs. This transform group is not used for dynamic SQL statements or for the exchange of parameters and results with external functions or methods.

### ***groupname***

An SQL identifier of up to 18 bytes in length. A group name cannot include a qualifier prefix and cannot begin with the prefix SYS since this is reserved for database use. In a static SQL statement that interacts with host variables, the name of the transform group to be used for exchanging values of a structured type is as follows:

- The group name in the **TRANSFORM GROUP** bind option, if any
- The group name in the **TRANSFORM GROUP** prep option as specified at the original precompilation time, if any
- The DB2\_PROGRAM group, if a transform exists for the given type whose group name is DB2\_PROGRAM
- No transform group is used if none of the previously listed conditions exist.

The following errors are possible during the bind of a static SQL statement:

- SQLCODE *yyyyy*, SQLSTATE *xxxxx*: A transform is needed, but no static transform group has been selected.
- SQLCODE *yyyyy*, SQLSTATE *xxxxx*: The selected transform group does not include a necessary transform (TO SQL for input variables, FROM SQL for output variables) for the data type that needs to be exchanged.

- SQLCODE *yyyyy*, SQLSTATE *xxxxx*: The result type of the FROM SQL transform is not compatible with the type of the output variable, or the parameter type of the TO SQL transform is not compatible with the type of the input variable.

In these error messages, *yyyyy* is replaced by the SQL error code, and *xxxxx* by the SQL state code.

#### **VALIDATE**

Determines when the database manager checks for authorization errors and object not found errors. The package owner authorization ID is used for validity checking.

**BIND** Validation is performed at precompile/bind time. If all objects do not exist, or all authority is not held, error messages are produced. If **SQLERROR CONTINUE** is specified, a package/bind file is produced despite the error message, but the statements in error are not executable.

**RUN** Validation is attempted at bind time. If all objects exist, and all authority is held, no further checking is performed at execution time.

If all objects do not exist, or all authority is not held at precompile/bind time, warning messages are produced, and the package is successfully bound, regardless of the **SQLERROR CONTINUE** option setting. However, authority checking and existence checking for SQL statements that failed these checks during the precompile/bind process can be redone at execution time.

### **Examples**

The following example binds `myapp.bnd` (the bind file generated when the `myapp.sqc` program was precompiled) to the database to which a connection has been established:

```
db2 bind myapp.bnd
```

Any messages resulting from the bind process are sent to standard output.

#### **Usage notes**

Binding a package using the **REOPT** option with the **ONCE** or **ALWAYS** value specified might change the static and dynamic statement compilation and performance.

Binding can be done as part of the precompile process for an application program source file, or as a separate step at a later time. Use **BIND** when binding is performed as a separate process.

The name used to create the package is stored in the bind file, and is based on the source file name from which it was generated (existing paths or extensions are discarded). For example, a precompiled source file called `myapp.sql` generates a default bind file called `myapp.bnd` and a default package name of `MYAPP`. However, the bind file name and the package name can be overridden at precompile time by using the **BINDFILE** and the **PACKAGE** options.

Binding a package with a schema name that does not already exist results in the implicit creation of that schema. The schema owner is `SYSIBM`. The `CREATEIN` privilege on the schema is granted to `PUBLIC`.

**BIND** executes under the transaction that was started. After performing the bind, **BIND** issues a COMMIT or a ROLLBACK to terminate the current transaction and start another one.

Binding stops if a fatal error or more than 100 errors occur. If a fatal error occurs, the utility stops binding, attempts to close all files, and discards the package.

When a package exhibits bind behavior, the following will be true:

1. The implicit or explicit value of the **BIND** option **OWNER** will be used for authorization checking of dynamic SQL statements.
2. The implicit or explicit value of the **BIND** option **QUALIFIER** will be used as the implicit qualifier for qualification of unqualified objects within dynamic SQL statements.
3. The value of the special register CURRENT SCHEMA has no effect on qualification.

In the event that multiple packages are referenced during a single connection, all dynamic SQL statements prepared by those packages will exhibit the behavior as specified by the **DYNAMICRULES** option for that specific package and the environment they are used in.

Parameters displayed in the SQL0020W message are correctly noted as errors, and will be ignored as indicated by the message.

If an SQL statement is found to be in error and the **BIND** option **SQLERROR CONTINUE** was specified, the statement will be marked as invalid. In order to change the state of the SQL statement, another **BIND** must be issued . Implicit and explicit rebinding will not change the state of an invalid statement. In a package bound with **VALIDATE RUN**, a statement can change from static to incremental bind or incremental bind to static across implicit and explicit rebinds depending on whether or not object existence or authority problems exist during the rebinding.

The privileges from the roles granted to the authorization identifier used to bind the package (the value of the **OWNER** bind option) or to PUBLIC, are taken into account when binding a package. Roles acquired through groups, in which the authorization identifier used to bind the package is a member, will not be used.

For an embedded SQL program, if the bind option is not explicitly specified the static statements in the package are bound using the **federated\_async** configuration parameter. If the **FEDERATED\_ASYNC** bind option is specified explicitly, that value is used for binding the packages and is also the initial value of the special register. Otherwise, the value of the database manager configuration parameter is used as the initial value of the special register. The **FEDERATED\_ASYNC** bind option influences dynamic SQL only when it is explicitly set.

The value of the **FEDERATED\_ASYNC** bind option is recorded in the **FEDERATED\_ASYNC** column in the **SYSCAT.PACKAGES** catalog table. When the bind option is not explicitly specified, the value of **federated\_async** configuration parameter is used and the catalog shows a value of -2 for the **FEDERATED\_ASYNC** column.

If the **FEDERATED\_ASYNC** bind option is not explicitly specified when a package is bound, and if this package is implicitly or explicitly rebound, the package is rebound using the current value of the **federated\_async** configuration parameter.

## CATALOG DATABASE

Stores database location information in the system database directory. The database can be located either on the local workstation or on a remote database partition server. The **CATALOG DATABASE** command can also be used to recatalog uncataloged databases, or maintain multiple aliases for one database, regardless of database location

### Scope

In a partitioned database environment, when cataloging a local database into the system database directory, this command must be issued from a database partition on the server where the database is located.

### Authorization

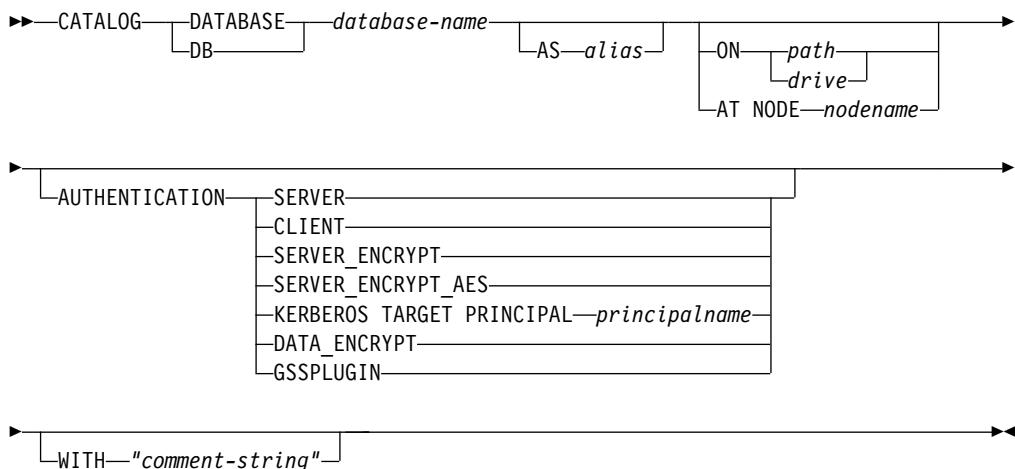
One of the following authorities:

- SYSADM
- SYSCTRL

### Required connection

None. Directory operations affect the local directory only.

### Command syntax



### Command parameters

#### DATABASE *database-name*

Specifies the name of the database to catalog.

#### AS *alias*

Specifies an alias as an alternate name for the database being cataloged. If an alias is not specified, the database manager uses *database-name* as the alias.

#### ON *path* | *drive*

Specifies the path on which the database being cataloged resides. On Windows operating systems, may instead specify the letter of the drive on which the database being cataloged resides (if it was created on a drive, not on a specific path).

**AT NODE** *nodename*

Specifies the name of the database partition server where the database being cataloged resides. This name should match the name of an entry in the node directory. If the node name specified does not exist in the node directory, a warning is returned, but the database is cataloged in the system database directory. The node name should be cataloged in the node directory if a connection to the cataloged database is required.

**AUTHENTICATION**

The authentication value is stored for remote databases (it appears in the output from the **LIST DATABASE DIRECTORY** command) but it is not stored for local databases.

Specifying an authentication type can result in a performance benefit.

**SERVER** Specifies that authentication takes place on the database partition server containing the target database.

**CLIENT** Specifies that authentication takes place on the database partition server where the application is invoked.

**SERVER\_ENCRYPT**

Specifies that authentication takes place on the database partition server containing the target database, and that user IDs and passwords are encrypted at the source. User IDs and passwords are decrypted at the target, as specified by the authentication type cataloged at the source.

**KERBEROS**

Specifies that authentication takes place using Kerberos Security Mechanism.

**TARGET PRINCIPAL** *principalname*

Fully qualified Kerberos principal name for the target server; that is, the fully qualified Kerberos principal of the Db2 instance owner in the form of *name/instance@REALM*. For Windows Server 2003, this is the logon account of the Db2 server service in the form of *userid@DOMAIN*, *userid@xxx.xxx.xxx.com* or *domain\userid*.

**DATA\_ENCRYPT**

Specifies that authentication takes place on the database partition server containing the target database, and that connections must use data encryption.

**GSSPLUGIN**

Specifies that authentication takes place using an external GSS API-based plug-in security mechanism.

**SERVER\_ENCRYPT\_AES**

Specifies that authentication takes place on the database partition server containing the target database, and that user IDs and passwords are encrypted with an Advanced Encryption Standard (AES) encryption algorithm at the source and decrypted at the target.

**WITH** "*comment-string*"

Describes the database or the database entry in the system database directory. The maximum length of a comment string is 30 characters. A carriage return or a line feed character is not permitted. The comment text must be enclosed by double quotation marks.

## Examples

```
db2 catalog database sample on /databases/sample
with "Sample Database"
```

## Usage notes

Db2 automatically catalogs databases when they are created. It catalogs an entry for the database in the local database directory and another entry in the system database directory. If the database is created from a remote client (or a client which is executing from a different instance on the same machine), an entry is also made in the system database directory at the client instance.

If you do not specify a path or a database partition server name, the database is assumed to be local. In this case, the location of the database is assumed to be the value of the **dftdbpath** database manager configuration parameter.

Databases on the same database partition server as the database manager instance are cataloged as *indirect* entries. Databases on other database partition servers are cataloged as *remote* entries.

**CATALOG DATABASE** automatically creates a system database directory if one does not exist. The system database directory is stored on the path that contains the database manager instance that is being used, and is maintained outside of the database.

List the contents of the system database directory using the **LIST DATABASE DIRECTORY** command. To list the contents of the local database directory use the **LIST DATABASE DIRECTORY ON path**, where *path* is where the database was created.

If directory caching is enabled, database, node and DCS directory files are cached in memory. To see if directory caching is enabled, check the value for the *dir\_cache* directory cache support configuration parameter in the output from the **GET DATABASE MANAGER CONFIGURATION** command. An application's directory cache is created during its first directory lookup. Since the cache is only refreshed when the application modifies any of the directory files, directory changes made by other applications might not be effective until the application has restarted.

To refresh the CLP's directory cache, use the **TERMINATE** command. To refresh the database manager's shared cache, stop (**db2stop**) and then restart (**db2start**) the database manager. To refresh the directory cache for another application, stop and then restart that application.

In a pureScale environment, the **db2cluster -cm -add -database\_mounts database-name** command must be run after the **CATALOG DATABASE** command.

## CATALOG DCS DATABASE

Stores information about remote host or System i databases in the Database Connection Services (DCS) directory.

These databases are accessed through an Application Requester (AR), such as Db2 Connect. Having a DCS directory entry with a database name matching a database name in the system database directory invokes the specified AR to forward SQL requests to the remote server where the database resides.

## Authorization

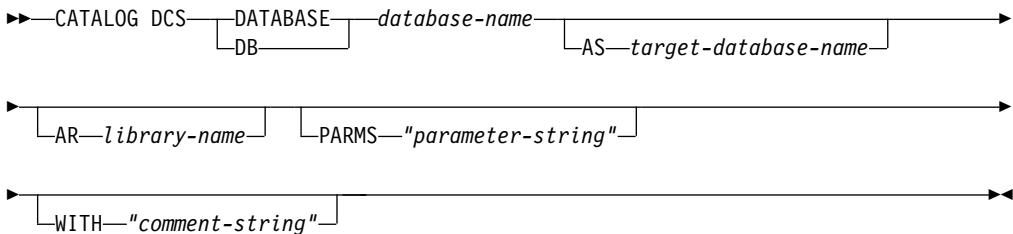
one of the following authorities:

- SYSADM
- SYSCTRL

## Required connection

None

## Command syntax



## Command parameters

### **DATABASE *database-name***

Specifies the alias of the target database to catalog. This name should match the name of an entry in the database directory that is associated with the remote database partition server.

### **AS *target-database-name***

Specifies the name of the target host or System i database to catalog.

### **AR *library-name***

Specifies the name of the Application Requester library that is loaded and used to access a remote database listed in the DCS directory.

If using the Db2 Connect AR, do not specify a library name. The default value will cause Db2 Connect to be invoked.

If not using Db2 Connect, specify the library name of the AR, and place that library on the same path as the database manager libraries. On Windows operating systems, the path is *drive*:\\sqllib\\bin. On Linux and UNIX operating systems, the path is \$HOME/sqllib/lib of the instance owner.

### **PARMS *"parameter-string"***

Specifies a parameter string that is to be passed to the AR when it is invoked. The parameter string must be enclosed by double quotation marks.

### **WITH *"comment-string"***

Describes the DCS directory entry. Any comment that helps to describe the database cataloged in this directory can be entered. Maximum length is 30 characters. A carriage return or a line feed character is not permitted. The comment text must be enclosed by double quotation marks.

## Examples

The following example catalogs information about the DB1 database, which is a Db2 for z/OS database, into the DCS directory:

```
db2 catalog dcs database db1 as dsn_db_1
with "DB2/z/OS location name DSN_DB_1"
```

## Usage notes

The Db2 Connect program provides connections to DRDA Application Servers such as:

- Db2 for z/OS databases on System/370 and System/390® architecture host computers.
- Db2 for VM and VSE databases on System/370 and System/390 architecture host computers.
- System i databases on Application System/400 (System i) and System i computers.

The database manager creates a Database Connection Services directory if one does not exist. This directory is stored on the path that contains the database manager instance that is being used. The DCS directory is maintained outside of the database.

The database must also be cataloged as a remote database in the system database directory .

List the contents of the DCS directory using the **LIST DCS DIRECTORY** command.

If directory caching is enabled, database, node, and DCS directory files are cached in memory. An application's directory cache is created during its first directory lookup. Since the cache is only refreshed when the application modifies any of the directory files, directory changes made by other applications might not be effective until the application has restarted.

To refresh the CLP's directory cache, use the **TERMINATE** command. To refresh the shared cache in Db2, stop (**db2stop**) and then restart (**db2start**) the database manager. To refresh the directory cache for another application, stop and then restart that application.

## CATALOG LDAP DATABASE

Registers the database in Lightweight Directory Access Protocol (LDAP).

### Authorization

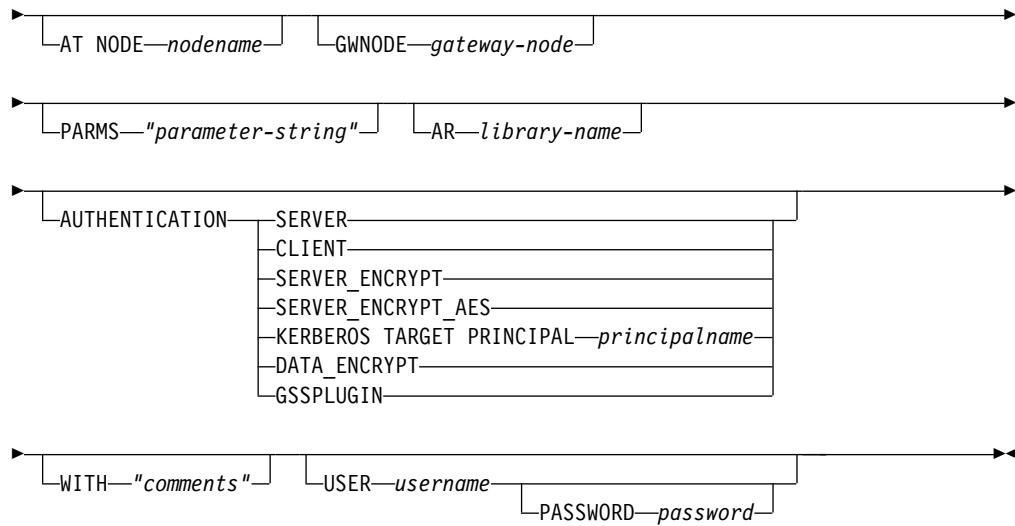
None

### Required connection

None

### Command syntax

```
►► CATALOG LDAP [DATABASE database-name] [AS alias]
```



## Command parameters

### **DATABASE** *database-name*

Specifies the name of the database to catalog.

### **AS** *alias*

Specifies an alias as an alternate name for the database being cataloged. If an alias is not specified, the database name is used as the alias.

### **AT NODE** *nodename*

Specifies the LDAP node name for the database server on which the database resides. This parameter must be specified when registering a database on a remote server.

### **GWNODE** *gateway-node*

Specifies the LDAP node name for the gateway server.

### **PARMS** "parameter-string"

Specifies a parameter string that is passed to the Application Requester (AR) when accessing DCS databases. The change password *sym\_dest\_name* should not be specified in the parameter string. Use the keyword **CHGPWDLU** to specify the change password LU name when registering the Db2 server in LDAP.

### **AR** *library-name*

Specifies the name of the Application Requester library that is loaded and used to access a remote database listed in the DCS directory.

If using the Db2 Connect AR, do not specify a library name. The default value will cause Db2 Connect to be invoked.

If not using Db2 Connect, specify the library name of the AR, and place that library on the same path as the database manager libraries. On Windows operating systems, the path is *drive:\sql1lib\dl1*. On UNIX operating systems, the path is *\$HOME/sql1lib/lib* of the instance owner.

### **AUTHENTICATION**

Specifies the authentication level. Valid values are:

**SERVER** Specifies that authentication takes place on the node containing the target database.

**CLIENT** Specifies that authentication takes place on the node from which the application is invoked.

**SERVER\_ENCRYPT**

Specifies that authentication takes place on the database partition server containing the target database, and that user IDs and passwords are encrypted at the source. User IDs and passwords are decrypted at the target, as specified by the authentication type catalogued at the source.

**SERVER\_ENCRYPT\_AES**

Specifies that authentication takes place on the database partition server containing the target database, and that user IDs and passwords are encrypted with an Advanced Encryption Standard (AES) encryption algorithm at the source and decrypted at the target.

**KERBEROS**

Specifies that authentication takes place using Kerberos Security Mechanism.

**TARGET PRINCIPAL *principalname***

Fully qualified Kerberos principal name for the target server; that is, the logon account of the Db2 server service in the form of *userid@xxx.xxx.xxx.com* or *domain\userid*.

**DATA\_ENCRYPT**

Specifies that authentication takes place on the node containing the target database, and that connections must use data encryption.

**GSSPLUGIN**

Specifies that authentication takes place using an external GSS API-based plug-in security mechanism.

**WITH "comments"**

Describes the Db2 server. Any comment that helps to describe the server registered in the network directory can be entered. Maximum length is 30 characters. A carriage return or a line feed character is not permitted. The comment text must be enclosed by double quotation marks.

**USER *username***

Specifies the user's LDAP distinguished name (DN). The LDAP user DN must have sufficient authority to create the object in the LDAP directory. If the user's LDAP DN is not specified, the credentials of the current logon user will be used. If the user's LDAP DN and password have been specified using **db2lcfg**, the user name and password do not have to be specified here.

**PASSWORD *password***

Account password. If the user's LDAP DN and password have been specified using **db2lcfg**, the user name and password do not have to be specified here.

## Usage notes

If the node name is not specified, Db2 will use the first node in LDAP that represents the Db2 server on the current machine.

It might be necessary to manually register (catalog) the database in LDAP if:

- The database server does not support LDAP. The administrator must manually register each database in LDAP to allow clients that support LDAP to access the database without having to catalog the database locally on each client machine.
- The application wants to use a different name to connect to the database. In this case, the administrator can catalog the database using a different alias name.
- The database resides at the host or System i database server. In this case, the administrator can register the database in LDAP and specify the gateway node through the **GWNODE** parameter.
- During CREATE DATABASE IN LDAP the database name already exists in LDAP. The database is still created on the local machine (and can be accessed by local applications), but the existing entry in LDAP will not be modified to reflect the new database. In this case, the administrator can:
  - Remove the existing database entry in LDAP and manually register the new database in LDAP.
  - Register the new database in LDAP using a different alias name.

## CATALOG LDAP NODE

Catalogs a new node entry in Lightweight Directory Access Protocol (LDAP).

### Authorization

None

### Required connection

None

### Command syntax

```
►►CATALOG LDAP—NODE—nodename—AS—nodealias—————►
 ►►[USER—username]————[PASSWORD—password]————►
```

### Command parameters

#### **NODE** *nodename*

Specifies the LDAP node name of the Db2 server.

#### **AS** *nodealias*

Specifies a new alias name for the LDAP node entry.

#### **USER** *username*

Specifies the user's LDAP distinguished name (DN). The LDAP user DN must have sufficient authority to create the object in the LDAP directory. If the user's LDAP DN is not specified, the credentials of the current logon user will be used.

#### **PASSWORD** *password*

Account password.

## Usage notes

The **CATALOG LDAP NODE** command is used to specify a different alias name for the node that represents the Db2 server.

## CATALOG LOCAL NODE

Creates a local alias for an instance that resides on the same machine. A local node should be cataloged when there is more than one instance on the same workstation to be accessed from the user's client. Interprocess Communications (IPC) is used to access the local node.

### Authorization

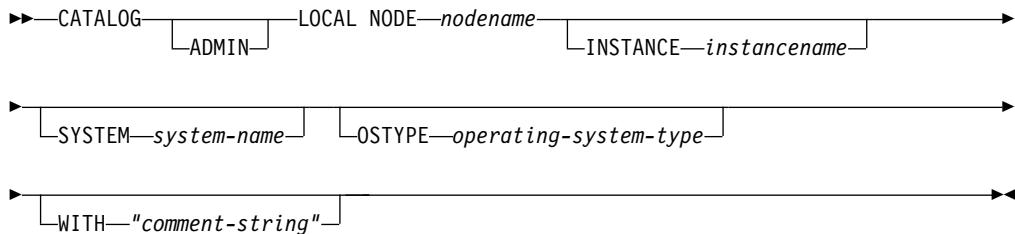
One of the following authorities:

- SYSADM
- SYSCTRL

### Required connection

None

### Command syntax



### Command parameters

#### ADMIN

Specifies that a local administration server node is to be catalogued.

#### INSTANCE *instancename*

Name of the local instance to be accessed.

#### SYSTEM *system-name*

Specifies the Db2 system name that is used to identify the server machine.

#### OSTYPE *operating-system-type*

Specifies the operating system type of the server machine. Valid values are: AIX, WIN, HPUX, SUN, OS390, OS400, VM, VSE, SNI, SCO, LINUX and DYNIX.

## Examples

Workstation A has two server instances, *inst1* and *inst2*. To create databases at both instances from a single CLP session, issue the following sequence of commands (assume the **DB2INSTANCE** environment variable is set to *inst1*):

1. Create a local database at *inst1*:

```
db2 create database mydb1
```

2. Catalog another server instance on this workstation:

```
db2 catalog local node mynode2 instance inst2
```

3. Create a database at mynode2:

```
db2 attach to mynode2
db2 create database mydb2
```

### Usage notes

If directory caching is enabled, database, node, and DCS directory files are cached in memory. An application's directory cache is created during its first directory lookup. Since the cache is only refreshed when the application modifies any of the directory files, directory changes made by other applications might not be effective until the application has restarted.

To refresh the CLP's directory cache, use **TERMINATE**. To refresh the shared cache in Db2, stop (**db2stop**) and then restart (**db2start**) the database manager. To refresh the directory cache for another application, stop and then restart that application.

## CATALOG NAMED PIPE NODE

Adds a named pipe node entry to the node directory. The named pipe is used to access the remote node.

This command is available on Windows only.

### Authorization

One of the following authorities:

- SYSADM
- SYSCTRL

### Required connection

None

### Command syntax

```
►►—CATALOG—ADMIN—NPIPE NODE—nodename—REMOTE—computername—►
►—INSTANCE—instancename—SYSTEM—system-name—►
►—OSTYPE—operating-system-type— WITH—“comment-string”—►
```

### Command parameters

#### ADMIN

Specifies that an NPIPE administration server node is to be cataloged.

#### REMOTE *computername*

The computer name of the node on which the target database resides.  
Maximum length is 15 characters.

#### INSTANCE *instancename*

Name of the server instance on which the target database resides. Identical to the name of the remote named pipe, which is used to communicate with the remote node.

**SYSTEM** *system-name*

Specifies the Db2 system name that is used to identify the server machine.

**OSTYPE** *operating-system-type*

Specifies the operating system type of the server machine. Valid values are: AIX, WIN, HPUX, SUN, OS390, OS400, VM, VSE, SNI, SCO, and LINUX.

**Examples**

```
db2 catalog npipe node db2np1 remote nphost instance db2inst1
with "A remote named pipe node."
```

**Usage notes**

The database manager creates the node directory when the first node is cataloged (that is, when the first **CATALOG...NODE** command is issued). On a Windows client, it stores and maintains the node directory in the instance subdirectory where the client is installed. On an AIX client, it creates the node directory in the Db2 installation directory.

List the contents of the local node directory using the **LIST NODE DIRECTORY** command.

If directory caching is enabled (see the configuration parameter **dir\_cache** in the **GET DATABASE MANAGER CONFIGURATION** command), database, node, and DCS directory files are cached in memory. An application's directory cache is created during its first directory lookup. Since the cache is only refreshed when the application modifies any of the directory files, directory changes made by other applications might not be effective until the application has restarted.

To refresh the CLP's directory cache, use the **TERMINATE** command. To refresh the shared cache in Db2, stop (**db2stop**) and then restart (**db2start**) the database manager. To refresh the directory cache for another application, stop and then restart that application.

## **CATALOG ODBC DATA SOURCE**

Catalogs a user or system ODBC data source.

A *data source*, in ODBC (Open Database Connectivity) terminology, is a user-defined name for a specific database or file system. That name is used to access the database or file system through ODBC APIs. Either user or system data sources can be cataloged. A user data source is only visible to the user who cataloged it, whereas a system data source is visible to and can be used by all other users.

This command is available on Windows platforms only.

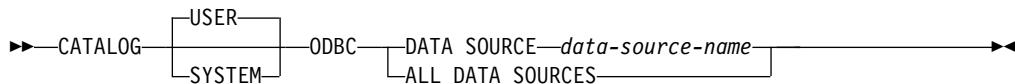
**Authorization**

None

**Required connection**

None

## Command syntax



## Command parameters

**USER** Catalog a user data source. This is the default if no keyword is specified.

**SYSTEM**

Catalog a system data source.

**DATA SOURCE *data-source-name***

Specifies the name of the data source to be cataloged. The name of the data source and the name of the database must be the same. Therefore, the name of the data source is limited to the maximum length for a database name.

**ALL DATA SOURCES**

Specifies to catalog all local database aliases as ODBC data sources (DSNs).

## Usage notes

On Microsoft Windows operating systems, you must execute the **CATALOG SYSTEM ODBC DATA SOURCE** command from a Db2 command window running with full administrator privileges.

Specifying the **ALL DATA SOURCES** parameter will not update an existing ODBC DSN that has set its dbalias parameter to a value that matches the alias of a database in the local database directory.

In Windows environments, the ODBC DSN must be restored after upgrading Db2. To import and export the ODBC DSN settings, use the **db2cfimp** command or the **db2cfexp** command, or add DSNs manually.

To CATALOG ODBC DATA SOURCE for 32bit CLI/ODBC Driver of 64bit Db2 installation on 64bit Windows environments, use **db2cli32.exe** executable with **registerdsn** option, instead of Db2 Command Line Tool.

To catalog a system data source, use the command:

```
db2cli32 registerdsn -add -dsn mydsn1 -system
```

To catalog user data source, use the command:

```
db2cli32 registerdsn -add -dsn mydsn1 -user
```

## Example 1

Assume there is an existing ODBC DSN named "MyProdDatabase". The dbalias parameter is set to "PRODDB". Assume there is also a database in the local directory with the alias "PRODDB". Executing the **CATALOG ODBC DATA SOURCE myproddatabase** command or the **CATALOG ODBC ALL DATA SOURCES** command will not alter the "MyProdDatabase" DSN because the DSN does not match the database alias. Instead, an ODBC DSN entry is created for "PRODDB" with the dbalias set to "PRODDB". If there is an existing ODBC DSN with the same name as

the database alias, the existing ODBC DSN's dbalias parameter will be updated with the database alias. All associated CLI parameters and values will remain unchanged.

### Example 2

Assume there is an existing DSN called "MYDB" that has the dbalias parameter set to "salesdb". If there is a database in the local directory named "MYDB" then executing the **CATALOG ODBC DATA SOURCE mydb** command or the **CATALOG ODBC ALL DATA SOURCES** command will change the DSN's dbalias parameter to "MYDB".

## CATALOG STORAGE ACCESS

Creates an alias for accessing remote storage on IBM SoftLayer Object Storage or Amazon Simple Storage Service (S3) directly with the **INGEST**, **LOAD**, **BACKUP DATABASE**, or **RESTORE DATABASE** commands. When you create a storage access alias, your remote storage account credentials are safely stored in an encrypted keystore.

**Note:** Storage access aliases and remote cloud storage are supported under Linux only.

### Authorization

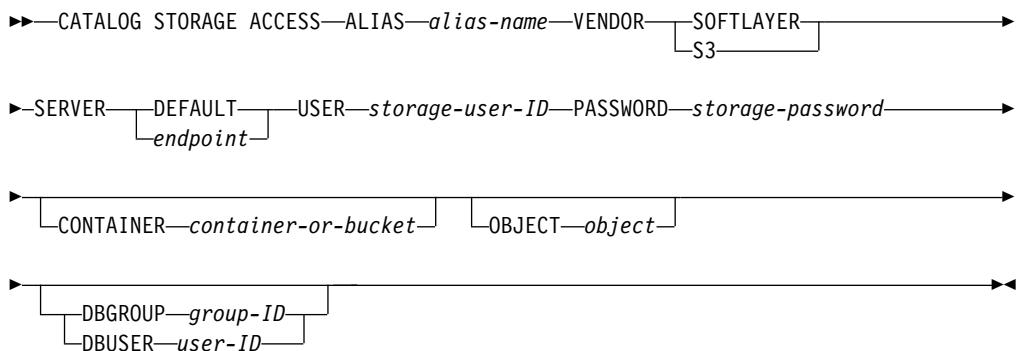
One of the following authorities:

- SYSADM
- SYSCTRL

### Required connection

None

### Command syntax



### Command parameters

#### ALIAS *alias-name*

Specifies the new alias name.

#### VENDOR ( **SOFTLAYER** | **S3** )

Specifies the type of the remote storage. Valid values include:

- SOFTLAYER - for IBM SoftLayer Object Storage
- S3 - for Amazon S3

**SERVER ( DEFAULT | *endpoint* )**

Specifies the *Authentication Endpoint* of the remote storage. Valid values include:

- DEFAULT - to use the SoftLayer endpoint in Dallas
- *endpoint* - to use the endpoint you choose

Only private endpoints are supported with the **CATALOG STORAGE ACCESS** command.

**USER *storage-user-ID***

Specifies the SoftLayer *Username* or S3 *Access Key ID* of the remote storage account.

**PASSWORD *storage-password***

Specifies the SoftLayer *API key* or S3 *Secret Access Key* of the remote storage account credentials.

**CONTAINER *container-or-bucket***

[Optional] Specifies a SoftLayer *container* or an S3 *bucket*.

**OBJECT *object***

[Optional] Specifies the name of the object (file) on the remote storage.

If you specify a file name with the OBJECT parameter when you issue the CATALOG STORAGE ALIAS command, then you don't need to specify the file name with the db2remote:// string when you use the alias in the BACKUP, RESTORE, LOAD, or INGEST command.

**DBGROUP *group-ID***

[Optional] Specifies the user group that may access the alias. For more information about users and groups see: Db2 users and groups

If neither **DBUSER** nor **DBGROUP** is specified, only users with SYSADM authority may use the alias.

**DBUSER *user-ID***

[Optional] Specifies the user ID that may access the alias.

If neither **DBUSER** nor **DBGROUP** is specified, only users with SYSADM authority may use the alias.

## Example

Creating an alias called "montrealprivate" which only the user "thomas" may use for accessing a container called "container1" which was previously created on the SoftLayer private authentication endpoint in Montreal:

```
catalog storage access alias montrealprivate vendor softlayer
 server https://mon01.objectstorage.service.networklayer.com/auth/v1.0/
 user SLOS482762-5:SL729462
 password a1b635c2556681ddd8354daa2db1dbc88bb6da3311c8904319058a9434169c3
 container container1 dbuser thomas
```

Using the alias created above and the following remote storage format:

DB2REMOTE://<alias>/<container>/<storage-path>

A backup to the database can be created in one of the following ways:

- backup db testdb to DB2REMOTE://montrealprivate//bkupDir11/1453245697
- backup db testdb to DB2REMOTE://montrealprivate/container1/bkupDir11/1453245697

## Usage notes

### Keystore required

When you issue the **CATALOG STORAGE ACCESS** command, remote storage account credentials are stored in a keystore:

- If the Db2 instance is already configured to store master keys in a keystore for Db2 native encryption, then the same keystore will be used to store the remote storage account credentials.
- If the instance is not configured for Db2 native encryption, then you must create a keystore for the remote storage account credentials before you can create storage access aliases:
  1. Create a local keystore
  2. Configure the Db2 instance to use the keystore

### Looking up remote storage details

- You can look up the SoftLayer account credentials and Authentication Endpoint by logging in to the SoftLayer Customer Portal, selecting "Object Storage" from the Storage drop-down menu, navigating to the container in the Object Storage page, and then clicking the "View Credentials" link.
- You can look up Amazon S3 Account Key IDs by logging in to the AWS Management Console, selecting "S3", selecting the "IAM" option in the "Security & Identity" section of the "Security" drop-down menu, selecting "Users" from the navigation menu, and then clicking on the "Security Credentials" tab. However, although Secret Access Key information is available when you create a new user, you cannot retrieve Secret Access Keys for an existing user. For more information see: Managing Access Keys for IAM Users.
- You can look up the endpoint for an S3 bucket by logging in to the AWS Management Console, selecting "S3", selecting the bucket, clicking on the "Properties" button to see the Region, and then looking up that Region in the following "Amazon Simple Storage Service (Amazon S3)" table on this web page: AWS Regions and Endpoints.

### Managing storage access aliases

You can manage storage access aliases by using some related commands:

- List storage access aliases that you can use:  
`list storage access`

When members with SYSADM authority issue this command, they can see all storage access aliases even though they can only use storage access aliases created for their group or user ID.

- Remove a storage access alias:  
`uncatalog storage access alias <alias>`
- Rotate the master key in the keystore:  
`rotate master key for storage access`

## CATALOG TCPIP/TCPIP4/TCPIP6 NODE

Adds a Transmission Control Protocol/Internet Protocol (TCP/IP) database partition server entry to the node directory. The TCP/IP communications protocol is used to access the remote database partition server. The **CATALOG TCPIP/TCPIP4/TCPIP6 NODE** command is run on a client.

**Note:** Starting with the Db2 Version 10.1 release, the AIX 5.3 operating system is not supported. Db2 Version 9.7 is the last release to support the AIX 5.3 operating system. The AIX 6.1 operating system is the minimum supported level.

## Authorization

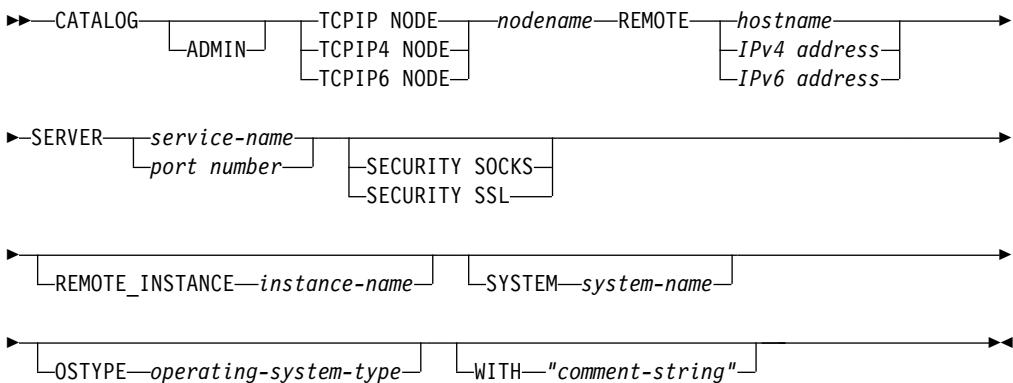
one of the following authorities:

- SYSADM
- SYSCTRL

## Required connection

None. Directory operations affect the local directory only.

## Command syntax



## Command parameters

**ADMIN** Specifies that a TCP/IP administration server node is to be cataloged. This parameter cannot be specified if the **SECURITY SOCKS** parameter is specified.

### TCPIP NODE *nodename*

The nodename of the TCPIP, TCPIP4, or TCPIP6 database partition server represents a local nickname you can set for the machine that contains the database you want to catalog. Only specify **TCPIP4** when specifying an IPv4 IP address, and only specify **TCPIP6** when specifying an IPv6 IP address. The maximum length of the *nodename* is 8 characters.

### REMOTE *hostname* | *IPv4 address* | *IPv6 address*

The hostname or the IP address of the node where the target database resides. *IP address* can be an IPv4 or IPv6 address. The hostname is the name of the database partition server that is known to the TCP/IP network. The maximum length of the hostname is 255 characters.

### SERVER *service-name* | *port number*

Specifies the service name or the port number of the server database manager instance. The maximum length is 14 characters. This parameter is case sensitive.

If a service name is specified, the services file on the client is used to map the service name to a port number. A service name is specified in the server's database manager configuration file, and the services file on the server is used to map this service name to a port number. The port number on the client and the server must match.

A port number, instead of a service name, can be specified in the database manager configuration file on the server, but this is not recommended. If a port number is specified, no service name needs to be specified in the local services file.

This parameter must not be specified for ADMIN nodes, but is mandatory for non-ADMIN nodes. The value on ADMIN nodes is always 523.

#### **SECURITY SOCKS**

Specifies that the node will be SOCKS-enabled. This parameter is only supported for IPv4. If **CATALOG TCPIP NODE** is used and **SECURITY SOCKS** is specified, the Db2 database product will use IPv4 to establish the connection. This parameter cannot be specified if the **ADMIN** parameter is specified.

The following environment variables are mandatory and *must* be set to enable SOCKS:

##### **SOCKS\_NS**

The Domain Name Server for resolving the host address of the SOCKS server. This should be a hostname or IPv4 address.

##### **SOCKS\_SERVER**

The fully qualified hostname or IPv4 address of the SOCKS server. If the SOCKSified IBM Data Server Client is unable to resolve the fully qualified hostname, it assumes that an IPv4 address has been entered.

One of the following conditions should be true:

- The SOCKS server is reachable via the domain name server.
- The hostname is listed in the hosts file. The location of this file is described in the TCP/IP documentation.
- An IPv4 address is specified.

If this command is issued after a **db2start**, it is necessary to issue a **TERMINATE** command to have the command take effect.

#### **SECURITY SSL**

Specifies that the node is SSL enabled. You cannot specify the **SECURITY SSL** clause if you also specify the **ADMIN** parameter.

#### **REMOTE\_INSTANCE *instance-name***

Specifies the name of the server instance where the database resides, and to which an attachment or connection is being made.

#### **SYSTEM *system-name***

Specifies the Db2 system name that is used to identify the server machine. This is the name of the physical machine, server system, or workstation.

#### **OSTYPE *operating-system-type***

Specifies the operating system type of the server machine. Valid values are: AIX, WIN, HPUX, SUN, OS390, OS400, VM, VSE, and LINUX.

#### **WITH *comment-string***

Describes the database entry in the database directory. Any comment that helps to describe the database can be entered. Maximum length is 30 characters. A carriage return or a line feed character is not permitted. The comment text must be enclosed by single or double quotation marks.

## Examples

To specify a hostname using the **CATALOG TCPIP NODE** command, issue:

```
db2 catalog tcPIP node db2tcp1 remote hostname server db2inst1
with "Look up IPv4 or IPv6 address from hostname"
```

To specify an IPv4 address using the **CATALOG TCPIP4 NODE** command, issue:

```
db2 catalog tcPIP4 node db2tcp2 remote 192.0.32.67 server db2inst1
with "Look up IPv4 address from 192.0.32.67"
```

This example specifies an IPv4 address. You should not specify an IPv6 address in the **CATALOG TCPIP4 NODE** command. The catalog will not fail if you do, but a subsequent attach or connect will fail because an invalid address was specified during cataloging.

To specify an IPv6 address using the **CATALOG TCPIP6 NODE** command, issue:

```
db2 catalog tcPIP6 node db2tcp3 1080:0:0:0:8:800:200C:417A server 50000
with "Look up IPv6 address from 1080:0:0:0:8:800:200C:417A"
```

This example specifies an IPv6 address and a port number for **SERVER**. You should not specify an IPv6 address in the **CATALOG TCPIP4 NODE** command. The catalog will not fail if you do, but a subsequent attach or connect will fail because an invalid address was specified during cataloging.

The following example catalogs a node for an SSL connection (the server hostname is *hostname*, and *ssl\_port* is the port number at which this database server waits for communication from remote client nodes using the SSL protocol):

```
db2 catalog tcPIP node db2tcp4 remote hostname server ssl_port
```

## Usage notes

The database manager creates the node directory when the first node is cataloged (that is, when the first **CATALOG...NODE** command is issued). On a Windows client, it stores and maintains the node directory in the instance subdirectory where the client is installed. On an AIX client, it creates the node directory in the Db2 installation directory.

List the contents of the local node directory using the **LIST NODE DIRECTORY** command.

If directory caching is enabled, database, node, and DCS directory files are cached in memory. An application's directory cache is created during its first directory lookup. Since the cache is only refreshed when the application modifies any of the directory files, directory changes made by other applications might not be effective until the application has restarted.

To refresh the CLP's directory cache, use the **TERMINATE** command. To refresh Db2's shared cache, stop (**db2stop**) and then restart (**db2start**) the database manager. To refresh the directory cache for another application, stop and then restart that application.

To get the Db2 database manager to listen on IPv6, the operating system and server must first be configured for IPv6. Speak to your system administrator to ensure this configuration has been done before cataloging an IPv6 TCPIP node. Follow Upgrading to IPv6 with IPv4 configured to see how this can be done on AIX.

## CHANGE DATABASE COMMENT

Changes a database comment in the system database directory or the local database directory. New comment text can be substituted for text currently associated with a comment.

### Scope

This command only affects the database partition on which it is executed.

### Authorization

One of the following authorities:

- SYSADM
- SYSCTRL

### Required connection

None

### Command syntax

```
►►—CHANGE—DATABASE—DB—database-alias—COMMENT—ON—path—drive—►
►►—WITH—"comment-string"—►►
```

### Command parameters

#### DATABASE *database-alias*

Specifies the alias of the database whose comment is to be changed. To change the comment in the system database directory, specify the alias for the database. To change the comment in the local database directory, specify the path where the database resides (with the *path* parameter), and enter the name (not the alias) of the database.

#### ON *path* | *drive*

Specifies the path on which the database resides, and changes the comment in the local database directory. If a path is not specified, the database comment for the entry in the system database directory is changed. On Windows operating systems, may instead specify the letter of the drive on which the database resides (if it was created on a drive, not on a specific path).

#### WITH "*comment-string*"

Describes the entry in the system database directory or the local database directory. Any comment that helps to describe the cataloged database can be entered. The maximum length of a comment string is 30 characters. A carriage return or a line feed character is not permitted. The comment text must be enclosed by double quotation marks.

### Examples

The following example changes the text in the system database directory comment for the SAMPLE database from "Test 2 - Holding" to "Test 2 - Add employee info rows":

```
db2 change database sample comment
with " 'Test 2 - Add employee inf rows' "
```

### Usage notes

New comment text replaces existing text. To append information, enter the old comment text, followed by the new text.

Only the comment for an entry associated with the database alias is modified. Other entries with the same database name, but with different aliases, are not affected.

If the path is specified, the database alias must be cataloged in the local database directory. If the path is not specified, the database alias must be cataloged in the system database directory.

## CHANGE ISOLATION LEVEL

Changes the way that Db2 isolates data from other processes while a database is being accessed.

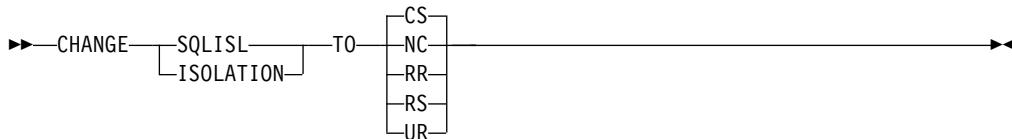
### Authorization

None

### Required connection

None

### Command syntax



### Command parameters

#### TO

- CS** Specifies cursor stability as the isolation level.
- NC** Specifies no commit as the isolation level. Not supported by Db2.
- RR** Specifies repeatable read as the isolation level.
- RS** Specifies read stability as the isolation level.
- UR** Specifies uncommitted read as the isolation level.

### Usage notes

Db2 uses isolation levels to maintain data integrity in a database. The isolation level defines the degree to which an application process is isolated (shielded) from changes made by other concurrently executing application processes.

If a selected isolation level is not supported by a database, it is automatically escalated to a supported level at connect time.

Isolation level changes are not permitted while connected to a database with a type 1 connection. The back end process must be terminated before isolation level can be changed:

```
db2 terminate
db2 change isolation to ur
db2 connect to sample
```

Changes are permitted using a type 2 connection, but should be made with caution, because the changes will apply to every connection made from the same command line processor back-end process. The user assumes responsibility for remembering which isolation level applies to which connected database.

In the following example, a user is in Db2 interactive mode following creation of the SAMPLE database:

```
update command options using c off
catalog db sample as sample2

set client connect 2

connect to sample
connect to sample2

change isolation to cs
set connection sample
declare c1 cursor for select * from org
open c1
fetch c1 for 3 rows

change isolation to rr
fetch c1 for 2 rows
```

An SQL0514N error occurs because c1 is not in a prepared state for this isolation level.

```
change isolation to cs
set connection sample2
fetch c1 for 2 rows
```

An SQL0514N error occurs because c1 is not in a prepared state for this database.

```
declare c1 cursor for select division from org
```

A DB21029E error occurs because cursor c1 has already been declared and opened.

```
set connection sample
fetch c1 for 2 rows
```

This works because the original database (SAMPLE) was used with the original isolation level (CS).

## COMPLETE XMLSCHEMA

Completes the process of registering an XML schema in the XML schema repository (XSR).

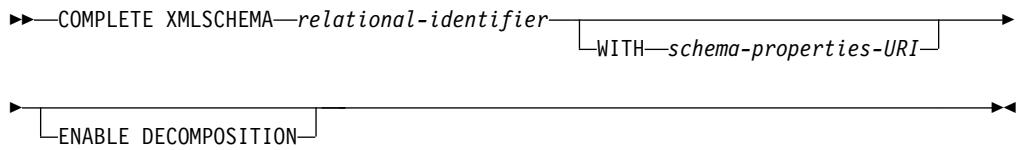
### Authorization

- The user ID must be the owner of the XSR object as recorded in the catalog view SYSCAT.XSROBJECTS.

### Required connection

Database

## Command syntax



## Description

### *relational-identifier*

Specifies the relational name of an XML schema previously registered with the **REGISTER XMLSCHEMA** command. The relational name can be specified as a two-part SQL identifier, consisting of the SQL schema and the XML schema name, having the following format: *SQLschema.name*. The default SQL schema, as defined in the CURRENT SCHEMA special register, is used if no schema is specified.

### **WITH** *schema-properties-URI*

Specifies the uniform resource identifier (URI) of a properties document for the XML schema. Only a local file, specified by a file scheme URI, is supported. A schema property document can only be specified during the completion stage of XML schema registration.

### **ENABLE DECOMPOSITION**

Indicates that the schema can be used for decomposing XML instance documents.

## Example

```
COMPLETE XMLSCHEMA user1.POschema WITH 'file:///c:/TEMP/schemaProp.xml'
```

## Usage notes

An XML schema cannot be referenced or used for validation or annotation until the XML schema registration process has been completed. This command completes the XML schema registration process for an XML schema that was begun with the **REGISTER XMLSCHEMA** command.

## CREATE DATABASE

Initializes a new database with an optional user-defined collating sequence, creates the three initial table spaces, creates the system tables, and allocates the recovery log file. When you initialize a new database, the **AUTOCONFIGURE** command is issued by default.

**Note:** When the instance and database directories are created by the Db2 database manager, the permissions are accurate and should not be changed.

When the **CREATE DATABASE** command is issued, the Configuration Advisor also runs automatically. This means that the database configuration parameters are automatically tuned for you according to your system resources. In addition, Automated Runstats is enabled. To disable the Configuration Advisor from running at database creation, refer to the **DB2\_ENABLE\_AUTOCONFIG\_DEFAULT** registry variable. To disable Automated Runstats, refer to the **auto\_runstats** database configuration parameter.

Adaptive Self Tuning Memory is also enabled by default for single partition databases. To disable Adaptive Self Tuning Memory by default, refer to the **self\_tuning\_mem** database configuration parameter. For multi-partition databases, Adaptive Self Tuning Memory is disabled by default.

If no code set is specified on the **CREATE DATABASE** command, then the collations that are allowed are: SYSTEM, IDENTITY\_16BIT, *language-aware-collation*, and *locale-sensitivity-collation* (SQLCODE -1083). The default code set for a database is UTF-8. If a particular code set and territory is needed for a database, the required code set and territory should be specified in the **CREATE DATABASE** command.

This command is not valid on a client.

## Scope

In a partitioned database environment, this command affects all database partitions that are listed in the db2nodes.cfg file.

The database partition from which this command is issued becomes the catalog database partition for the new database.

## Authorization

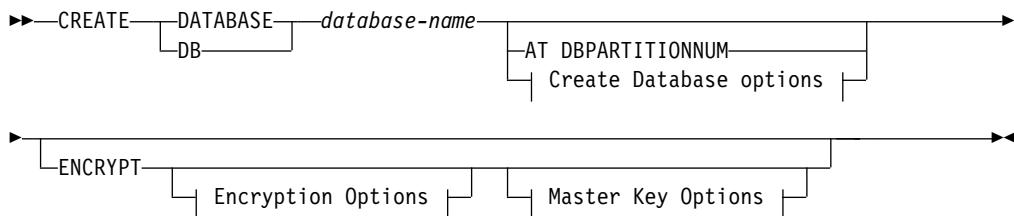
You must have one of the following authorities:

- SYSADM
- SYSCTRL

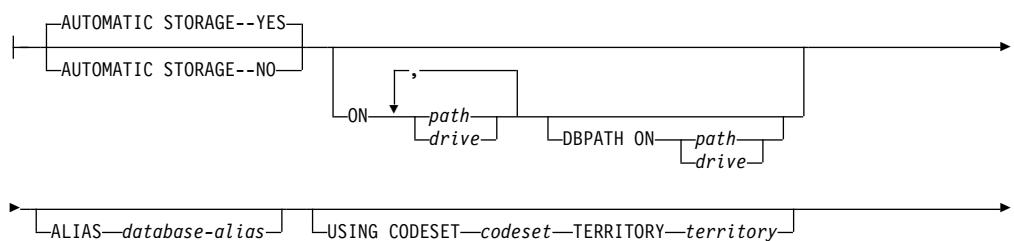
## Required connection

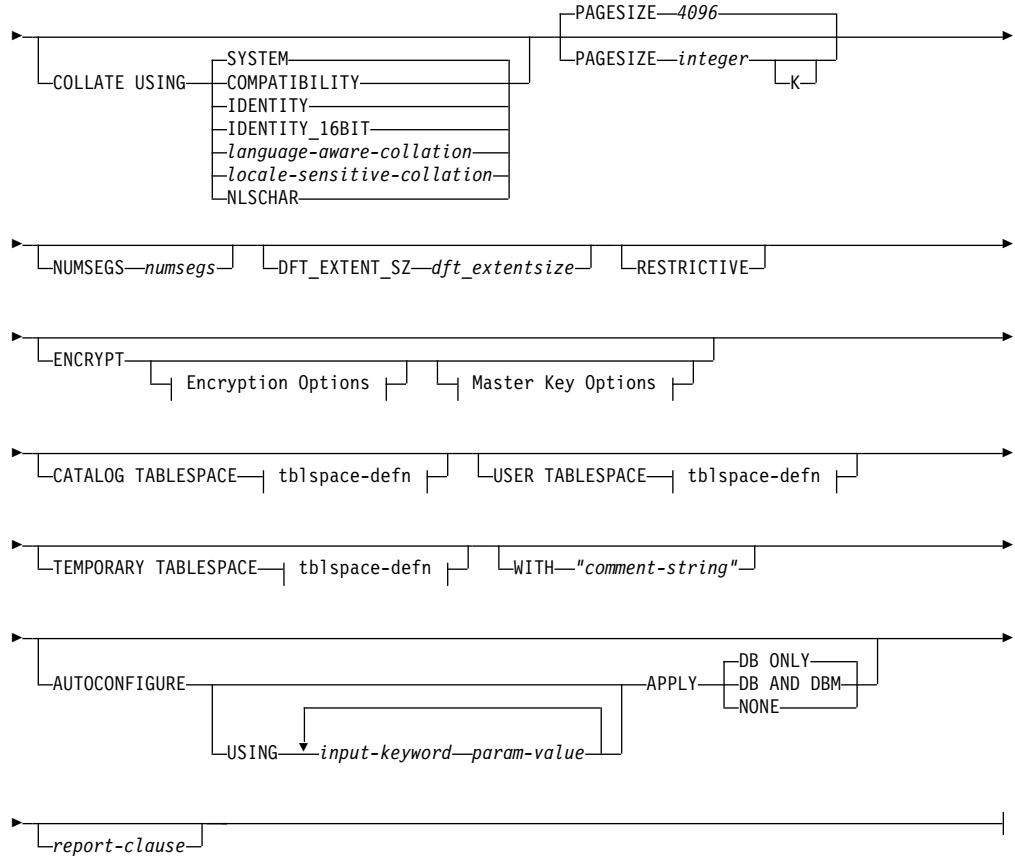
Instance. To create a database at another (remote) database partition server, you must first attach to that server. A database connection is temporarily established by this command during processing.

## Command syntax

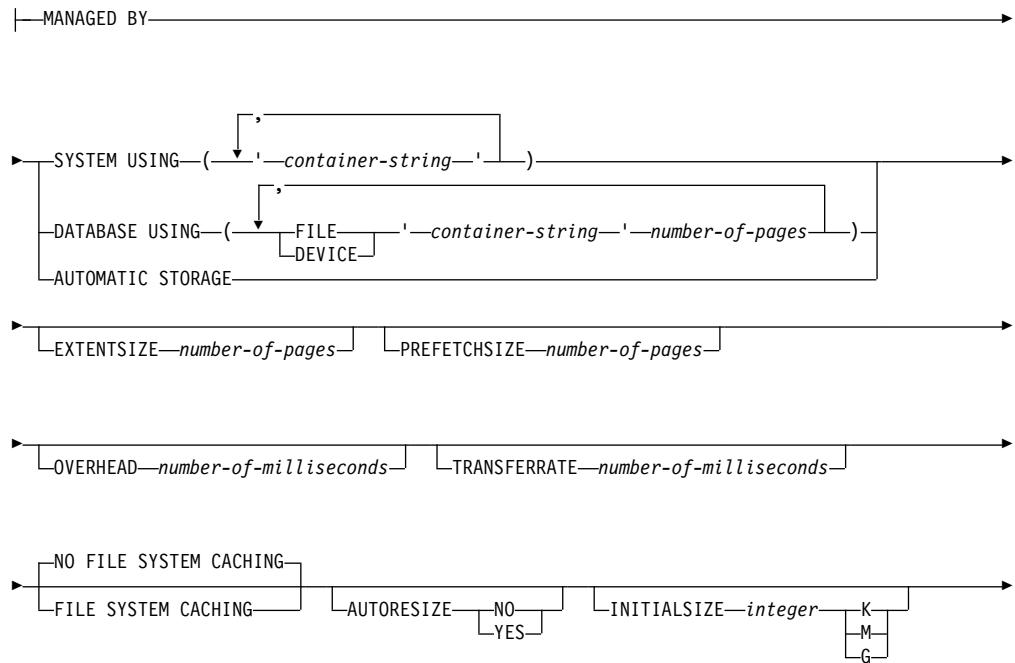


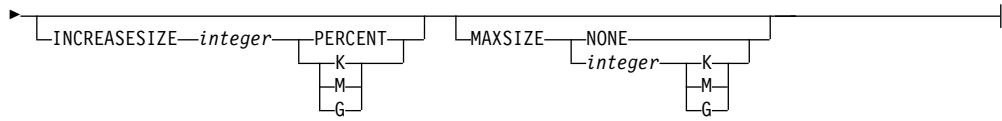
### Create Database options:



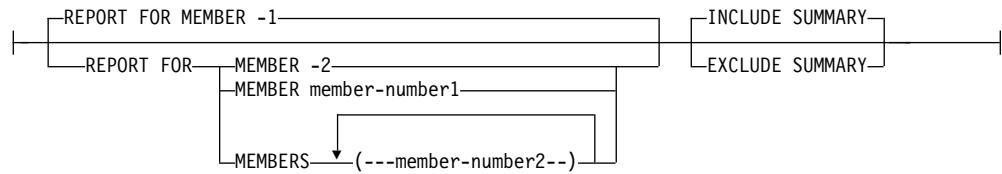


#### Tblspace-defn:

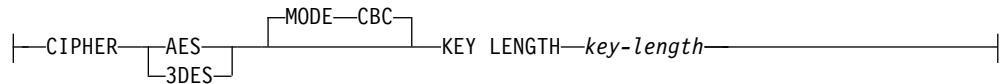




### Report-clause:



### Encryption Options:



### Master Key Options:



### Note:

1. The combination of the code set and territory values must be valid.
2. Not all collating sequences are valid with every code set and territory combination.
3. The table space definitions that are specified on **CREATE DATABASE** apply to all database partitions on which the database is being created. They cannot be specified separately for each database partition. If the table space definitions are to be created differently on particular database partitions, the **CREATE TABLESPACE** statement must be used.  
When defining containers for table spaces, \$N can be used. \$N will be replaced by the database partition number when the container is actually created. This is required if the user wants to specify containers in a multiple logical partition database.
4. The **AUTOCONFIGURE** parameter requires SYSADM authority.

## Command parameters

### DATABASE *database-name*

A name to be assigned to the new database. This must be a unique name that differentiates the database from any other database in either the local database directory or the system database directory. The name must conform to naming conventions for databases. Specifically, the name must not contain any space characters.

### AT DBPARTITIONNUM

Specifies that the database is to be created only on the database partition that issues the command. You do not specify this parameter when you create a new database. You can use it to re-create a database partition that

you dropped because it was damaged. After you use the **CREATE DATABASE** command with the **AT DBPARTITIONNUM** parameter, the database at this database partition is in the restore-pending state. You must immediately restore the database on this database partition server. This parameter is not intended for general use. For example, it should be used with **RESTORE DATABASE** command if the database partition at a database partition server was damaged and must be re-created. Improper use of this parameter can cause inconsistencies in the system, so it should only be used with caution.

If this parameter is used to re-create a database partition that was dropped (because it was damaged), the database at this database partition will be in the restore-pending state. After re-creating the database partition, the database must immediately be restored on this database partition.

#### **AUTOMATIC STORAGE NO | YES**

Specifies that automatic storage is being explicitly disabled or enabled for the database. The default value is YES. If the **AUTOMATIC STORAGE** clause is not specified, automatic storage is implicitly enabled by default.

- NO** Automatic storage is not being enabled for the database. This parameter cannot be specified in a Db2 pureScale environment.
- YES** Automatic storage is being enabled for the database. The default storage group, IBMSTOGROUP, is created in the SYSSTOGROUPS catalog table. To modify a storage group, use the ALTER STOGROUP statement.

**Important:** This parameter has been deprecated and might be removed in a future release. Once removed, AUTOMATIC STORAGE YES will be the only option.

#### **ON path or drive**

The meaning of this parameter depends on the value of the **AUTOMATIC STORAGE** parameter.

- If **AUTOMATIC STORAGE NO** is specified, automatic storage is disabled for the database. In this case, only one path can be included as part of the **ON** parameter, and it specifies the path on which to create the database. If a path is not specified, the database is created on the default database path that is specified in the database manager configuration file (**dftdbpath** parameter).
- Otherwise, automatic storage is enabled for the database by default. In this case, multiple paths may be listed here, each separated by a comma. These are referred to as storage paths defined to the default storage group IBMSTOGROUP and are used to hold table space containers for automatic storage table spaces. For multi-partition databases, the same storage paths will be used on all partitions.

The **DBPATH ON** parameter specifies on which paths to create the database. If the **DBPATH ON** parameter is not specified, the database is created on the first path listed in the **ON** parameter. If no paths are specified with the **ON** parameter, the database is created on the default database path that is specified in the database manager configuration file (**dftdbpath** parameter). This will also be used as the location for the single storage path that is associated with the default storage group.

The database path is the location where a hierarchical directory structure is created. The structure holds the following files that are needed for the operation of the database:

- Buffer pool information

- Table space information
- Storage path information
- Database configuration information
- History file information regarding backups, restores, loading of tables, reorganization of tables, altering of table spaces, and other database changes
- Log control files with information about active logs

The **DBPATH ON** parameter can be used to place these files and information in a directory that is separate from the storage paths where the database data is kept. It is suggested that the **DBPATH ON** parameter be used when automatic storage is enabled to keep the database information separate from the database data.

The maximum length of a path is 175 characters.

For a partitioned database environment, a database should not be created in an NFS-mounted directory. If a path is not specified, ensure that the **dftdbpath** database manager configuration parameter is not set to an NFS-mounted path (for example, on UNIX operating systems, it should not specify the \$HOME directory of the instance owner). The path that is specified for this command in a partitioned database environment cannot be a relative path. Also, all paths that are specified as part of the **ON** parameter must exist on all database partitions.

A given database path or storage path must exist and be accessible on each database partition.

#### **DBPATH ON** *path or drive*

If automatic storage is enabled, the **DBPATH ON** parameter specifies the path on which to create the database. If automatic storage is enabled and the **DBPATH ON** parameter is not specified, the database is created on the first path that is listed with the **ON** parameter.

The maximum length of a database path is 215 characters and the maximum length of a storage path is 175 characters.

#### **ALIAS** *database-alias*

An alias for the database in the system database directory. If no alias is provided, the specified database name is used.

#### **USING CODESET** *codeset*

Specifies the code set to be used for data entered into this database. After you create the database, you cannot change the specified code set.

#### **TERRITORY** *territory*

Specifies the territory identifier or locale identifier to be used for data entered into this database. After you create the database, you cannot change the specified territory. The combination of the code set and territory or locale values must be valid.

#### **COLLATE USING**

Identifies the type of collating sequence to be used for the database. Once the database has been created, the collating sequence cannot be changed.

In a Unicode database, the catalog tables and views are always created with the IDENTITY collation, regardless of the collation specified in the COLLATE USING clause. In non-Unicode databases, the catalog tables and views are created with the database collation.

## **COMPATIBILITY**

The Db2 Version 2 collating sequence. Some collation tables have been enhanced. This parameter specifies that the previous version of these tables is to be used.

## **IDENTITY**

Identity collating sequence, in which strings are compared byte for byte.

## **IDENTITY\_16BIT**

CESU-8 (Compatibility Encoding Scheme for UTF-16: 8-Bit) collation sequence as specified by the Unicode Technical Report #26, which is available at the Unicode Consortium website ([www.unicode.org](http://www.unicode.org)). This parameter can only be specified when creating a Unicode database.

### *language-aware-collation*

This parameter can only be used for Unicode databases. The database collating sequence is based on the SYSTEM collation for a non-Unicode database. This string must be of the format `SYSTEM_codepage_territory`. If the string supplied is invalid, the create database will fail (SQLCODE -204; object not found). See “Language-aware collations for Unicode data” for more information and for the naming of system-based collations.

**Note:** When the **CREATE DATABASE** command is performed against a Version 9.0 server, this parameter cannot be used. By default, a Unicode database on such a server will be created with SYSTEM collation.

### *locale-sensitive-collation*

This parameter can only be used for Unicode databases. See “Unicode Collation Algorithm based collations” for more information and for the naming of locale-sensitive UCA-based collations. If the collation name provided is invalid, the **CREATE DATABASE** command execution will fail (SQLCODE -204).

## **NLSCHAR**

Built-in collating sequence using the unique collation rules for the specific code set/territory.

This parameter can only be used with the Thai code page (CP874). If this parameter is specified in non-Thai environments, the command will fail and return the error SQL1083N with Reason Code 4.

**SYSTEM** This is the default parameter when creating a database. For non-Unicode databases, the collating sequence is based on the database territory. For Unicode databases, this parameter maps to a language-aware collation, based on the client code set and territory. If an appropriate language-aware collation is unavailable, then the IDENTITY collation is used.

## **PAGESIZE *integer***

Specifies the page size of the default buffer pool along with the initial table spaces (SYSCATSPACE, TEMPSPACE1, USERSPACE1) when the database is created. This also represents the default page size for all future CREATE BUFFERPOOL and CREATE TABLESPACE statements. The valid values for integer without the suffix K are 4 096, 8 192, 16 384, or 32 768. The valid

values for integer with the suffix K are 4, 8, 16, or 32. At least one space is required between the integer and the suffix K. The default is a page size of 4 096 bytes (4 K).

A 4- or 8-KB page size is generally suitable for an online transaction processing (OLTP) environment, and a 16- or 32-KB page size is appropriate for analytics. A 32-KB page size is recommended for column-organized tables.

#### **NUMSEGS** *numseg*

Specifies the number of directories (table space containers) that will be created and used to store the database table files for any default SMS table spaces. This parameter does not affect automatic storage table spaces, DMS table spaces, any SMS table spaces with explicit creation characteristics (created when the database is created), or any SMS table spaces that are explicitly created after the database is created.

#### **DFT\_EXTENT\_SZ** *dft\_extentsize*

Specifies the default extent size of table spaces in the database.

#### **RESTRICTIVE**

If the **RESTRICTIVE** parameter is present, it causes the **restrict\_access** database configuration parameter to be set to YES and no privileges or authorities are automatically granted to PUBLIC. If the **RESTRICTIVE** parameter is not present, then the **restrict\_access** database configuration parameter is set to NO and privileges are automatically granted to PUBLIC. For information about privileges, see: "Default privileges granted on creating a database".

#### **ENCRYPT**

Specifies that the database is to be encrypted. Encryption includes all system, user, and temporary table spaces, indexes, and all transaction log data. All data types within those table spaces are encrypted, including long field data, LOBs, and XML data.

#### **CIPHER**

Specifies the encryption algorithm that is to be used for encrypting the database. You can choose one of the following FIPS 140-2 approved options:

**AES** Advanced Encryption Standard (AES) algorithm. This is the default.

**3DES** Triple Data Encryption Standard (3DES) algorithm.

#### **MODE CBC**

Specifies the encryption algorithm mode that is to be used for encrypting the database. CBC (Cipher Block Chaining) is the default mode.

#### **KEY LENGTH** *key-length*

Specifies the length of the key that is to be used for encrypting the database. The length can be one of the following values, specified in bits:

**128** Available with AES only

**168** Available with 3DES only

**192** Available with AES only

**256** Available with AES only. This is the default.

## MASTER KEY LABEL

Specifies a label for the master key that is used to protect the key that is used to encrypt the database. The encryption algorithm that is used for encrypting with the master key is always AES. If the master key is automatically generated by the Db2 data server, it is always a 256-bit key.

### *label-name*

Uniquely identifies the master key within the keystore that is identified by the value of the **keystore\_location** database manager configuration parameter. The maximum length of *label-name* is 255 bytes.

If a master key label is not specified, the database manager automatically generates a master key label, and a master key is generated and inserted into the keystore.

### Note:

When the **allow\_key\_insert\_without\_keystore\_backup** configuration knob is off, you cannot use the automatically generated master key.

## CATALOG TABLESPACE *tblspace-defn*

Specifies the definition of the table space that will hold the catalog tables, SYSCATSPACE. If not specified and automatic storage is not enabled for the database, SYSCATSPACE is created as a System Managed Space (SMS) table space with **NUMSEGS** number of directories as containers, and with an extent size of **DFT\_EXTENTSIZE**. For example, the following containers would be created if **NUMSEGS** were specified to be 5:

```
/u smith smith/NODE0000/SQL00001/SQLT0000.0
/u smith smith/NODE0000/SQL00001/SQLT0000.1
/u smith smith/NODE0000/SQL00001/SQLT0000.2
/u smith smith/NODE0000/SQL00001/SQLT0000.3
/u smith smith/NODE0000/SQL00001/SQLT0000.4
```

If not specified and automatic storage is enabled for the database, SYSCATSPACE is created as an automatic storage table space with its containers created on the defined storage paths. The extent size of this table space is 4. Appropriate values for **AUTORESIZE**, **INITIALSIZE**, **INCREASESIZE**, and **MAXSIZE** are set automatically.

See “CREATE TABLESPACE statement” for more information about the table space definition fields.

In a partitioned database environment, the catalog table space is only created on the catalog database partition, the database partition on which the **CREATE DATABASE** command is issued.

## USER TABLESPACE *tblspace-defn*

Specifies the definition of the initial user table space, USERSPACE1. If not specified and automatic storage is not enabled for the database, USERSPACE1 is created as an SMS table space with **NUMSEGS** number of directories as containers and with an extent size of **DFT\_EXTENTSIZE**. For example, the following containers would be created if **NUMSEGS** were specified to be 5:

```
/u smith smith/NODE0000/SQL00001/SQLT0001.0
/u smith smith/NODE0000/SQL00001/SQLT0002.1
/u smith smith/NODE0000/SQL00001/SQLT0002.2
/u smith smith/NODE0000/SQL00001/SQLT0002.3
/u smith smith/NODE0000/SQL00001/SQLT0002.4
```

If not specified and automatic storage is enabled for the database, USERSPACE1 is created as an automatic storage table space with its containers created on the defined storage paths. The extent size of this table space will be **DFT\_EXTENTSIZE**. Appropriate values for **AUTORESIZE**, **INITIALSIZE**, **INCREASESIZE**, and **MAXSIZE** are set automatically.

See “CREATE TABLESPACE statement” for more information about the table space definition fields.

#### **TEMPORARY TABLESPACE *tblspace-defn***

Specifies the definition of the initial system temporary table space, TEMPSPACE1. If not specified and automatic storage is not enabled for the database, TEMPSPACE1 is created as an SMS table space with **NUMSEGS** number of directories as containers and with an extent size of **DFT\_EXTENTSIZE**. For example, the following containers would be created if **NUMSEGS** were specified to be 5:

```
/u smith smith/NODE0000/SQL00001/SQLT0002.0
/u smith smith/NODE0000/SQL00001/SQLT0001.1
/u smith smith/NODE0000/SQL00001/SQLT0001.2
/u smith smith/NODE0000/SQL00001/SQLT0001.3
/u smith smith/NODE0000/SQL00001/SQLT0001.4
```

If not specified and automatic storage is enabled for the database, TEMPSPACE1 is created as an automatic storage table space with its containers created on the defined storage paths. The extent size of this table space is **DFT\_EXTENTSIZE**.

See “CREATE TABLESPACE statement” for more information about the table space definition fields.

#### ***tblspace-defn***

Various table space definitions can be specified through the following command parameters. In a Db2 pureScale environment, only **MANAGED BY AUTOMATIC STORAGE** can be used.

##### **MANAGED BY**

###### **SYSTEM USING *container-string***

Specifies that the table space is to be an SMS table space. When the type of table space is not specified, the default behavior is to create a regular table space.

**Important:** For **USER TABLESPACE** specification, **MANAGED BY SYSTEM** is deprecated and might be removed in a future release. Use **MANAGED BY AUTOMATIC STORAGE** instead.

For an SMS table space, identifies one or more containers that will belong to the table space and in which the table space data will be stored. The *container-string* cannot exceed 240 bytes in length.

Each *container-string* can be an absolute or relative directory name.

The directory name, if not absolute, is relative to the database directory, and can be a path name alias (a symbolic link on UNIX operating systems) to storage that is not physically associated with the database directory. For example, *dbdir/work/c1* could be a symbolic link to a separate file system.

If any component of the directory name does not exist, it is created by the database manager. When a table space is dropped, all components created by the database manager are deleted. If the directory identified by *container-string* exists, it must not contain any files or subdirectories (SQLSTATE 428B2).

The format of *container-string* depends on the operating system. On Windows operating systems, an absolute directory path name begins with a drive letter and a colon (:); on UNIX operating systems, an absolute path name begins with a forward slash (/). A relative path name on any platform does not begin with an operating system-dependent character.

Remote resources (such as LAN-redirected drives or NFS-mounted file systems) are currently only supported when using Network Appliance Filers, IBM iSCSI, IBM Network-Attached Storage, Network Appliance iSCSI, NEC iStorage S2100, S2200, or S4100, or NEC Storage NS Series with a Windows Db2 server. Note that NEC Storage NS Series is only supported by the use of an uninterrupted power supply (UPS); continuous UPS (rather than standby) is recommended. An NFS-mounted file system on AIX must be mounted in uninterruptible mode by using the **-o nointr** parameter.

#### DATABASE USING

Specifies that the table space is to be a DMS table space. When the type of table space is not specified, the default behavior is to create a large table space.

**Important:** For **USER TABLESPACE** specification, **MANAGED BY DATABASE** is deprecated and might be removed in a future release. Use **MANAGED BY AUTOMATIC STORAGE** instead.

For a DMS table space, identifies one or more containers that will belong to the table space and in which the table space data will be stored. The type of the container (either **FILE** or **DEVICE**) and its size (in **PAGESIZE** pages) are specified. A mixture of **FILE** and **DEVICE** containers can be specified. The *container-string* cannot exceed 254 bytes in length.

Remote resources (such as LAN-redirected drives or NFS-mounted file systems) are currently only supported when using Network Appliance Filers, IBM iSCSI, IBM Network-Attached Storage, Network Appliance iSCSI, NEC iStorage S2100, S2200, or S4100, or NEC Storage NS Series with a Windows Db2 server. Note that NEC Storage NS

Series is only supported by the use of an uninterrupted power supply (UPS); continuous UPS (rather than standby) is recommended.

All containers must be unique across all databases. A container can belong to only one table space. The size of the containers can differ; however, optimal performance is achieved when all containers are the same size. The exact format of *container-string* depends on the operating system.

**FILE** *container-string number-of-pages*

For a FILE container, *container-string* must be an absolute or relative file name. The file name, if not absolute, is relative to the database directory. If any component of the directory name does not exist, it is created by the database manager. If the file does not exist, it will be created and initialized to the specified size by the database manager. When a table space is dropped, all components that are created by the database manager are deleted.

**Note:** If the file exists, it is overwritten, and if it is smaller than specified, it is extended. The file will not be truncated if it is larger than specified.

**DEVICE** *container-string number-of-pages*

For a DEVICE container, *container-string* must be a device name. The device must already exist.

**AUTOMATIC STORAGE**

Specifies that the table space is to be an automatic storage table space. If there are no storage groups defined, an error is returned (SQLSTATE 55060).

An automatic storage table space is created as a system-managed space (SMS) table space if it is a temporary table space and as a database-managed space (DMS) table space if it is a permanent table space. If the type of DMS table space is not specified, the default behavior is to create a large table space. With an automatic storage table space, the database manager determines which containers are to be assigned to the table space, based on the storage paths that are associated with the database.

**EXTENTSIZE** *number-of-pages*

Specifies the number of **PAGESIZE** pages that will be written to a container before skipping to the next container. The extent size value can also be specified as an integer value followed by K (for kilobytes) or M (for megabytes). If specified in this way, the floor of the number of bytes divided by the page size is used to determine the value for the extent size. The database manager cycles repeatedly through the containers as data is stored.

The default value is provided by the **dft\_extent\_sz** database configuration parameter, which has a valid range of 2-256 pages.

**PREFETCHSIZE** *number-of-pages*

Specifies the number of **PAGESIZE** pages that will be read from the table space when data prefetching is being performed. The prefetch size value can also be specified as an integer value followed by K (for kilobytes), M (for megabytes), or G (for gigabytes). If specified in this way, the floor of the number of bytes divided by the page size is used to determine the number of pages value for prefetch size.

**OVERHEAD** *number-of-milliseconds*

Number that specifies the I/O controller usage, disk seek, and latency time in milliseconds. This value is used to determine the cost of I/O during query optimization. The value of *number-of-milliseconds* is any numeric literal (integer, decimal, or floating point). If this value is not the same for all containers, the number should be the average for all containers that belong to the table space.

For a database that was created in Version 9 or later, the default I/O controller usage and disk seek and latency time is 7.5 milliseconds. For a database that was upgraded from a previous version of Db2 to Version 9 or later, the default is 12.67 milliseconds.

**TRANSFERRATE** *number-of-milliseconds*

Specifies the time to read one page into memory. This value is used to determine the cost of I/O during query optimization. The value of *number-of-milliseconds* is any numeric literal (integer, decimal, or floating point). If this value is not the same for all containers, the number should be the average for all containers that belong to the table space.

For a database that was created in Version 9 or later, the default time to read one page into memory is 0.06 milliseconds. For a database that was upgraded from a previous version of Db2 to Version 9 or later, the default is 0.18 milliseconds.

**NO FILE SYSTEM CACHING**

Specifies that all I/O operations are to bypass the file system-level cache. See “Table spaces without file system caching” for more details. This is the default parameter on most configurations. See “File system caching configurations” for details.

**FILE SYSTEM CACHING**

Specifies that all I/O operations in the target table space are to be cached at the file system level. See “Table spaces without file system caching” for more details. This is the default parameter on some configurations. See “File system caching configurations” for details.

**AUTORESIZE**

Specifies whether the auto-resize capability of a DMS table space or an automatic storage table space is to be enabled. Auto-resizable table spaces automatically increase in size

when they become full. The default is NO for DMS table spaces and YES for automatic storage table spaces.

**NO** Specifies that the auto-resize capability of a DMS table space or an automatic storage table space is to be disabled.

**YES** Specifies that the auto-resize capability of a DMS table space or an automatic storage table space is to be enabled.

#### **INITIALSIZE** *integer*

Specifies the initial size, per database partition, of an automatic storage table space. This parameter is only valid for automatic storage table spaces. The integer value must be followed by K (for kilobytes), M (for megabytes), or G (for gigabytes). Note that the actual value that is used might be slightly smaller than what was specified, because the database manager strives to maintain a consistent size across containers in the table space. Moreover, if the table space is auto-resizable and the initial size is not large enough to contain metadata that must be added to the new table space, the database manager will continue to extend the table space by the value of **INCREASESIZE** until there is enough space. If the **INITIALSIZE** clause is not specified, the database manager determines an appropriate value. The value for *integer* must be at least 48 K.

**K** K (for kilobytes).

**M** M (for megabytes).

**G** G (for gigabytes).

#### **INCREASESIZE** *integer*

Specifies the amount, per database partition, by which a table space that is enabled for auto-resize will automatically be increased when the table space is full, and a request for space has been made. The integer value must be followed by either:

- PERCENT to specify the amount as a percentage of the table space size at the time that a request for space is made. When PERCENT is specified, the integer value must be between 0 and 100 (SQLSTATE 42615).
- K (for kilobytes), M (for megabytes), or G (for gigabytes) to specify the amount in bytes.

Note that the actual value used might be slightly smaller or larger than what was specified, because the database manager strives to maintain consistent growth across containers in the table space. If the table space is auto-resizable, but the **INCREASESIZE** clause is not specified, the database manager determines an appropriate value.

#### **PERCENT**

Percent from 0 to 100.

**K** K (for kilobytes).

**M** M (for megabytes).

**G** G (for gigabytes).

**MAXSIZE**

Specifies the maximum size to which a table space that is enabled for auto-resize can automatically be increased. If the table space is auto-resizable, but the **MAXSIZE** clause is not specified, the default is **NONE**.

**NONE** Specifies that the table space is to be allowed to grow to file system capacity, or to the maximum table space size.

*integer*

Specifies a hard limit on the size, per database partition, to which a DMS table space or an automatic storage table space can automatically be increased. The integer value must be followed by **K** (for kilobytes), **M** (for megabytes), or **G** (for gigabytes). Note that the actual value that is used might be slightly smaller than what was specified, because the database manager strives to maintain consistent growth across containers in the table space.

**K** K (for kilobytes).

**M** M (for megabytes).

**G** G (for gigabytes).

**WITH** *comment-string*

Describes the database entry in the database directory. Any comment that helps to describe the database can be entered. Maximum length is 30 characters. A carriage return or a line feed character is not permitted. The comment text must be enclosed by single or double quotation marks.

**AUTOCONFIGURE**

Based on user input, calculates the recommended settings for buffer pool size, database configuration, and database manager configuration and optionally applies them. The Configuration Advisor is run by default when the **CREATE DATABASE** command is issued. The **AUTOCONFIGURE** parameter is needed only if you want to tweak the recommendations.

**USING** *input-keyword param-value*

Table 7. Valid input keywords and parameter values

| Keyword         | Valid values                                                                                                                                                                                                                                                                                                                      | Default value | Explanation                                                                                                                                                                                                                                                                                                                               |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| mem_percent     | <ul style="list-style-type: none"> <li>When analytics is not enabled, the default value is 25</li> <li>When analytics is enabled, mem_percent defaults to the higher of the following values:           <ul style="list-style-type: none"> <li>25</li> <li>80% divided by the number of database instances</li> </ul> </li> </ul> | 25            | Percentage of instance memory that is assigned to the database. However, if the <b>CREATE DATABASE</b> command invokes the configuration advisor and you do not specify a value for <b>mem_percent</b> , the percentage is calculated based on memory usage in the instance and the system up to a maximum of 25% of the instance memory. |
| workload_type   | simple, mixed, complex                                                                                                                                                                                                                                                                                                            | mixed         | Simple workloads tend to be I/O intensive and mostly transactions, whereas complex workloads tend to be CPU intensive and mostly queries.                                                                                                                                                                                                 |
| num_stmts       | 1–1 000 000                                                                                                                                                                                                                                                                                                                       | 25            | Number of statements per unit of work                                                                                                                                                                                                                                                                                                     |
| tpm             | 1–200 000                                                                                                                                                                                                                                                                                                                         | 60            | Transactions per minute                                                                                                                                                                                                                                                                                                                   |
| admin_priority  | performance, recovery, both                                                                                                                                                                                                                                                                                                       | both          | Optimize for better performance (more transactions per minute) or better recovery time                                                                                                                                                                                                                                                    |
| num_local_apps  | 0–5 000                                                                                                                                                                                                                                                                                                                           | 0             | Number of connected local applications                                                                                                                                                                                                                                                                                                    |
| num_remote_apps | 0–5 000                                                                                                                                                                                                                                                                                                                           | 100           | Number of connected remote applications                                                                                                                                                                                                                                                                                                   |
| isolation       | RR, RS, CS, UR                                                                                                                                                                                                                                                                                                                    | RR            | Isolation level of applications connecting to this database (Repeatable Read, Read Stability, Cursor Stability, Uncommitted Read)                                                                                                                                                                                                         |
| bp_resizeable   | yes, no                                                                                                                                                                                                                                                                                                                           | yes           | Are buffer pools resizable?                                                                                                                                                                                                                                                                                                               |

## APPLY

### DB ONLY

Displays the recommended values for the database configuration and the buffer pool settings based on the current database manager configuration. Applies the recommended changes to the database configuration and the buffer pool settings.

### DB AND DBM

Displays and applies the recommended changes to the database manager configuration, the database configuration, and the buffer pool settings.

**NONE** Disables the Configuration Advisor (it is enabled by default).

- If the **AUTOCONFIGURE** keyword is specified with the **CREATE DATABASE** command, the **DB2\_ENABLE\_AUTOCONFIG\_DEFAULT** variable value is not considered. Adaptive Self Tuning Memory and Auto Runstats will be

enabled and the Configuration Advisor will tune the database configuration and database manager configuration parameters as indicated by the **APPLY DB** or **APPLY DBM** parameters.

- Specifying the **AUTOCONFIGURE** parameter with the **CREATE DATABASE** command on a database will recommend enablement of the Self Tuning Memory Manager. However, if you run the **AUTOCONFIGURE** command on a database in an instance where **sheapthres** is not zero, sort memory tuning (**sortheap**) will not be enabled automatically. To enable sort memory tuning (**sortheap**), you must set **sheapthres** equal to zero using the **UPDATE DATABASE MANAGER CONFIGURATION** command. Note that changing the value of **sheapthres** can affect the sort memory usage in your previously existing databases.

#### **REPORT FOR**

Specifies the members to include in the report when used in a partitioned database environment or Db2 pureScale environment.

##### **MEMBER -1**

In a partitioned database environment or Db2 pureScale environment, the Configuration Advisor will report the member level configuration parameters computed changes recommended or made on the current member determined by your connection. This is the default if the REPORT FOR clause is not specified.

##### **MEMBER -2**

Indicates that the Configuration Advisor is to report the computed recommendations or changes for all members.

##### **FOR MEMBER member-number1**

Specifies the number of the member the Configuration Advisor is to report the computed recommendations or changes for.

##### **FOR MEMBERS (member-number2...)**

Specifies the numbers for each of the members the Configuration Advisor is to report the computed recommendations or changes for.

#### **INCLUDE SUMMARY**

Indicates that the Configuration Advisor will include a summary of all the member groupings based on the computed recommendations as part of the report. This is the default option.

#### **EXCLUDE SUMMARY**

Indicates that the Configuration Advisor will not include a summary as part of the report.

## **Examples**

1. Create database TESTDB3 on the drive that is specified by the value of the **dftdbpath** database manager configuration parameter. By default, the storage group IBMSTOGROUP is created with the path **dftdbpath**.

`CREATE DATABASE TESTDB3`

2. Create database TESTDB7 on drive C: (the first drive in the storage path list). The storage group IBMSTOGROUP has storage paths C: and D:.

`CREATE DATABASE TESTDB7 ON C: ,D:`

3. Create database TESTDB15 on drive E: (explicitly listed as **DBPATH**). The storage group IBMSTOGROUP has storage paths C: and D:.  
CREATE DATABASE TESTDB15  
ON C:,D: DBPATH ON E:

4. Encrypt database MYDB by using the default encryption options.  
CREATE DATABASE mydb ENCRYPT;

5. Encrypt database MYDB by using explicitly provided encryption options. The label mylabel.mydb.myinstance.myserver already exists in the keystore.

```
CREATE DATABASE mydb
ENCRYPT CIPHER AES KEY LENGTH 192
MASTER KEY LABEL mylabel.mydb.myinstance.myserver;
```

## Usage notes

The **CREATE DATABASE** command:

- Creates a database in the specified subdirectory. In a partitioned database environment, creates the database on all database partitions listed in db2nodes.cfg, and creates a \$DB2INSTANCE/NODExxxx directory under the specified subdirectory at each database partition. In a single partition database environment, creates a \$DB2INSTANCE/NODE0000 directory under the specified subdirectory.
- Creates the system catalog tables and recovery log.
- Catalogs the database in the following database directories:
  - Server's local database directory on the path indicated by *path* or, if the path is not specified, the default database path defined in the database manager system configuration file by the **dftdbpath** parameter. A local database directory resides on each file system that contains a database.
  - Server's system database directory for the attached instance. The resulting directory entry will contain the database name and a database alias.  
If the command was issued from a remote client, the client's system database directory is also updated with the database name and an alias.

Creates a system or a local database directory if neither exists. If specified, the comment and code set values are placed in both directories.

**Note:** If the database configuration parameter **newlogpath** is not set, then, the default for the location of log files configuration parameter **logpath** is the path shown by the **DBPATH ON** parameter. It is suggested that the **DBPATH ON** parameter be used when automatic storage is enabled to keep the database information separate from the database data.

- Stores the specified code set, territory, and collating sequence. A flag is set in the database configuration file if the collating sequence consists of unique weights, or if it is the identity sequence.
- Creates the schemas called SYSCAT, SYSFUN, SYSIBM, and SYSSTAT with SYSIBM as the owner. The database partition server on which this command is issued becomes the catalog database partition for the new database. Two database partition groups are created automatically: IBMDEFAULTGROUP and IBMCATGROUP.
- Binds the previously defined database manager bind files to the database (these are listed in the utilities bind file list, db2ubind.1st). If one or more of these files do not bind successfully, **CREATE DATABASE** returns a warning in the SQLCA, and provides information about the binds that failed. If a bind fails, the user can take corrective action and manually bind the failing file. The database is created in

any case. A schema called NULLID is implicitly created when performing the binds with CREATEIN privilege granted to PUBLIC, if the **RESTRICTIVE** parameter is not selected.

The utilities bind file list contains two bind files that cannot be bound against previous version of the server:

- db2ugtpi.bnd cannot be bound against Db2 Version 2 servers.
- db2dropv.bnd cannot be bound against Db2 Parallel Edition Version 1 servers.

If db2ubind.lst is bound against a server which is not at the latest level, warnings pertaining to these two files are returned, and can be disregarded.

- Creates SYSCATSPACE, TEMPSPACE1, and USERSPACE1 table spaces. The SYSCATSPACE table space is only created on the catalog database partition.
- For information about the privileges granted when creating a database, see: “Default privileges granted on creating a database”.
- The size of the partitioning map is selected by the database manager. The size cannot change once selected. By default, the partitioning map will have 32,768 entries. This can reduce data skew for clusters with many database partitions. However, the following deprecated APIs will not work and return a **SQL2768N** error: **sqlugtpi()** and **sqlugrpn()**. In its place, you can use **db2GetDistMap()** and **getRowPartNum()**, respectively. If the deprecated APIs are required set the **DB2\_PMAP\_COMPATIBILITY** registry variable prior to database creation. This will pick a partitioning map size of 4,096, which will allow the deprecated APIs to work.

Automatic storage is a collection of storage paths associated with a storage group on which table spaces can be created without having to explicitly specify container definitions (see the “CREATE TABLESPACE statement” for more information). Automatic storage is enabled by default, but can be explicitly disabled for a database when it is created. Automatic storage can be disabled at database creation time by specifying the **AUTOMATIC STORAGE NO** parameter.

When free space is calculated for an automatic storage path for a given database partition, the database manager will check for the existence of the following directories or mount points within the storage path and will use the first one that is found. In doing this, file systems can be mounted at a point beneath the storage path and the database manager will recognize that the actual amount of free space available for table space containers cannot be the same amount that is associated with the storage path directory itself.

1. *storage\_path/instance\_name/NODE####/database\_name*
2. *storage\_path/instance\_name/NODE###*
3. *storage\_path/instance\_name*
4. *storage\_path/*

Where

- *storage\_path* is a storage path associated with the database.
- *instance\_name* is the instance under which the database resides.
- *NODE####* corresponds to the database partition number (for example NODE0000 or NODE0001).
- *database\_name* is the name of the database.

Consider the example where two logical database partitions exist on one physical machine and the database is being created with a single storage path: /db2data. Each database partition will use this storage path but the user may want to isolate

the data from each partition within its own file system. In this case, a separate file system can be created for each partition and be mounted at `/db2data/instance/NODE####`. When creating containers on the storage path and determining free space, the database manager will know not to retrieve free space information for `/db2data`, but instead retrieve it for the corresponding `/db2data/instance/NODE###` directory.

In general, the same storage paths must be used for each partition in a multi-partition database and they must all exist before executing the **CREATE DATABASE** command. One exception to this is where database partition expressions are used within the storage path. Doing this allows the database partition number to be reflected in the storage path such that the resulting path name is different on each partition.

In a partitioned database environment, the database manager creates a subdirectory, `$DB2INSTANCE/NODExxxx`, under the specified or default path on all database partitions. The `xxxx` is the database partition number as defined in the `db2nodes.cfg` file (that is, database partition 0 becomes `NODE0000`). Subdirectories `SQL00001` through `SQLnnnnn` will reside on this path. This ensures that the database objects associated with different database partitions are stored in different directories (even if the subdirectory `$DB2INSTANCE` under the specified or default path is shared by all database partitions).

If LDAP (Lightweight Directory Access Protocol) support is enabled on the current machine, the database will be automatically registered in the LDAP directory. If a database object of the same name already exists in the LDAP directory, the database is still created on the local machine, but a warning message is returned, indicating that there is a naming conflict. In this case, the user can manually catalog an LDAP database entry by using the **CATALOG LDAP DATABASE** command.

**CREATE DATABASE** will fail if the application is already connected to a database.

When a database is created, a detailed deadlocks event monitor is created. As with any monitor, there is some additional processing usage associated with this event monitor. You can drop the deadlocks event monitor by issuing the **DROP EVENT MONITOR** command.

Use **CATALOG DATABASE** to define different alias names for the new database.

The combination of the code set and territory values must be valid. For a list of the supported combinations, see “Supported territory codes and code pages”.

To specify a database path (instead of a drive) on a Windows operating system, you need to set the Db2 registry variable: `DB2_CREATE_DB_ON_PATH=YES`.

Use the `COLLATE USING` clause with a language-aware-collation or locale-sensitive-collation instead of `UCA400_NO`, `UCA400_LSK`, or `UCA400_LTH`.

**Important:** Collations based on the Unicode Collation Algorithm of the Unicode Standard version 4.0.0 have been deprecated in Version 10.1 and might be removed in a future release. For more information, see “Collations based on the Unicode Collation Algorithm of the Unicode Standard version 4.0.0 have been deprecated” at [http://www.ibm.com/support/knowledgecenter/SSEPGG\\_10.1.0/com.ibm.db2.luw.wn.doc/doc/i0058749.html](http://www.ibm.com/support/knowledgecenter/SSEPGG_10.1.0/com.ibm.db2.luw.wn.doc/doc/i0058749.html).

## CREATE TOOLS CATALOG

Creates the Db2 tools catalog tables in a new or existing database. The tools catalog contains information about the administrative tasks that are available to you.

The database must be local.

This command will optionally force all applications and stop and restart the database manager if new table spaces are created for the tools catalog. It will also update the Db2 Administration Server (DAS) configuration and activate the scheduler.

This command is not valid on a IBM Data Server Client.

### Scope

The node from which this command is issued becomes the catalog node for the new database.

### Authorization

One of the following authorities:

- SYSADM
- SYSCTRL

The user must also have DASADM authority to update the Db2 administration server configuration parameters.

### Required connection

A database connection is temporarily established by this command during processing. This command will optionally stop and restart the database manager if new table spaces are created.

### Command syntax

```
►--CREATE TOOLS CATALOG—catalog-name————→
►—CREATE NEW DATABASE—database-name————→
 └ USE EXISTING ┌ DATABASE—database-name—┐————→
 └ TABLESPACE—tablespace-name—IN ┘————→
 └ FORCE ┘ └ KEEP INACTIVE ┘————→
```

### Command parameters

#### CATALOG *catalog-name*

A name to be used to uniquely identify the Db2 tools catalog. The catalog tables are created under this schema name.

#### NEW DATABASE *database-name*

A name to be assigned to the new database. This must be a unique name that differentiates the database from any other database in either the local database directory or the system database directory. The name must conform to naming conventions for databases.

#### **EXISTING DATABASE** *database-name*

The name of an existing database to host the tools catalog. It must be a local database.

#### **EXISTING TABLESPACE** *tablespace-name*

A name to be used to specify the existing 32K page table space used to create the Db2 tools catalog tables. A 32K page size temporary table space must also exist for the tables to be created successfully.

#### **FORCE**

When you create a tools catalog in a new table space, the database manager must be restarted, which requires that no applications be connected. Use the **FORCE** option to ensure that no applications are connected to the database. If applications are connected, the tools catalog creation will fail unless you specify an existing table space.

#### **KEEP INACTIVE**

This option will not update the Db2 administration server configuration parameters or enable the scheduler.

### **Examples**

```
db2 create tools catalog cc create new database toolsdb
db2 create tools catalog catalog1 use existing database toolsdb force
db2 create tools catalog catalog1 use existing tablespace user32Ksp
in database toolsdb
db2 create tools catalog toolscat use existing database toolsdb keep inactive
```

### **Usage notes**

- The tools catalog tables require two 32K page table spaces (regular and temporary). In addition, unless you specify existing table spaces, a new 32K buffer pool is created for the table spaces. This requires a restart of the database manager. If the database manager must be restarted, all existing applications must be forced off. The new table spaces are created with a single container each in the default database directory path.
- If an active catalog with this name exists before you execute this command, it is deactivated and the new catalog becomes the active catalog.
- Multiple Db2 tools catalogs can be created in the same database and are uniquely identified by the catalog name.
- The **jdk\_path** configuration parameter must be set in the Db2 administration server (DAS) configuration to the minimum supported level of the SDK for Java<sup>TM</sup>.
- Updating the DAS configuration parameters requires DASADM authority on the Db2 administration server.
- Unless you specify the **KEEP INACTIVE** option, this command updates the local DAS configuration parameters related to the Db2 tools catalog database configuration and enables the scheduler at the local DAS server.
- The **jdk\_64\_path** configuration parameter must be set if you are creating a tools catalog against a 64-bit instance on one of the platforms that supports both 32- and 64-bit instances (AIX, HP-UX, and Solaris).
- In partitioned database environments, the 32 KB REGULAR table space must exist on the catalog partition, otherwise the command (such as the following one) will fail when a table space is specified:

```
db2 create tools catalog catalog1 use existing tablespace user32Ksp
in database toolsdb
```

## DEACTIVATE DATABASE

Deactivates the specified database and stops all necessary database services.

### Scope

This command deactivates the target database on all members in the instance or, a specified member. If one or more of these members encounters an error during deactivation, a warning is returned. The database remains activated on those members.

### Authorization

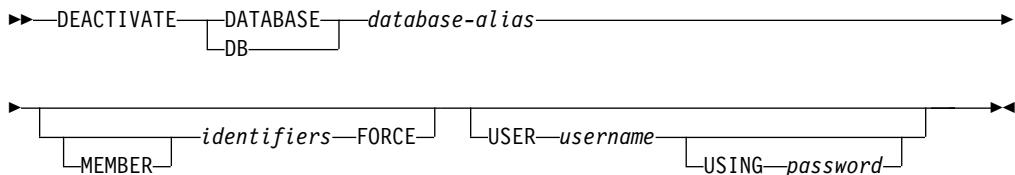
One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT

### Required connection

None

### Command syntax



### Command parameters

#### DATABASE | DB *database-alias*

Specifies the alias of the database to be stopped.

#### MEMBER

Specifies one or more members on which to deactivate the database.

#### *identifiers*

Specifies the numeric identifier of one or more members on which to deactivate the database. You can use the numeric identifier without specifying the **MEMBER** parameter keyword.

#### FORCE

Forces a database to deactivate even if indoubt transactions exist.

**Note:** An error is returned if you try to deactivate a database without using the **FORCE** option with existing indoubt transactions.

#### USER *username*

Specifies the user stopping the database.

#### USING *password*

Specifies the password for the user name.

## Usage notes

- An application issuing the **DEACTIVATE DATABASE** command cannot have an active database connection to any database.
- Databases initialized by the **ACTIVATE DATABASE** command can be shut down by issuing the **DEACTIVATE DATABASE** or **db2stop** command. If a database is initialized by the **ACTIVATE DATABASE** command, the last application disconnecting from the database does not shut down the database, and the **DEACTIVATE DATABASE** command must be used.
- In a Db2 pureScale environment, an active database on a member can only be deactivated on that member by issuing the **DEACTIVATE DATABASE** or **db2stop** command.

## Compatibilities

For compatibility with previous versions:

- **DBPARTITIONNUM** can be substituted for **MEMBER**, except when the **DB2\_ENFORCE\_MEMBER\_SYNTAX** registry variable is set to **ON**.

## DECOMPOSE XML DOCUMENT

Invokes a stored procedure to decompose a single XML document using a registered and decomposition-enabled XML schema.

### Authorization

One of the following groups of privileges or authorities is required:

- One of the following authorizations:
  - CONTROL privilege on all target tables referenced in the set of annotated schema documents
  - DATAACCESS authority
- All of the following privileges:
  - INSERT privileges on the target table, as required for the operation specified in the action file
  - SELECT, INSERT, UPDATE, or DELETE privilege, as applicable, on any table referenced by the db2-xdb:expression or db2-xdb:condition annotation

If the **VALIDATE** option is specified, USAGE privilege on the XML schema is also required.

### Required connection

Database

### Command syntax

```
►►—DECOMPOSE XML DOCUMENT—xml-document-name—XMLSCHEMA—xml-schema-name————►
►—————VALIDATE—————►
```

## Command parameters

### DECOMPOSE XML DOCUMENT *xml-document-name*

*xml-document-name* is the file path and file name of the input XML document to be decomposed.

### XMLSHEMA *xml-schema-name*

*xml-schema-name* is the name of an existing XML schema registered with the XML schema repository to be used for document decomposition.

*xml-schema-name* is a qualified SQL identifier consisting of an optional SQL schema name followed by a period and the XML schema name. If the SQL schema name is not specified, it is assumed to be the value of the Db2 special register CURRENT SCHEMA.

### VALIDATE

This parameter indicates that the input XML document is to be validated first, then decomposed only if the document is valid. If **VALIDATE** is not specified, the input XML document will not be validated before decomposition.

## Examples

The following example specifies that the XML document `./gb/document1.xml` is to be validated and decomposed with the registered XML schema DB2INST1.GENBANKSCHEMA.

```
DECOMPOSE XML DOCUMENT ./gb/document1.xml
 XMLSHEMA DB2INST1.GENBANKSCHEMA
 VALIDATE
```

The following example specifies that the XML document `./gb/document2.xml` is to be decomposed without validation with the registered XML schema DB2INST2."GENBANK SCHEMA1", on the assumption that the value of the Db2 special register CURRENT SCHEMA is set to DB2INST2.

```
DECOMPOSE XML DOCUMENT ./gb/document2.xml
 XMLSHEMA "GENBANK SCHEMA1"
```

## DECOMPOSE XML DOCUMENTS

Decomposes XML documents stored in a database column. The data from the XML documents is stored in columns of relational tables based on annotations specified in an XML schema.

The DECOMPOSE XML DOCUMENTS command invokes the XDB\_DECOMP\_XML\_FROM\_QUERY stored procedure to decompose one or more XML documents from a binary or XML column using a registered and decomposition-enabled XML schema.

## Authorization

One of the following groups of privileges is required:

- All of the following privileges:
  - INSERT privilege on all target tables referenced in the annotated schema
  - SELECT privilege on the table, alias, or view containing the column holding the input documents
  - SELECT, INSERT, UPDATE, or DELETE privilege, as applicable, on any table referenced by the db2-xdb:expression or db2-xdb:condition annotation
- One of the following authorizations:

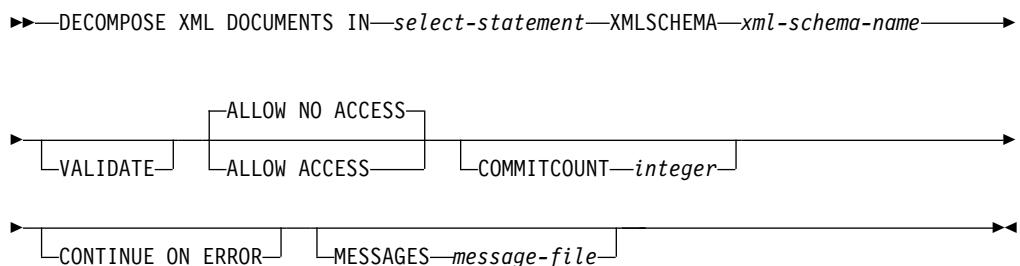
- CONTROL privilege on all tables referenced in the set of annotated schema documents and on the table, alias, or view containing the column holding the input documents
- DATAACCESS authority

If the **VALIDATE** option is specified, USAGE privilege on the XML schema is also required.

## Required connection

Database

## Command syntax



## Command parameters

### **DECOMPOSE XML DOCUMENTS IN *select-statement***

The *select-statement* conforms to the rules of an SQL SELECT statement, and must return a result set containing 2 columns. The first column is the document identifier. Each document identifier uniquely identifies an XML document to be decomposed. The column must be of character type or be castable to character type. The second column contains the XML documents to be decomposed. The supported types for the document column are XML, BLOB, VARCHAR FOR BIT DATA, and LONG VARCHAR FOR BIT DATA. The column containing the XML documents must resolve to a column of an underlying base table, the column cannot be a generated column.

For example, the DOCID column in the following SELECT statement contains the unique identifiers for the XML documents stored in SALESDOC column.

`SELECT DOCID, SALESDOC FROM SALESTAB`

### **XMLSCHEMA *xml-schema-name***

*xml-schema-name* is the name of an existing XML schema registered with the XML schema repository to be used for document decomposition.

*xml-schema-name* is a qualified SQL identifier consisting of an optional SQL schema name followed by a period and the XML schema name. If the SQL schema name is not specified, it is assumed to be the value of the Db2 special register CURRENT SCHEMA.

### **VALIDATE**

Specifies that each input XML document is to be validated against *xml-schema-name*, then decomposed if the document is valid. If **VALIDATE** is not specified, input XML documents are not validated before decomposition.

If **VALIDATE** is not specified, it is the user's responsibility to validate the documents before calling the command. For example, the user can use XMLVALIDATE when inserting the XML documents into the column, or use an

XML processor before inserting the documents. If an input XML document is not valid and **VALIDATE** is not specified, the decomposition results are undefined. See the related reference at the end of this topic for information about XML validation.

#### **ALLOW**

Specifies whether access to the target tables specified in the XML Schema *xml-schema-name* are allowed during decomposition. ALLOW NO ACCESS is the default value.

#### **ALLOW ACCESS**

If ALLOW ACCESS is specified, when acquiring locks on the target table, the DECOMPOSE operation will wait and possibly timeout.

#### **ALLOW NO ACCESS**

If ALLOW NO ACCESS specified or used as the default value, the DECOMPOSE operation will acquire an exclusive lock (X) on all tables which have mappings specified in the XML schema. Not all target tables will necessarily participate during the decomposition of each document, but all target tables will be locked to lower the possibility of deadlock during a long unit of work.

#### **COMMITCOUNT *integer***

Specifies that after every *integer* successful document decompositions, a COMMIT is performed. A value of 0, or if the option is not specified, means that no COMMIT will ever be performed by the DECOMPOSE operation.

#### **CONTINUE\_ON\_ERROR**

Specifies that the DECOMPOSE operation continues to the next document if a document-specific error occurs. Any changes to the database caused by an unsuccessfully decomposed document is undone before proceeding to the next document. If CONTINUE\_ON\_ERROR is not specified, the DECOMPOSE operation stops on the first document that cannot be successfully decomposed.

The DECOMPOSE operation does not continue on fatal errors and non-document specific errors even if the CONTINUE\_ON\_ERROR option is specified.

#### **MESSAGES *message-file***

The DECOMPOSE operation generates a UTF-8 encoded XML document that lists the input XML documents that were not successfully decomposed, along with the reason for their failure. The document containing the decomposition errors is generated only if there is at least one XML document that could not be successfully decomposed. Messages are translated according to server locale. *message-file* is the file that contains the XML document containing the decomposition information. If *message-file* is specified the file will be created on the system from where the CLP command is invoked. If the complete path of the file is not specified, it will be created in the current directory.

If this option is not specified, the decomposition information will be written to standard output.

Information about the decomposition of XML documents is displayed as an XML document that can optionally be sent to *message-file* specified by the parameter **MESSAGES**. The format of the XML document in *message-file* is as follows:

```
<?xml version='1.0' xmlns:xdb="http://www.ibm.com/xmlns/prod/db2/xdb1"?>
<xdb:errorReport>
 <xdb:document>
 <xdb:documentId>sssss</xdb:documentId>
 <xdb:errorMsg>qqqqq</xdb:errorMsg>
```

```

</xdb:document>
<xdb:document>
 .
 .
 </xdb:document>
 .
 .
</xdb:errorReport>
```

The documentId value *sssss* is the value from the first column specified by *select-statement*. The value identifies the XML document that was not successfully decomposed. The errorMsg value *qqqqq* is the error encountered during the attempt to decompose the document.

## Example

You could insert XML documents to be decomposed into a relational table, for example: ABC.SALESTAB. All the documents correspond to an XML schema registered as ABC.SALES, and the schema has been annotated with decomposition information and enabled for decomposition. Assuming the column name into which the documents are inserted is SALESDOC, and the corresponding ID is inserted into DOCID, invoke the DECOMPOSE XML DOCUMENTS command as follows:

```
DECOMPOSE XML DOCUMENTS IN 'SELECT DOCID, SALESDOC FROM SALESTAB'
 XMLSHEMA ABC.SALES
 MESSAGES /home/myid/errors/errorreport.xml
```

## Deregister

Deregisters the Db2 server from the network directory server.

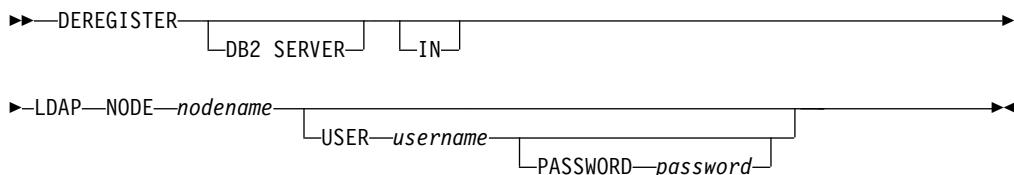
### Authorization

None

### Required connection

None

### Command syntax



### Command parameters

**IN**      Specifies the network directory server from which to deregister the Db2 server. The valid value is LDAP for an LDAP (Lightweight Directory Access Protocol) directory server.

#### USER *username*

This is the user's LDAP distinguished name (DN). The LDAP user DN must have sufficient authority to delete the object from the LDAP directory. The user name is optional when deregistering in LDAP. If the user's LDAP DN is not specified, the credentials of the current logon user will be used.

**PASSWORD** *password*  
Account password.

**NODE** *nodename*  
The node name is the value that was specified when the Db2 server was registered in LDAP.

### Usage notes

This command can only be issued for a remote machine when in the LDAP environment. When issued for a remote machine, the node name of the remote server must be specified.

The Db2 server is automatically deregistered when the instance is dropped.

## DESCRIBE

Displays metadata about the columns, indexes, and data partitions of tables or views. This command can also display metadata about the output of SELECT, CALL, or XQuery statements.

Use the **DESCRIBE** command to display information about any of the following items:

- Output of a SELECT, CALL, or XQuery statement
- Columns of a table or a view
- Indexes of a table or a view
- Data partitions of a table or view

### Authorization

The authorization required depends on the type of information you want to display using the **DESCRIBE** command.

- If the SYSTOOLSTMPSPACE table space exists, one of the authorities shown in the following table is required.

| Object to display information about              | Privileges or authorities required                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output of a SELECT statement or XQuery statement | At least one of the following authorizations: <ul style="list-style-type: none"><li>• DATAACCESS authority</li><li>• DBADM authority</li><li>• SQLADM authority</li><li>• EXPLAIN authority</li><li>• For each object referenced in the statement:<ul style="list-style-type: none"><li>– SELECT privilege on each table, view or nickname</li><li>– EXECUTE privilege on each routine</li><li>– READ privilege on each global variable</li><li>– USAGE privilege on each sequence</li><li>– EXECUTE privilege on each module</li></ul></li></ul> |

| Object to display information about | Privileges or authorities required                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output of a CALL statement          | <p>Any of the following privileges or authorities:</p> <ul style="list-style-type: none"> <li>• DATAACCESS authority</li> <li>• EXECUTE privilege on the stored procedure</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Columns of a table or a view        | <p>Any of the following privileges or authorities for the SYSCAT.COLUMNS system catalog table:</p> <ul style="list-style-type: none"> <li>• SELECT privilege</li> <li>• ACCESSCTRL authority</li> <li>• DATAACCESS authority</li> <li>• DBADM authority</li> <li>• SECADM authority</li> <li>• SQLADM authority</li> </ul> <p>If you want to use the <b>SHOW DETAIL</b> parameter, you also require any of these privileges or authorities on the SYSCAT.DATAPARTITIONEXPRESSION system catalog table.</p> <p>Because PUBLIC has all the privileges over declared temporary tables, you can use the command to display information about any declared temporary table that exists within your connection.</p> |
| Indexes of a table or a view        | <p>Any of the following privileges or authorities on the SYSCAT.INDEXES system catalog table:</p> <ul style="list-style-type: none"> <li>• SELECT privilege</li> <li>• ACCESSCTRL authority</li> <li>• DATAACCESS authority</li> <li>• DBADM authority</li> <li>• SECADM authority</li> <li>• SQLADM authority</li> </ul> <p>If you want to use the <b>SHOW DETAIL</b> parameter, you also require EXECUTE privilege on the GET_INDEX_COLNAMES() UDF.</p> <p>Because PUBLIC has all the privileges over declared temporary tables, you can use the command to display information about any declared temporary table that exists within your connection.</p>                                                  |

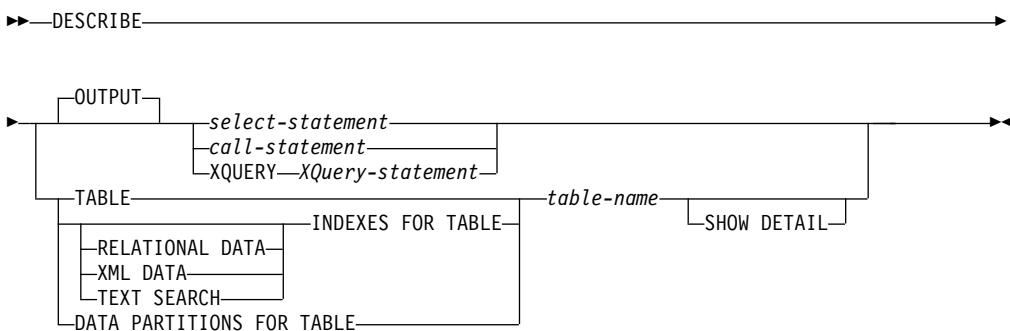
| Object to display information about | Privileges or authorities required                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data partitions of a table or view  | <p>Any of the following privileges or authorities on the SYSCAT.DATAPARTITIONS system catalog table:</p> <ul style="list-style-type: none"> <li>• SELECT privilege</li> <li>• ACCESSCTRL authority</li> <li>• DATAACCESS authority</li> <li>• DBADM authority</li> <li>• SECADM authority</li> <li>• SQLADM authority</li> </ul> <p>Because PUBLIC has all the privileges over declared temporary tables, you can use the command to display information about any declared temporary table that exists within your connection.</p> |

- If the SYSTOOLSTMPSPACE table space does not exist, SYSADM or SYSCTRL authority is also required in addition to the one of the previously listed authorities.

## Required connection

Database. If implicit connect is enabled, a connection to the default database is established.

## Command syntax



## Command parameters

**OUTPUT** Indicates that the output of the statement should be described. This keyword is optional.

***select-statement | call-statement | XQUERY XQuery-statement***

Identifies the statement about which information is wanted. The statement is automatically prepared by CLP. To identify an XQuery statement, precede the statement with the keyword **XQUERY**. A DESCRIBE OUTPUT statement only returns information about an implicitly hidden column if the column is explicitly specified as part of the SELECT list of the final result table of the query described.

**TABLE** *table-name*

Specifies the table or view to be described. The fully qualified name in the form *schema.table-name* must be used. An alias for the table cannot be used in place of the actual table. Information about implicitly hidden columns is returned, but SHOW DETAIL must be used to indicate which columns are implicitly hidden.

The **DESCRIBE TABLE** command lists the following information about each column:

- Column name
- Type schema
- Type name
- Length
- Scale
- Nulls (yes/no)

**INDEXES FOR TABLE** *table-name*

Specifies the table or view for which indexes need to be described. You can use the fully qualified name in the form *schema.table-name* or you can just specify the *table-name* and default schema will be used automatically. An alias for the table cannot be used in place of the actual table.

The **DESCRIBE INDEXES FOR TABLE** command lists the following information about each index of the table or view:

- Index schema
- Index name
- Unique rule
- Number of columns
- Index type

If the **DESCRIBE INDEXES FOR TABLE** command is specified with the **SHOW DETAIL** option, the index name is truncated when the index name is greater than 18 bytes. If no index type option is specified, information for all index types is listed: relational data index, index over XML data, and Text Search index. The output includes the following additional information:

- Index ID for a relational data index, an XML path index, an XML regions index, or an index over XML data
- Data Type for an index over XML data
- Hashed for an index over XML data
- Max VARCHAR Length for an index over XML data
- XML Pattern specified for an index over XML data
- Codepage for a text search index
- Language for a text search index
- Format specified for a text search index
- Update minimum for a text search index
- Update frequency for a text search index
- Collection directory for a text search index
- Column names of the indexes that are preceded by + for an ascending order, - for a descending order, and \* for a random order.
- Expressions in square brackets following the generated column name for any part of an index key that is based on an expression.
- Whether the BUSINESS\_TIME WITHOUT OVERLAPS clause is specified

Specify an index type to list information for only a specific index type. Specifying multiple index types is not supported.

Column name is truncated when it is greater than 8256 bytes.

#### **RELATIONAL DATA**

If the **RELATIONAL DATA** index type option is specified without the **SHOW DETAIL** option, only the following information is listed:

- Index schema
- Index name
- Unique rule
- Number of columns
- Null keys

If **SHOW DETAIL** is specified, the column names information is also listed.

#### **XML DATA**

If the **XML DATA** index type option is specified without the **SHOW DETAIL** option, only the following information is listed:

- Index schema
- Index name
- Unique rule
- Number of columns
- Index type

If **SHOW DETAIL** is specified, the following information for an index over XML data is also listed:

- Index ID
- Data type
- Hashed
- Max Varchar length
- XML Pattern
- Column names

#### **TEXT SEARCH**

If the **TEXT SEARCH** index type option is specified without the **SHOW DETAIL** option, only the following information is listed:

- Index schema
- Index name

If **SHOW DETAIL** is specified, the following text search index information is also listed:

- Column name
- Codepage
- Language
- Format
- Update minimum
- Update frequency
- Collection directory

If the **TEXT SEARCH** option is specified and a text search option is not installed or not properly configured, an error (SQLSTATE 42724) is returned.

See Db2 Text Search for information listed in the columns.

#### **DATA PARTITIONS FOR TABLE** *table-name*

Specifies the table or view for which data partitions need to be described. The information displayed for each data partition in the table includes; the partition identifier and the partitioning intervals. Results are ordered according to the partition identifier sequence. The fully qualified name in the form *schema.table-name* must be used. An alias for the table cannot be used in place of the actual table. The *schema* is the user name under which the table or view was created.

For the **DESCRIBE DATA PARTITIONS FOR TABLE** command, specifies that output include a second table with the following additional information:

- Data partition sequence identifier
- Data partition expression in SQL

#### **SHOW DETAIL**

For the **DESCRIBE TABLE** command, specifies that output include the following additional information:

- Whether a CHARACTER, VARCHAR or LONG VARCHAR column was defined as FOR BIT DATA
- Column number
- Distribution key sequence
- Code page
- Hidden attribute
- Default
- Table partitioning type (for tables partitioned by range this output appears after the original output)
- Partitioning key columns (for tables partitioned by range this output appears after the original output)
- Identifier of table space used for the index
- Periods that are defined on the table (for temporal tables this output appears after the original output)
- Whether versioning is enabled on the table (for temporal tables this output appears after the original output)

## **Examples**

### **Describing the output of a SELECT Statement**

The following example shows how to describe a SELECT statement:

```
db2 describe output select * from staff
```

Column Information

Number of columns: 7

| Data Type     | Length | Column Name | Name Length |
|---------------|--------|-------------|-------------|
| 500 SMALLINT  | 2      | ID          | 2           |
| 449 VARCHAR   | 9      | NAME        | 4           |
| 501 SMALLINT  | 2      | DEPT        | 4           |
| 453 CHARACTER | 5      | JOB         | 3           |
| 501 SMALLINT  | 2      | YEARS       | 5           |
| 485 DECIMAL   | 7,2    | SALARY      | 6           |
| 485 DECIMAL   | 7,2    | COMM        | 4           |

### **Describing the output of a CALL Statement**

Given a stored procedure created with the statement:

```
CREATE PROCEDURE GIVE_BONUS (IN EMPNO INTEGER,
 IN DEPTNO INTEGER,
 OUT CHEQUE INTEGER,
 INOUT BONUS DEC(6,0))
```

...

The following example shows how to describe the output of a CALL statement:

```
db2 describe output call give_bonus(123456, 987, ?, 15000.)
```

Column Information

Number of Columns: 2

| Data Type   | Length | Column Name | Name Length |
|-------------|--------|-------------|-------------|
| 497 INTEGER | 4      | CHEQUE      | 6           |
| 485 DECIMAL | 6, 0   | BONUS       | 5           |

If the procedure has one or more parameters of an array type, the output from the **DESCRIBE** command has one additional column, that indicates the maximum cardinality of array parameters. An empty value indicates that the parameter is not an array.

Given the array type and procedure created with the statements:

```
CREATE TYPE PRODUCT_LIST AS INTEGER ARRAY[100]
CREATE TYPE CUSTOMER_LIST AS INTEGER ARRAY[1000]
```

```
CREATE PROCEDURE DISCONTINUE_PROD (IN PROD_LIST PRODUCT_LIST,
 IN EFFECTIVE_DATE DATE,
 OUT NUM_PENDING_ORDERS INTEGER,
 OUT CUST_LIST CUSTOMER_LIST)
```

...

The following example shows how to describe the output of a CALL statement with array parameters. The only format difference with the previous example is the Max cardinality column.

```
db2 describe output call discontinue_prod(ARRAY[12, 34, 26], '04/13/2006', ?)
```

Column Information

Number of Columns: 2

| SQL type    | Type length | Column name        | Name length | Max cardinality |
|-------------|-------------|--------------------|-------------|-----------------|
| 497 INTEGER | 4           | NUM_PENDING_ORDERS | 17          |                 |
| 497 INTEGER | 10          | CUSTOMER_LIST      | 13          | 1000            |

### Describing the output of an XQuery Statement

Given a table named CUSTOMER that has a column named INFO of the XML data type, the following example shows how to describe an XQuery statement:

```
db2 describe xquery for $cust in db2-fn:xmlcolumn("CUSTOMER.INFO") return $cust
```

Column Information

Number of Columns: 1

| SQL type | Type length | Column name | Name length |
|----------|-------------|-------------|-------------|
| 998 XML  | 0           | 1           | 1           |

If the keyword **XQUERY** is not specified, SQL0104N is returned.

```
db2 describe for $cust in db2-fn:xmlcolumn("CUSTOMER.INFO") return $cust
SQL0104N An unexpected token "for" was found following "DESCRIBE". Expected
tokens may include: "OUTPUT". SQLSTATE=42601
```

If the **DESCRIBE XQUERY** command is issued against a previous server that does not support the **XQUERY** option, the message DB21108E is returned to indicate that the functionality is not supported by the previous server.

## Describing a Table

The following example shows how to describe a table:

```
db2 describe table user1.department
```

Table: USER1.DEPARTMENT

| Column name | Data Type schema | Data Type name | Column length | Scale | Nulls |
|-------------|------------------|----------------|---------------|-------|-------|
| AREA        | SYSIBM           | SMALLINT       | 2             | 0     | No    |
| DEPT        | SYSIBM           | CHARACTER      | 3             | 0     | No    |
| DEPTNAME    | SYSIBM           | CHARACTER      | 20            | 0     | Yes   |

The following example shows how to describe a table with details. If the table is partitioned, as in this example, additional details appear after the existing output. For a non-partitioned table, the additional table heading is not displayed:

```
db2 describe table user1.employee show detail
```

| Column name  | Data Type schema | Column number | Data Type name | Column length | Hidden     |
|--------------|------------------|---------------|----------------|---------------|------------|
| FIRST        | SYSIBM           | 0             | CHARACTER      | 10            | No         |
| LAST         | SYSIBM           | 1             | CHARACTER      | 10            | No         |
| EMPLOYEEENUM | SYSTEM           | 2             | CHARACTER      | 10            | Implicitly |

Table is partitioned by range (ordered on the following column/s):

```
LAST
FIRST
EMPLOYEEENUM
```

## Describing a Table Index

The following example shows how to describe a table index. This command lists two relational data indexes, six xml data indexes, two text search indexes, and the system indexes:

```
db2 describe indexes for table user1.department
```

| Index schema | Index name         | Unique rule | Number of columns | Index type                 |
|--------------|--------------------|-------------|-------------------|----------------------------|
| SYSIBM       | SQL070531145253450 | D           | -                 | XML DATA - REGIONS         |
| SYSIBM       | SQL070531145253620 | U           | 1                 | XML DATA - PATH            |
| USER1        | RELIDX1            | D           | 1                 | RELATIONAL DATA            |
| USER1        | RELIDX2            | D           | 2                 | RELATIONAL DATA            |
| SYSIBM       | SQL070531145253650 | P           | 1                 | RELATIONAL DATA            |
| USER1        | XMLIDX1            | D           | 1                 | XML DATA - VALUES LOGICAL  |
| SYSIBM       | SQL070531154625650 | D           | 1                 | XML DATA - VALUES PHYSICAL |
| USER1        | XMLIDX2            | D           | 1                 | XML DATA - VALUES LOGICAL  |
| SYSIBM       | SQL070531154626000 | D           | 1                 | XML DATA - VALUES PHYSICAL |
| USER1        | XMLIDX3            | D           | 1                 | XML DATA - VALUES LOGICAL  |
| SYSIBM       | SQL070531154626090 | D           | 1                 | XML DATA - VALUES PHYSICAL |
| USER1        | XMLIDX4            | D           | 1                 | XML DATA - VALUES LOGICAL  |
| SYSIBM       | SQL070531154626190 | D           | 1                 | XML DATA - VALUES PHYSICAL |
| USER1        | XMLIDX5            | D           | 1                 | XML DATA - VALUES LOGICAL  |
| SYSIBM       | SQL070531154626290 | D           | 1                 | XML DATA - VALUES PHYSICAL |
| USER1        | XMLIDX6            | D           | 1                 | XML DATA - VALUES LOGICAL  |
| SYSIBM       | SQL070531154626400 | D           | 1                 | XML DATA - VALUES PHYSICAL |
| USER1        | TXTIDX1            | -           | 1                 | TEXT SEARCH                |
| USER1        | TXTIDX2            | -           | 1                 | TEXT SEARCH                |

The following command lists the relational data indexes for table USER1.DEPARTMENT:

```
db2 describe relational data indexes for table user1.department
```

| Index schema | Index name         | Unique rule | Number of columns | Null keys |
|--------------|--------------------|-------------|-------------------|-----------|
| SYSIBM       | SQL070531145253650 | P           | 1                 | Y         |
| USER1        | RELIDX1            | D           | 1                 | N         |
| USER1        | RELIDX2            | D           | 2                 | Y         |

The following command lists the indexes over XML data for table USER1.DEPARTMENT:

```
db2 describe xml data indexes for table user1.department
```

| Index schema | Index name         | Unique rule | Number of columns | Index type                 |
|--------------|--------------------|-------------|-------------------|----------------------------|
| SYSIBM       | SQL070531145253450 | D           | -                 | XML DATA - REGIONS         |
| SYSIBM       | SQL070531145253620 | U           | 1                 | XML DATA - PATH            |
| USER1        | XMLIDX1            | D           | 1                 | XML DATA - VALUES LOGICAL  |
| SYSIBM       | SQL070531154625650 | D           | 1                 | XML DATA - VALUES PHYSICAL |
| USER1        | XMLIDX2            | D           | 1                 | XML DATA - VALUES LOGICAL  |
| SYSIBM       | SQL070531154626000 | D           | 1                 | XML DATA - VALUES PHYSICAL |
| USER1        | XMLIDX3            | D           | 1                 | XML DATA - VALUES LOGICAL  |
| SYSIBM       | SQL070531154626090 | D           | 1                 | XML DATA - VALUES PHYSICAL |
| USER1        | XMLIDX4            | D           | 1                 | XML DATA - VALUES LOGICAL  |
| SYSIBM       | SQL070531154626190 | D           | 1                 | XML DATA - VALUES PHYSICAL |
| USER1        | XMLIDX5            | D           | 1                 | XML DATA - VALUES LOGICAL  |
| SYSIBM       | SQL070531154626290 | D           | 1                 | XML DATA - VALUES PHYSICAL |
| USER1        | XMLIDX6            | D           | 1                 | XML DATA - VALUES LOGICAL  |
| SYSIBM       | SQL070531154626400 | D           | 1                 | XML DATA - VALUES PHYSICAL |

The following command lists the text search index information for table USER1.DEPARTMENT:

```
db2 describe text search indexes for table user1.department
```

| Index schema | Index name |
|--------------|------------|
| USER1        | TXTIDX1    |
| USER1        | TXTIDX2    |

The following command lists information about both partitioned and nonpartitioned indexes on the partitioned table myDpartT:

```
db2 describe indexes for table myDpartT
```

| Index schema | Index name | Unique rule | Number of columns | Index Partitioning |
|--------------|------------|-------------|-------------------|--------------------|
| NEWTON       | IDXNDP     | D           | 1                 | N                  |
| NEWTON       | IDXDP      | D           | 1                 | P                  |

### Describing Data Partitions

The following example shows how to describe data partitions:

```
db2 describe data partitions for table user1.sales
```

| PartitionId | Inclusive (y/n) |            | Inclusive (y/n) |            |
|-------------|-----------------|------------|-----------------|------------|
|             | Low Value       | High Value | Low Value       | High Value |
| 0           | Y               | 2001,1     | Y               | 2001,3     |
| 1           | N               | 2001,3     | Y               | 2001,6     |
| 3           | N               | 2001,6     | Y               | 2001,9     |

Describing the data partitions with details returns the same output, as in the previous example, and includes an additional table showing the Partition ID and table space where the data for the data partition is stored, and the ID of the table space where the index is stored:

```
db2 describe data partitions for table user1.employee show detail
```

| PartitionId | Inclusive (y/n) |                   | Inclusive (y/n) |                   |
|-------------|-----------------|-------------------|-----------------|-------------------|
|             | Low Value       | High Value        |                 |                   |
| 0           | Y               | MINVALUE,MINVALUE | Y               | 'beck','kevin'    |
| 1           | N               | 'beck','kevin'    | N               | 'treece','jeff'   |
| 2           | Y               | 'treece','jeff'   | Y               | 'zhang','liping'  |
| 3           | Y               | 'zyzyck',MINVALUE | Y               | MAXVALUE,MAXVALUE |

| PartitionId | PartitionName | TableSpId | LongTblSpId | IndexTblSpId | AccessMode | Status |
|-------------|---------------|-----------|-------------|--------------|------------|--------|
| 0           | PARTx         | 3         | 43          | 50           | F          |        |
| 1           | PARTNew       | 13        | 13          | 13           | N          | A      |
| 2           | PART3         | 31        | 33          | 35           | F          |        |
| 3           | PART4         | 23        | 34          | 23           | N          | A      |

## DETACH

Removes the logical DBMS instance attachment, and terminates the physical communication connection if there are no other logical connections using this layer.

### Authorization

None

### Required connection

None. Removes an existing instance attachment.

### Command syntax

```
►—DETACH—————►
```

### Command parameters

None

## DROP CONTACT

Removes a contact from the list of contacts defined on the local system. A contact is a user to whom the Scheduler and Health Monitor send messages. The setting of the Database Administration Server (DAS) **contact\_host** configuration parameter determines whether the list is local or global.

### Authorization

None

### Required connection

None. Local execution only: this command cannot be used with a remote connection.

### Command syntax

```
►—DROP CONTACT—name—————►
```

## **Command parameters**

### **CONTACT *name***

The name of the contact that will be dropped from the local system.

## **DROP CONTACTGROUP**

Removes a contact group from the list of contacts defined on the local system. A contact group contains a list of users to whom the Scheduler and Health Monitor send messages. The setting of the Database Administration Server (DAS) **contact\_host** configuration parameter determines whether the list is local or global.

### **Authorization**

None

### **Required Connection**

None

### **Command Syntax**

**►—DROP CONTACTGROUP—*name*—►**

## **Command Parameters**

### **CONTACTGROUP *name***

The name of the contact group that will be dropped from the local system.

## **DROP DATABASE**

Deletes the database contents and log files for the database, uncatalogs the database, and deletes the database subdirectory.

### **Scope**

By default, this command affects all database partitions that are listed in the db2nodes.cfg file.

### **Authorization**

One of the following authorities:

- SYSADM
- SYSCTRL

### **Required connection**

Instance. An explicit attachment is not required. If the database is listed as remote, an instance attachment to the remote database partition server is established for the duration of the command.

## Command syntax

```
►—DROP— DATABASE [database-alias] [AT DBPARTITIONNUM] —►
```

## Command parameters

### DATABASE *database-alias*

Specifies the alias of the database to be dropped. The database must be cataloged in the system database directory.

### AT DBPARTITIONNUM

Specifies that the database is to be deleted only on the database partition that issued the **DROP DATABASE** command. This parameter is used by utilities supplied with IBM Db2 Warehouse, can be used in partitioned database environments, and is not intended for general use. Improper use of this parameter can cause inconsistencies in the system, so it should only be used with caution.

## Examples

The following example deletes the database referenced by the database alias SAMPLE:

```
db2 drop database sample
```

## Usage notes

**DROP DATABASE** deletes all user data and log files, as well as any backup and restore history for the database. If the log files are needed for a rollforward recovery after a restore operation, or the backup history required to restore the database, these files should be saved before issuing this command.

When you use the **DROP DATABASE** command, archived log files for the dropped database are not affected. You must manually move archived log files from the log archive path. If you do not move these log files, future database recovery operations that use the same archive log path might fail.

The database must not be in use; all users must be disconnected database before the database can be dropped.

To be dropped, a database must be cataloged in the system database directory. Only the specified database alias is removed from the system database directory. If other aliases with the same database name exist, their entries remain. If the database being dropped is the last entry in the local database directory, the local database directory is deleted automatically.

If **DROP DATABASE** is issued from a remote client (or from a different instance on the same machine), the specified alias is removed from the client's system database directory. The corresponding database name is removed from the server's system database directory.

You must migrate databases to Db2 Version 10.5 before dropping a database. If you drop a database before migrating it, the operation fails (SQL5035N).

## **DROP DBPARTITIONNUM VERIFY**

Verifies if a database partition exists in the database partition groups of any databases, and if an event monitor is defined on the database partition. This command should be used before dropping a database partition from a partitioned database environment.

### **Scope**

This command only affects the database partition on which it is issued.

### **Authorization**

SYSADM

### **Command syntax**

►—DROP DBPARTITIONNUM VERIFY—————►

### **Command parameters**

None

### **Usage notes**

If a message is returned, indicating that the database partition is not in use, use the **STOP DATABASE MANAGER** command with **DROP DBPARTITIONNUM** to remove the entry for the database partition from the db2nodes.cfg file, which removes the database partition from the database system.

If a message is returned, indicating that the database partition is in use, the following actions should be taken:

1. If the database partition contains data, redistribute the data to remove it from the database partition using **REDISTRIBUTE DATABASE PARTITION GROUP**. Use either the **DROP DBPARTITIONNUM** option on the **REDISTRIBUTE DATABASE PARTITION GROUP** command or on the **ALTER DATABASE PARTITION GROUP** statement to remove the database partition from any database partition groups for the database. This must be done for each database that contains the database partition in a database partition group.
2. Drop any event monitors that are defined on the database partition.
3. Rerun **DROP DBPARTITIONNUM VERIFY** to ensure that the database is no longer in use.

## **DROP TOOLS CATALOG**

Drops the Db2 tools catalog tables for the specified catalog in the given database.

This command is not valid on a IBM Data Server Client.

**Warning:** If you drop the active tools catalog, you can no longer schedule tasks and scheduled tasks are not executed. To activate the scheduler, you must activate a previous tools catalog or create a new one.

## Scope

This command affects the database.

## Authorization

One of the following authorities:

- SYSADM
- SYSCTRL

The user must also have DASADM authority to update the Db2 administration server (DAS) configuration parameters.

## Required connection

A database connection is temporarily established by this command during processing.

## Command syntax

```
►►—DROP TOOLS CATALOG—catalog-name—IN DATABASE—database-name—FORCE—►►
```

## Command parameters

### CATALOG *catalog-name*

A name to be used to uniquely identify the Db2 tools catalog. The catalog tables are dropped from this schema.

### DATABASE *database-name*

A name to be used to connect to the local database containing the catalog tables.

### FORCE

The force option is used to force the Db2 administration server's scheduler to stop. If this is not specified, the tools catalog will not be dropped if the scheduler cannot be stopped.

## Examples

```
db2 drop tools catalog cc in database toolsdb
db2 drop tools catalog in database toolsdb force
```

## Usage notes

- The **jdk\_path** configuration parameter must be set in the Db2 administration server (DAS) configuration to the minimum supported level of the SDK for Java.
- This command will disable the scheduler at the local DAS and reset the DAS configuration parameters related to the Db2 tools catalog database configuration.

## ECHO

Permits the user to write character strings to standard output.

## Authorization

None

## Required connection

None

## Command syntax

```
►►—ECHO—
 └─character-string─┘
```

## Command parameters

*character-string*

Any character string.

## Usage notes

If an input file is used as standard input, or comments are to be printed without being interpreted by the command shell, the **ECHO** command will print character strings directly to standard output.

One line is printed each time that **ECHO** is issued.

The **ECHO** command is not affected by the verbose (-v) option.

## EDIT

Launches a user-specified editor with a specified command for editing. When the user finishes editing, saves the contents of the editor and exits the editor, permits the user to execute the command in CLP interactive mode.

## Scope

This command can only be run within CLP interactive mode. Specifically, it cannot be run from the CLP command mode or the CLP batch mode.

## Authorization

None

## Required connection

None

## Command syntax

```
►►—EDIT—
 └─E─┘ └─EDITOR—editor─┘ └─num─┘
```

## Command parameters

### EDITOR

Launch the editor specified for editing. If this parameter is not specified, the editor to be used is determined in the following order:

1. the editor specified by the **DB2\_CLP\_EDITOR** registry variable
2. the editor specified by the **VISUAL** environment variable

3. the editor specified by the **EDITOR** environment variable
4. On Windows operating systems, the Notepad editor; on UNIX operating systems, the vi editor

**num** If *num* is positive, launches the editor with the command corresponding to *num*. If *num* is negative, launches the editor with the command corresponding to *num*, counting backwards from the most recent command in the command history. Zero is not a valid value for *num*. If this parameter is not specified, launches the editor with the most recently run command. (This is equivalent to specifying a value of -1 for *num*.)

### Usage notes

1. The editor specified must be a valid editor contained in the **PATH** of the operating system.
2. You can view a list of the most recently run commands available for editing by executing the **HISTORY** command.
3. The **EDIT** command will never be recorded in the command history. However, if you choose to run a command that was edited using the **EDIT** command, this command will be recorded in the command history.

## EXPORT

Exports data from a database to one of several external file formats. The user specifies the data to be exported by supplying an SQL SELECT statement, or by providing hierarchical information for typed tables.

For more information, see “File type modifiers for the export utility” on page 145.

### Authorization

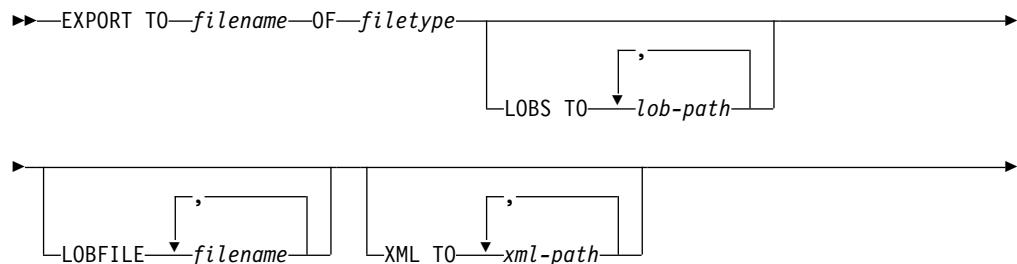
One of the following authorities:

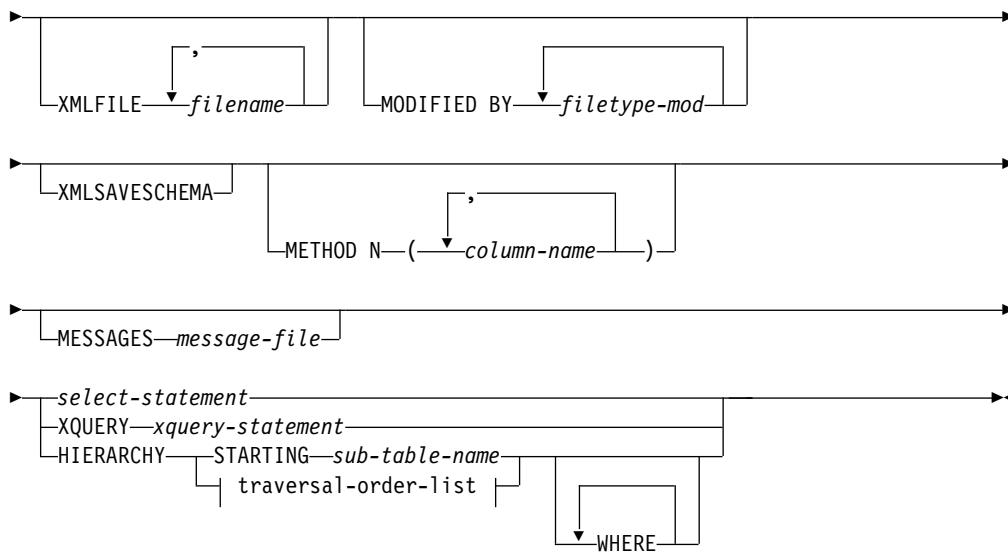
- DATAACCESS authority
- CONTROL or SELECT privilege on each participating table or view

### Required connection

Database. If implicit connect is enabled, a connection to the default database is established. Utility access to Linux, UNIX, or Windows database servers from Linux, UNIX, or Windows clients must be a direct connection through the engine. Access must not be a direct connection through a Db2 Connect gateway or loop back environment.

### Command syntax





#### traversal-order-list:



## Command parameters

### **TO** *filename*

Specifies the name of the file to which data is to be exported. If the complete path to the file is not specified, the export utility uses the current directory and the default drive as the destination.

If the name of a file that exists is specified, the export utility overwrites the contents of the file; it does not append the information.

### **OF** *filetype*

Specifies the format of the data in the output file:

- **DEL** (delimited ASCII format), which is used by various database manager and file manager programs.
- **IXF** (Integration Exchange Format, PC version) is a proprietary binary format.

### **LOBS TO** *lob-path*

Specifies one or more paths to directories in which the LOB files are to be stored. There must be at least one file per LOB path, and each file must contain at least one LOB. The maximum number of paths that can be specified is 999. This setting implicitly activates the **LOBSINFILE** behavior.

### **LOBFILE** *filename*

Specifies one or more base file names for the LOB files. When name space is exhausted for the first name, the second name is used, and so on. This setting implicitly activates the **LOBSINFILE** behavior.

When you create LOB files during an export operation, file names are constructed by appending the current base name from this list to the current path (from *lob-path*). Then, you must append a 3-digit sequence number to start, and the three character identifier **lob**. For example, if the

current LOB path is the directory /u/foo/lob/path/, and the current LOB file name is bar, the LOB files that are created are /u/foo/lob/path/bar.001.lob, /u/foo/lob/path/bar.002.lob, and so on. The 3-digit sequence number in the LOB file name grows to 4-digits once 999 is used, 4-digits grow to 5-digits once 9999 is used, and so on.

**XML TO** *xml-path*

Specifies one or more paths to directories in which the XML files are to be stored. There is at least one file per XML path, and each file contains at least one XQuery Data Model (XDM) instance. If more than one path is specified, then XDM instances are distributed evenly among the paths.

**XMLFILE** *filename*

Specifies one or more base file names for the XML files. When name space is exhausted for the first name, the second name is used, and so on.

When you create XML files during an export operation, file names are constructed by appending the current base name from this list to the current path (from *xml-path*). Then, you must append a 3-digit sequence number, and the three character identifier xml. For example, if the current XML path is the directory /u/foo/xml/path/, and the current XML file name is bar, the XML files that are created are /u/foo/xml/path/bar.001.xml, /u/foo/xml/path/bar.002.xml, and so on.

**MODIFIED BY** *filetype-mod*

Specifies file type modifier options. See “File type modifiers for the export utility” on page 145.

**XMLSAVESCHEMA**

Specifies that XML schema information must be saved for all XML columns. For each exported XML document that was validated against an XML schema when it was inserted, the fully qualified SQL identifier of that schema is stored as an (SCH) attribute inside the corresponding XML Data Specifier (XDS). If the exported document was not validated against an XML schema or the schema object no longer exists in the database, an SCH attribute will not be included in the corresponding XDS.

The schema and name portions of the SQL identifier are stored as the "OBJECTSCHEMA" and "OBJECTNAME" values in the row of the SYSCAT.XSROBJECTS catalog table corresponding to the XML schema.

The **XMLSAVESCHEMA** option is not compatible with XQuery sequences that do not produce well-formed XML documents.

**METHOD N** *column-name*

Specifies one or more column names to be used in the output file. If this parameter is not specified, the column names in the table are used. This parameter is valid only for IXF files, but is not valid when you export hierarchical data.

**MESSAGES** *message-file*

Specifies the destination for warning and error messages that occur during an export operation. If the file exists, the export utility appends the information. If *message-file* is omitted, the messages are written to standard output.

***select-statement***

Specifies the SELECT or XQUERY statement that returns the data to be exported. If the statement causes an error, a message is written to the

message file (or to standard output). If the error code is one of SQL0012W, SQL0347W, SQL0360W, SQL0437W, or SQL1824W, the export operation continues; otherwise, it stops.

If the SELECT statement is in the form of `SELECT * FROM tablename` and the table contains implicitly hidden columns, you must explicitly specify whether data for the hidden columns is included in the export operation. Use one of the following methods to indicate whether data for hidden columns is included:

- Use one of the hidden column file type modifiers: specify `implicitlyhiddeninclude` when the export contains data for the hidden columns, or `implicitlyhiddenmissing` when the export does not.  
`db2 export to t.del of del modified by implicitlyhiddeninclude  
select * from t`
- Use the `DB2_DMU_DEFAULT` registry variable on the client-side to set the default behavior when data movement utilities encounter tables with implicitly hidden columns.  
`db2set DB2_DMU_DEFAULT=IMPLICITLYHIDDENINCLUDE  
db2 export to t.del of del select * from t`

#### **HIERARCHY STARTING *sub-table-name***

Using the default traverse order (OUTER order for ASC or DEL files, or the order that is stored in PC/IXF data files), export a sub-hierarchy starting from *sub-table-name*.

#### **HIERARCHY *traversal-order-list***

Export a sub-hierarchy by using the specified traverse order. All sub-tables must be listed in PRE-ORDER fashion. The first sub-table name is used as the target table name for the SELECT statement.

## **Examples**

The following example shows how to export information from the STAFF table in the SAMPLE database to the file `myfile.ixf`. The output is in IXF format. You must be connected to the SAMPLE database before you issue the command. The index definitions (if any) are stored in the output file except when the database connection is made through Db2 Connect.

```
db2 export to myfile.ixf of ixf messages msgs.txt select * from staff
```

The following example shows how to export the information about employees in Department 20 from the STAFF table in the SAMPLE database. The output is in IXF format and goes into the `awards.ixf` file. You must first connect to the SAMPLE database before you issue the command. Also, the actual column name in the table is 'dept' instead of 'department'.

```
db2 export to awards.ixf of ixf messages msgs.txt select * from staff
where dept = 20
```

The following example shows how to export LOBs to a DEL file:

```
db2 export to myfile.del of del lobs to mylobs/
lobfile lobs1, lobs2 modified by lobsinfile
select * from emp_photo
```

The following example shows how to export LOBs to a DEL file, specifying a second directory for files that might not fit into the first directory:

```
db2 export to myfile.del of del
lobs to /db2exp1/, /db2exp2/ modified by lobsinfile
select * from emp_photo
```

The following example shows how to export data to a DEL file. This step is done by using a single quotation mark as the string delimiter, a semicolon as the column delimiter, and a comma as the decimal point. The same convention must be used when you import data back into the database:

```
db2 export to myfile.del of del
modified by chardel'' coldel; decpt,
select * from staff
```

## Usage notes

- Be sure to complete all table operations and release all locks before you start an export operation. This step can be done by issuing a COMMIT after you close all cursors opened WITH HOLD, or by issuing a ROLLBACK.
- Table aliases can be used in the SELECT statement.
- You might encounter the SQL27981W message when it does not seem applicable, such as when the EXPORT table is not partitioned. You can safely ignore this warning in this case. This warning message might be returned if the SELECT statement of the EXPORT command includes the word ' from ' before the SQL keyword FROM.
- The messages that are placed in the message file include the information that is returned from the message retrieval service. Each message begins on a new line.
- PC/IXF import must be used to move data between databases. If character data that contains row separators is exported to a delimited ASCII (DEL) file and processed by a text transfer program, fields that contain the row separators shrinks or expands.
- The file copying step is not necessary if the source and the target databases are both accessible from the same client.
- Db2 Connect can be used to export tables from DRDA servers such as Db2 for z/OS, Db2 for VM and VSE, and Db2 for OS/400®. Only PC/IXF export is supported.
- When you export to the IXF format, if identifiers exceed the maximum size that is supported by the IXF format, the export succeeds. However, the resulting datafile cannot be used by a subsequent import operation by using the CREATE mode (SQL27984W).
- When you export to the IXF format, the export utility does not maintain column-organized table metadata that is needed to re-create the column-organized table during a subsequent import operation by using the CREATE mode.
- When you export to a diskette on Windows, and the table that has more data than the capacity of a single diskette, the system prompts for another diskette. Multiple-part PC/IXF files (also known as multi-volume PC/IXF files, or logically split PC/IXF files), are generated and stored in separate diskettes. In each file, with the exception of the last, there is a Db2 CONTINUATION RECORD (or "AC" Record in short) written. This record indicates that the files are logically split and shows where to look for the next file. The files can then be transferred to an AIX system to be read by the import and load utilities. The export utility will not create multiple-part PC/IXF files when invoked from an AIX system. For detailed usage, see the **IMPORT** command or **LOAD** command.
- The export utility stores the NOT NULL WITH DEFAULT attribute of the table in an IXF file if the SELECT statement provided is in the form **SELECT \* FROM tablename**.
- When you export typed tables, subselect statements can be expressed only by specifying the target table name and the **WHERE** clause. Fullselect and *select-statement* cannot be specified when you export a hierarchy.

- For file formats other than IXF, it is recommended that you specify the traversal order list. The list tells Db2 how to traverse the hierarchy, and what sub-tables to export. If this list is not specified, all tables in the hierarchy are exported, and the default order is the OUTER order. The alternative is to use the default order, which is the order that is given by the OUTER function.
- Use the same traverse order during an import operation. The load utility does not support loading hierarchies or sub-hierarchies.
- When you export data from a table that has protected rows, the LBAC credentials that are held by the session authorization id might limit the rows that are exported. If the session authorization ID does not have read access to the rows, then they will not be exported. No error or warning is given.
- If the LBAC credentials that are held by the session authorization ID do not allow reading from one or more protected columns included in the export, then the export fails and an error (SQLSTATE 42512) is returned.
- When you run Data Movement utilities such as **export** and **db2move**, the query compiler might determine that the underlying query runs more efficiently against an MQT than the base table or tables. In this case, the query executes against a refresh deferred MQT, and the result of the utilities might not accurately represent the data in the underlying table.
- Export packages are bound by using the DATETIME ISO format. Thus, all date/time/timestamp values are converted into ISO format when cast to a string representation. Since the CLP packages are bound by using the DATETIME LOC format (locale-specific format), you might see inconsistent behavior between CLP and export if the CLP DATETIME format is different from ISO. For instance, the following SELECT statement might return expected results:

```
db2 select col2 from tab1 where char(col2)='05/10/2005';
 COL2

05/10/2005
05/10/2005
05/10/2005
3 record(s) selected.
```

But an export command that uses the same select clause will not:

```
db2 export to test.del of del select col2 from test
where char(col2)='05/10/2005';
Number of rows exported: 0
```

Now, replacing the LOCALE date format with ISO format gives the expected results:

```
db2 export to test.del of del select col2 from test
where char(col2)='2005-05-10';
Number of rows exported: 3
```

## File type modifiers for the export utility

Table 8. Valid file type modifiers for the export utility: All file formats

| Modifier                | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| lobsinfile              | <p><i>lob-path</i> specifies the path to the files that contain LOB data. Each path contains at least one file that contains at least one LOB pointed to by a Lob Location Specifier (LLS) in the data file. The LLS is a string representation of the location of a LOB in a file that is stored in the LOB file path. The format of an LLS is <i>filename.ext.nnn.mmm/</i>, where <i>filename.ext</i> is the name of the file that contains the LOB, <i>nnn</i> is the offset in bytes of the LOB within the file, and <i>mmm</i> is the length of the LOB in bytes. For example, if the string db2exp.001.123.456/ is stored in the data file, the LOB is at offset 123 in the file db2exp.001, and is 456 bytes long.</p> <p>If you specify the <b>lobsinfile</b> modifier when you use <b>EXPORT</b>, the LOB data is placed in the locations that are specified by the <b>LOBS TO</b> clause. Otherwise the LOB data is sent to the data file directory. The <b>LOBS TO</b> clause specifies one or more paths to directories in which the LOB files are to be stored. There is at least one file per LOB path, and each file contains at least one LOB. The <b>LOBS TO</b> or <b>LOBFILE</b> options implicitly activates the LOBSINFILE behavior.</p> <p>To indicate a null LOB, enter the size as -1. If the size is specified as 0, it is treated as a 0 length LOB. For null LOBS with length of -1, the offset and the file name are ignored. For example, the LLS of a null LOB might be db2exp.001.7.-1/.</p> |
| implicitlyhiddeninclude | <p>This modifier is used with <b>SELECT *</b> queries and specifies that the data in implicitly hidden columns is exported even though that data is not included in the result of the <b>SELECT *</b> query. This modifier cannot be used with the <b>implicitlyhiddenmissing</b> modifier.</p> <p>If this modifier is used and the query is not a <b>SELECT *</b>, then an error is returned (SQLCODE SQL3526N).</p> <p>This modifier does not apply to the hidden <b>RANDOM DISTRIBUTION KEY</b> column of a random distribution tables that uses the random by generation method. The column must be explicitly referenced in the query to be included in the exported data.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| implicitlyhiddenmissing | <p>This modifier is used with <b>SELECT *</b> queries and specifies that the data in implicitly hidden columns is not exported. This modifier cannot be used with the <b>implicitlyhiddeninclude</b> modifier.</p> <p>If this modifier is used and the query is not a <b>SELECT *</b>, then an error is returned (SQLCODE SQL3526N).</p> <p>This modifier does not apply to the hidden <b>RANDOM DISTRIBUTION KEY</b> column of a random distribution tables that uses the random by generation method. The column must be explicitly referenced in the query to be included in the exported data.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| xmlinsepfiles           | Each XQuery Data Model (XDM) instance is written to a separate file. By default, multiple values are concatenated together in the same file.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| lobsinsepfiles          | Each LOB value is written to a separate file. By default, multiple values are concatenated together in the same file.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| xmlnodedeclaration      | XDM instances are written without an XML declaration tag. By default, XDM instances are exported with an XML declaration tag at the beginning that includes an encoding attribute.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

*Table 8. Valid file type modifiers for the export utility: All file formats (continued)*

| Modifier   | Description                                                                                                                                                                                                                                                |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| xmlchar    | XDM instances are written in the character code page. The character codepage is the value that is specified by the codepage file type modifier, or the application code page if it is not specified. By default, XDM instances are written out in Unicode. |
| xmlgraphic | If the <code>xmlgraphic</code> modifier is specified with the <b>EXPORT</b> command, the exported XML document is encoded in the UTF-16 code page regardless of the application code page or the codepage file type modifier.                              |

*Table 9. Valid file type modifiers for the export utility: DEL (delimited ASCII) file format*

| Modifier           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| chardelx           | <p><i>x</i> is a single character string delimiter. The default value is a double quotation mark (""). The specified character is used in place of double quotation marks to enclose a character string.<sup>2</sup> If you want to explicitly specify the double quotation mark as the character string delimiter, it must be specified as follows:</p> <p style="padding-left: 40px;">modified by chardel""</p> <p>The single quotation mark ('') can also be specified as a character string delimiter as follows:</p> <p style="padding-left: 40px;">modified by chardel''</p> |
| codepage= <i>x</i> | <p><i>x</i> is an ASCII character string. The value is interpreted as the code page of the data in the output data set. Converts character data from this code page from the application code page during the export operation.</p> <p>For pure DBCS (graphic), mixed DBCS, and EUC, delimiters are restricted to the range of x00 to x3F, inclusive.</p>                                                                                                                                                                                                                          |
| coldelx            | <p><i>x</i> is a single character column delimiter. The default value is a comma (,). The specified character is used in place of a comma to signal the end of a column.<sup>2</sup></p> <p>In the following example, <code>coldel;</code> causes the export utility to use the semicolon character (;) as a column delimiter for the exported data:</p> <pre>db2 "export to temp of del modified by coldel;       select * from staff where dept = 20"</pre>                                                                                                                      |
| decplusblank       | Plus sign character. Causes positive decimal values to be prefixed with a blank space instead of a plus sign (+). The default action is to prefix positive decimal values with a plus sign.                                                                                                                                                                                                                                                                                                                                                                                        |
| decptx             | <i>x</i> is a single character substitute for the period as a decimal point character. The default value is a period (.). The specified character is used in place of a period as a decimal point character. <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                          |
| nochardel          | <p>Column data is not surrounded by character delimiters. This option must not be specified if the data is intended to be imported or loaded by using Db2. It is provided to support vendor data files that do not have character delimiters. Improper usage might result in data loss or corruption.</p> <p>This option cannot be specified with <code>chardelx</code> or <code>nodoubledel</code>. These options are mutually exclusive.</p>                                                                                                                                     |
| nodoubledel        | Suppresses recognition of double character delimiters. <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

**Table 9. Valid file type modifiers for the export utility: DEL (delimited ASCII) file format (continued)**

*Table 9. Valid file type modifiers for the export utility: DEL (delimited ASCII) file format (continued)*

| Modifier            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| timestampformat="x" | <p>x is the format of the time stamp in the source file.<sup>4</sup> Valid time stamp elements are:</p> <ul style="list-style-type: none"> <li><b>YYYY</b> Year (4 digits in the range 0000 - 9999)</li> <li><b>M</b> Month (1 or 2 digits in the range 1 - 12)</li> <li><b>MM</b> Month (2 digits in the range 01 - 12; mutually exclusive with M and MMM)</li> <li><b>MMM</b> Month (three-letter case-insensitive abbreviation for the month name; mutually exclusive with M and MM)</li> <li><b>D</b> Day (1 or 2 digits in the range 1 - 31)</li> <li><b>DD</b> Day (2 digits in the range 01 - 31; mutually exclusive with D)</li> <li><b>DDD</b> Day of the year (3 digits in the range 001 - 366; mutually exclusive with other day or month elements)</li> <li><b>H</b> Hour (1 or 2 digits in the range 0 - 12 for a 12-hour system, and 0 - 24 for a 24-hour system)</li> <li><b>HH</b> Hour (2 digits in the range 00 - 12 for a 12-hour system, and 00 - 24 for a 24-hour system; mutually exclusive with H)</li> <li><b>M</b> Minute (1 or 2 digits in the range 0 - 59)</li> <li><b>MM</b> Minute (2 digits in the range 00 - 59; mutually exclusive with M, minute)</li> <li><b>S</b> Second (1 or 2 digits in the range 0 - 59)</li> <li><b>SS</b> Second (2 digits in the range 00 - 59; mutually exclusive with S)</li> <li><b>SSSSS</b> Second of the day after midnight (5 digits in the range 00000 - 86400; mutually exclusive with other time elements)</li> <li><b>U (1 - 12 times)</b><br/>Fractional seconds (number of occurrences of U represent the number of digits with each digit in the range 0 - 9)</li> <li><b>TT</b> Meridian indicator (AM or PM)</li> </ul> <p>Following is an example of a time stamp format:<br/>         "YYYY/MM/DD HH:MM:SS.UUUUUU"</p> <p>The MMM element produces the following values: 'Jan', 'Feb', 'Mar', 'Apr', 'May', 'Jun', 'Jul', 'Aug', 'Sep', 'Oct', 'Nov', and 'Dec'. 'Jan' is equal to month 1, and 'Dec' is equal to month 12.</p> <p>The following example illustrates how to export data that contains user-defined time stamp formats from a table called 'schedule':</p> <pre>db2 export to delfile2 of del modified by timestampformat="yyyy.mm.dd hh:mm tt" select * from schedule</pre> |

*Table 10. Valid file type modifiers for the export utility: IXF file format*

| Modifier   | Description                                                                                                                                                                                                                                                                                                                                      |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| codepage=x | <p>x is an ASCII character string. The value is interpreted as the code page of the data in the output data set. Converts character data from this code page to the application code page during the export operation.</p> <p>For pure DBCS (graphic), mixed DBCS, and EUC, delimiters are restricted to the range of x00 to x3F, inclusive.</p> |

**Note:**

1. The export utility does not issue a warning if an attempt is made to use unsupported file types with the **MODIFIED BY** option. If this step is attempted, the export operation fails, and an error code is returned.
2. *Delimiter considerations for moving data* lists restrictions that apply to the characters that can be used as delimiter overrides.
3. The export utility normally writes
  - date data in *YYYYMMDD* format
  - char(date) data in "YYYY-MM-DD" format
  - time data in "HH.MM.SS" format
  - time stamp data in "YYYY-MM-DD-HH.MM.SS.uuuuuu" format

Data that is contained in any datetime columns that are specified in the SELECT statement for the export operation are also in these formats.

4. For time stamp formats, care must be taken to avoid ambiguity between the month and the minute descriptors, since they both use the letter M. A month field must be next to other date fields. A minute field must be next to other time fields. Following are some ambiguous time stamp formats:

"M" (could be a month, or a minute)  
"M:M" (Which is which?)  
"M:YYYY:M" (Both are interpreted as month.)  
"S:M:YYYY" (adjacent to both a time value and a date value)

In ambiguous cases, the utility reports an error message, and the operation fails.

Following are some unambiguous time stamp formats:

"M:YYYY" (Month)  
"S:M" (Minute)  
"M:YYYY:S:M" (Month....Minute)  
"M:H:YYYY:M:D" (Minute....Month)

5. All XDM instances are written to XML files that are separate from the main data file, even if the **XMLFILE** and **XML TO** clauses are not specified. By default, XML files are written to the path of the exported data file. The default base name for XML files is the name of the exported data file with the extension ".XML" appended to it.
6. All XDM instances are written with an XML declaration at the beginning that includes an encoding attribute, unless the XMLNODECLARATION file type modifier is specified.
7. By default, all XDM instances are written in Unicode unless the XMLCHAR or XMLGRAPHIC file type modifier is specified.
8. The default path for XML data and LOB data is the path of the main data file. The default XML file base name is the main data file. The default LOB file base name is the main data file. For example, if the main data file is:  
`/mypath/myfile.del`

The default path for XML data and LOB data is:  
`/mypath"`

The default XML file base name is:  
`myfile.del`

The default LOB file base name is:

`myfile.del`

The LOBSINFILE file type modifier must be specified in order to have LOB files generated.

9. The export utility appends a numeric identifier to each LOB file or XML file. The identifier starts as a 3-digit, 0 padded sequence value, starting at:  
`.001`

After the 999th LOB file or XML file, the identifier will no longer be padded with zeros (for example, the 1000th LOG file or XML file will have an extension of:

`.1000`

Following the numeric identifier is a three character type identifier that represents the data type, either:

`.lob`

or

`.xml`

For example, a generated LOB file would have a name in the format:

`myfile.del.001.lob`

and a generated XML file would have a name in the format:

`myfile.del.001.xml`

10. It is possible to have the export utility export XDM instances that are not well-formed documents by specifying an XQuery. However, you cannot import or load these exported documents directly into an XML column, since XML columns can contain only complete documents.

## FORCE APPLICATION

Forces local or remote users or applications off the system to allow for maintenance on a server.

**Attention:** If an operation that cannot be interrupted (**RESTORE DATABASE**, for example) is forced, the operation must be successfully re-executed before the database becomes available.

### Scope

This command affects all database partitions that are listed in the `$HOME/sql1ib/db2nodes.cfg` file.

In a partitioned database environment, this command does not have to be issued from the coordinator database partition of the application being forced. It can be issued from any database partition server in the partitioned database environment.

### Authorization

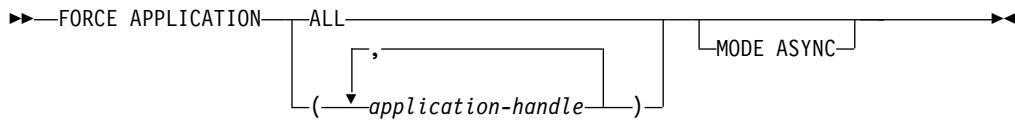
One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT

## Required connection

Instance. To force users off a remote server, it is first necessary to attach to that server. If no attachment exists, this command is executed locally.

## Command syntax



## Command parameters

### FORCE APPLICATION

**ALL** All applications will be disconnected from the database server.

#### *application-handle*

Specifies the agent to be terminated. List the values using the **LIST APPLICATIONS** command.

### MODE ASYNC

The command does not wait for all specified users to be terminated before returning; it returns as soon as the function has been successfully issued or an error (such as invalid syntax) is discovered.

This is the only mode that is currently supported.

## Examples

The following example forces two users, with *application-handle* values of 41408 and 55458, to disconnect from the database:

```
db2 "force application (41408, 55458)"
```

## Usage notes

The database manager remains active so that subsequent database manager operations can be handled without the need for **db2start**.

To preserve database integrity, only users who are idling or executing interruptible database operations can be terminated.

The following types of users and applications cannot be forced:

- users creating a database
- system applications

In order to successfully force these types of users and applications, the database must be deactivated and/or the instance restarted.

After a **FORCE APPLICATION** has been issued, the database will still accept requests to connect. Additional forces might be required to completely force all users off.

## GET ADMIN CONFIGURATION

Returns the values of individual Db2 Administration Server (DAS) configuration parameter values on the administration node of the system. The DAS is a special administrative tool that enables remote administration of Db2 servers.

For a list of the DAS configuration parameters, see the description of the **UPDATE ADMIN CONFIGURATION** command.

**Important:** The Db2 Administration Server (DAS) has been deprecated in Version 9.7 and might be removed in a future release. The DAS is not supported in Db2 pureScale environments. Use software programs that use the Secure Shell protocol for remote administration. For more information, see “Db2 administration server (DAS) has been deprecated” at .

## Scope

This command returns information about DAS configuration parameters on the administration node of the system to which you are attached or that you specify in the **FOR NODE** option.

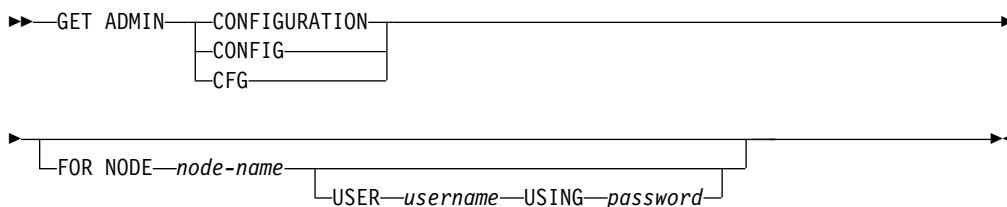
## Authorization

None

## Required connection

Node. To display the DAS configuration for a remote system, first connect to that system or use the **FOR NODE** option to specify the administration node of the system.

## Command syntax



## Command parameters

FOR NODE *node-name*

Enter the name of a the administration node to view DAS configuration parameters there.

**USER** *username* **USING** *password*

If connection to the node requires user name and password, enter this information.

## Examples

The following example is sample output from **GET ADMIN CONFIGURATION**:

## Admin Server Configuration

Authentication Type DAS (AUTHENTICATION) = SERVER ENCRYPT

DAS Administration Authority Group Name (DASADM\_GROUP) = ADMINIST

Name of the Db2 Server System (DB2SYSTEM) = swalkty

|                                 |                               |
|---------------------------------|-------------------------------|
| DAS Code Page                   | (DAS_CODEPAGE) = 0            |
| DAS Territory                   | (DAS_TERRITORY) = 0           |
| Location of Contact List        | (CONTACT_HOST) = hostA.ibm.ca |
| Execute Expired Tasks           | (EXEC_EXP_TASK) = NO          |
| Scheduler Mode                  | (SCHED_ENABLE) = ON           |
| SMTP Server                     | (SMTP_SERVER) = smtp1.ibm.ca  |
| Tools Catalog Database          | (TOOLSCAT_DB) = CCMD          |
| Tools Catalog Database Instance | (TOOLSCAT_INST) = DB2         |
| Tools Catalog Database Schema   | (TOOLSCAT_SCHEMA) = TOOLSCAT  |
| Scheduler User ID               | = db2admin                    |

## Usage notes

If an error occurs, the information returned is not valid. If the configuration file is invalid, an error message is returned. The user must install the DAS again to recover.

To set the configuration parameters to the default values shipped with the DAS, use the **RESET ADMIN CONFIGURATION** command.

## GET ALERT CONFIGURATION

Returns the alert configuration settings for health indicators for a particular instance.

**Important:** This command or API has been deprecated and might be removed in a future release because the health monitor has been deprecated in Version 9.7. It is not supported in Db2 pureScale environments. For more information, see “Health monitor has been deprecated” at [http://www.ibm.com/support/knowledgecenter/SSEPGG\\_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0055045.html](http://www.ibm.com/support/knowledgecenter/SSEPGG_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0055045.html).

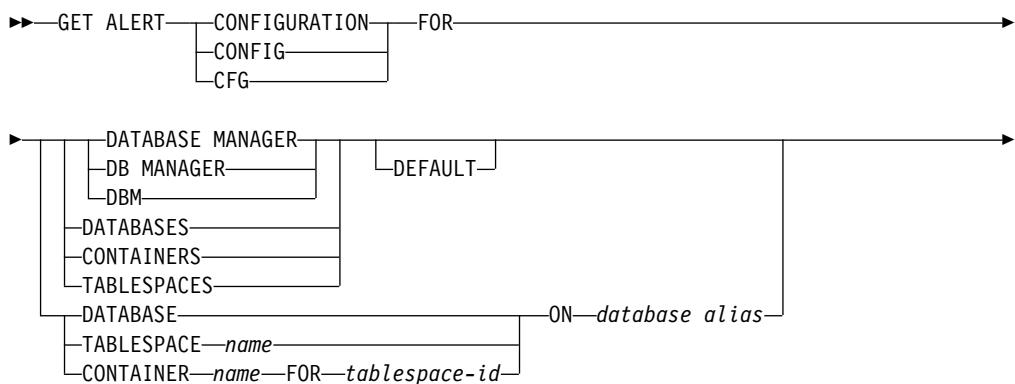
## Authorization

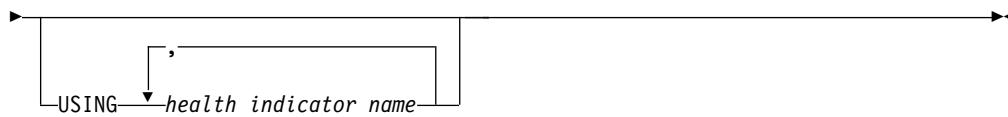
None

## Required connection

Instance. An explicit attachment is not required.

## Command syntax





## Command parameters

### **DATABASE MANAGER**

Retrieves alert settings for the database manager.

### **DATABASES**

Retrieves alert settings for all databases managed by the database manager. These are the settings that apply to all databases that do not have custom settings. Custom settings are defined using the **DATABASE ON *database alias*** clause.

### **CONTAINERS**

Retrieves alert settings for all table space containers managed by the database manager. These are the settings that apply to all table space containers that do not have custom settings. Custom settings are defined using the **CONTAINER *name* ON *database alias*** clause.

### **TABLESPACES**

Retrieves alert settings for all table spaces managed by the database manager. These are the settings that apply to all table spaces that do not have custom settings. Custom settings are defined using the **TABLESPACE *name* ON *database alias*** clause.

### **DEFAULT**

Specifies that the install defaults are to be retrieved.

### **DATABASE ON *database alias***

Retrieves the alert settings for the database specified using the **ON *database alias*** clause. If this database does not have custom settings, then the settings for all databases for the instance will be returned, which is equivalent to using the **DATABASES** parameter.

### **CONTAINER *name* FOR *tablespace-id* ON *database alias***

Retrieves the alert settings for the table space container called *name*, for the table space specified using the **FOR *tablespace-id*** clause, on the database specified using the **ON *database alias*** clause. If this table space container does not have custom settings, then the settings for all table space containers for the database will be returned, which is equivalent to using the **CONTAINERS** parameter.

### **TABLESPACE *name* ON *database alias***

Retrieves the alert settings for the table space called *name*, on the database specified using the **ON *database alias*** clause. If this table space does not have custom settings, then the settings for all table spaces for the database will be returned, which is equivalent to using the **TABLESPACES** parameter.

### **USING *health indicator name***

Specifies the set of health indicators for which alert configuration information will be returned. Health indicator names consist of a two-letter object identifier followed by a name that describes what the indicator measures. For example: **db.sort\_privmem\_util**. This is an optional clause, meaning that if it is not used, all health indicators for the specified object or object type will be returned.

## Examples

The following section is typical output resulting from a request for database manager information:

DB2 GET ALERT CFG FOR DBM

| Alert Configuration         |                                                        |
|-----------------------------|--------------------------------------------------------|
| Indicator Name              | = db2.db2_op_status                                    |
| Default                     | = Yes                                                  |
| Type                        | = State-based                                          |
| Sensitivity                 | = 0                                                    |
| Formula                     | = db2.db2_status;                                      |
| Actions                     | = Disabled                                             |
| Threshold or State checking | = Enabled                                              |
| Indicator Name              | = db2.sort_privmem_util                                |
| Default                     | = Yes                                                  |
| Type                        | = Threshold-based                                      |
| Warning                     | = 90                                                   |
| Alarm                       | = 100                                                  |
| Unit                        | = %                                                    |
| Sensitivity                 | = 0                                                    |
| Formula                     | = ((db2.sort_heap_allocated/sheapthres)*100);          |
| Actions                     | = Disabled                                             |
| Threshold or State checking | = Enabled                                              |
| Indicator Name              | = db2.mon_heap_util                                    |
| Default                     | = Yes                                                  |
| Type                        | = Threshold-based                                      |
| Warning                     | = 85                                                   |
| Alarm                       | = 95                                                   |
| Unit                        | = %                                                    |
| Sensitivity                 | = 0                                                    |
| Formula                     | = ((db2.mon_heap_cur_size/db2.mon_heap_max_size)*100); |
| Actions                     | = Disabled                                             |
| Threshold or State checking | = Enabled                                              |

The following section is typical output resulting from a request for configuration information:

DB2 GET ALERT CFG FOR DATABASES

| Alert Configuration         |                                                     |
|-----------------------------|-----------------------------------------------------|
| Indicator Name              | = db.db_op_status                                   |
| Default                     | = Yes                                               |
| Type                        | = State-based                                       |
| Sensitivity                 | = 0                                                 |
| Formula                     | = db.db_status;                                     |
| Actions                     | = Disabled                                          |
| Threshold or State checking | = Enabled                                           |
| Indicator Name              | = db.sort_shrmem_util                               |
| Default                     | = Yes                                               |
| Type                        | = Threshold-based                                   |
| Warning                     | = 70                                                |
| Alarm                       | = 85                                                |
| Unit                        | = %                                                 |
| Sensitivity                 | = 0                                                 |
| Formula                     | = ((db.sort_shrheap_allocated/sheapthres_shr)*100); |
| Actions                     | = Disabled                                          |
| Threshold or State checking | = Enabled                                           |
| Indicator Name              | = db.spilled_sorts                                  |

|                             |                                                                                                           |
|-----------------------------|-----------------------------------------------------------------------------------------------------------|
| Default                     | = Yes                                                                                                     |
| Type                        | = Threshold-based                                                                                         |
| Warning                     | = 30                                                                                                      |
| Alarm                       | = 50                                                                                                      |
| Unit                        | = %                                                                                                       |
| Sensitivity                 | = 0                                                                                                       |
| Formula                     | = $((\text{delta}(\text{db.sort_overflows}, 10)) / (\text{delta}(\text{db.total_sorts}, 10) + 1) * 100);$ |
| Actions                     | = Disabled                                                                                                |
| Threshold or State checking | = Enabled                                                                                                 |
| Indicator Name              |                                                                                                           |
| Default                     | = db.max_sort_shrmem_util                                                                                 |
| Type                        | = Yes                                                                                                     |
| Warning                     | = Threshold-based                                                                                         |
| Alarm                       | = 60                                                                                                      |
| Unit                        | = 30                                                                                                      |
| Sensitivity                 | = %                                                                                                       |
| Formula                     | = 0                                                                                                       |
| Actions                     | = $((\text{db.max_shr_sort_mem} / \text{sheapthres_shr}) * 100);$                                         |
| Threshold or State checking | = Disabled                                                                                                |
| Indicator Name              |                                                                                                           |
| Default                     | = db.log_util                                                                                             |
| Type                        | = Yes                                                                                                     |
| Warning                     | = Threshold-based                                                                                         |
| Alarm                       | = 75                                                                                                      |
| Unit                        | = 85                                                                                                      |
| Sensitivity                 | = %                                                                                                       |
| Formula                     | = 0                                                                                                       |
| Actions                     | = $((\text{db.total_log_used} / (\text{db.total_log_used} + \text{db.total_log_available})) * 100;$       |
| Threshold or State checking | = Enabled                                                                                                 |
| Indicator Name              |                                                                                                           |
| Default                     | = db.log_fs_util                                                                                          |
| Type                        | = Yes                                                                                                     |
| Warning                     | = Threshold-based                                                                                         |
| Alarm                       | = 75                                                                                                      |
| Unit                        | = 85                                                                                                      |
| Sensitivity                 | = %                                                                                                       |
| Formula                     | = 0                                                                                                       |
| Actions                     | = $((\text{os.fs_used} / \text{os.fs_total}) * 100);$                                                     |
| Threshold or State checking | = Enabled                                                                                                 |
| Indicator Name              |                                                                                                           |
| Default                     | = db.deadlock_rate                                                                                        |
| Type                        | = Yes                                                                                                     |
| Warning                     | = Threshold-based                                                                                         |
| Alarm                       | = 5                                                                                                       |
| Unit                        | = Deadlocks per hour                                                                                      |
| Sensitivity                 | = 10                                                                                                      |
| Formula                     | = $\text{delta}(\text{db.deadlocks});$                                                                    |
| Actions                     | = Disabled                                                                                                |
| Threshold or State checking | = Enabled                                                                                                 |
| Indicator Name              |                                                                                                           |
| Default                     | = db.locklist_util                                                                                        |
| Type                        | = Yes                                                                                                     |
| Warning                     | = Threshold-based                                                                                         |
| Alarm                       | = 75                                                                                                      |
| Unit                        | = 85                                                                                                      |
| Sensitivity                 | = %                                                                                                       |
| Formula                     | = 0                                                                                                       |
| Actions                     | = $((\text{db.lock_list_in_use} / (\text{locklist} * 4096)) * 100;)$                                      |
| Threshold or State checking |                                                                                                           |

|                             |                                                                                               |
|-----------------------------|-----------------------------------------------------------------------------------------------|
| Actions                     | = Disabled                                                                                    |
| Threshold or State checking | = Enabled                                                                                     |
| Indicator Name              |                                                                                               |
| Default                     | = db.lock_escal_rate                                                                          |
| Type                        | = Yes                                                                                         |
| Warning                     | = Threshold-based                                                                             |
| Alarm                       | = 5                                                                                           |
| Unit                        | = 10                                                                                          |
| Sensitivity                 | = Lock escalations per hour                                                                   |
| Formula                     | = 0                                                                                           |
| Actions                     | = delta(db.lock_escals);                                                                      |
| Threshold or State checking | = Disabled                                                                                    |
| Indicator Name              | = Enabled                                                                                     |
| Actions                     | = Disabled                                                                                    |
| Threshold or State checking | = Enabled                                                                                     |
| Indicator Name              |                                                                                               |
| Default                     | = db.apps_waiting_locks                                                                       |
| Type                        | = Yes                                                                                         |
| Warning                     | = Threshold-based                                                                             |
| Alarm                       | = 50                                                                                          |
| Unit                        | = 70                                                                                          |
| Sensitivity                 | = %                                                                                           |
| Formula                     | = 0                                                                                           |
| Actions                     | = (db.locks_waiting/db.appls_cur_cons)*100;                                                   |
| Threshold or State checking |                                                                                               |
| Indicator Name              |                                                                                               |
| Default                     | = db.pkgcache_hitratio                                                                        |
| Type                        | = Yes                                                                                         |
| Warning                     | = Threshold-based                                                                             |
| Alarm                       | = 80                                                                                          |
| Unit                        | = 70                                                                                          |
| Sensitivity                 | = %                                                                                           |
| Formula                     | = 0                                                                                           |
| Actions                     | = (1-<br>(db.pkg_cache_inserts/db.pkg_cache_lookups)<br>)*100;                                |
| Threshold or State checking | = Disabled                                                                                    |
| Indicator Name              | = Disabled                                                                                    |
| Actions                     | = db.catcache_hitratio                                                                        |
| Threshold or State checking |                                                                                               |
| Indicator Name              |                                                                                               |
| Default                     | = db.catcache_hitratio                                                                        |
| Type                        | = Yes                                                                                         |
| Warning                     | = Threshold-based                                                                             |
| Alarm                       | = 80                                                                                          |
| Unit                        | = 70                                                                                          |
| Sensitivity                 | = %                                                                                           |
| Formula                     | = 0                                                                                           |
| Actions                     | = (1-<br>(db.cat_cache_inserts/db.cat_cache_lookups)<br>)*100;                                |
| Threshold or State checking | = Disabled                                                                                    |
| Indicator Name              | = Disabled                                                                                    |
| Actions                     | = db.shrworkspace_hitratio                                                                    |
| Threshold or State checking |                                                                                               |
| Indicator Name              |                                                                                               |
| Default                     | = db.shrworkspace_hitratio                                                                    |
| Type                        | = Yes                                                                                         |
| Warning                     | = Threshold-based                                                                             |
| Alarm                       | = 80                                                                                          |
| Unit                        | = 70                                                                                          |
| Sensitivity                 | = %                                                                                           |
| Formula                     | = 0                                                                                           |
| Actions                     | = ((1-<br>(db.shr_workspace_section_inserts/<br>db.shr_workspace_section_lookups))<br>)*100); |
| Threshold or State checking | = Disabled                                                                                    |
| Indicator Name              | = Disabled                                                                                    |
| Actions                     | = db.db_heap_util                                                                             |
| Threshold or State checking |                                                                                               |

|                             |                                                                                   |
|-----------------------------|-----------------------------------------------------------------------------------|
| Default                     | = Yes                                                                             |
| Type                        | = Threshold-based                                                                 |
| Warning                     | = 85                                                                              |
| Alarm                       | = 95                                                                              |
| Unit                        | = %                                                                               |
| Sensitivity                 | = 0                                                                               |
| Formula                     | = ((db.db_heap_cur_size/<br>db.db_heap_max_size)*100);                            |
| Actions                     | = Disabled                                                                        |
| Threshold or State checking | = Enabled                                                                         |
| Indicator Name              |                                                                                   |
| Default                     | = db.tb_reorg_req                                                                 |
| Type                        | = Yes                                                                             |
| Sensitivity                 | = Collection state-based                                                          |
| Actions                     | = 0                                                                               |
| Threshold or State checking | = Disabled                                                                        |
| Indicator Name              |                                                                                   |
| Default                     | = db.hadr_op_status                                                               |
| Type                        | = State-based                                                                     |
| Warning                     | = 0                                                                               |
| Alarm                       | = db.hadr_connect_status;                                                         |
| Unit                        | = Disabled                                                                        |
| Sensitivity                 | = Enabled                                                                         |
| Formula                     |                                                                                   |
| Actions                     |                                                                                   |
| Threshold or State checking |                                                                                   |
| Indicator Name              |                                                                                   |
| Default                     | = db.hadr_delay                                                                   |
| Type                        | = Yes                                                                             |
| Warning                     | = Threshold-based                                                                 |
| Alarm                       | = 10                                                                              |
| Unit                        | = 15                                                                              |
| Sensitivity                 | = Minutes                                                                         |
| Formula                     | = 0                                                                               |
| Actions                     | = (db.hadr_log_gap*var.refresh_rate/60)<br>DIV(delta(db.hadr_secondary_log_pos)); |
| Threshold or State checking | = Disabled                                                                        |
| Indicator Name              |                                                                                   |
| Default                     | = Enabled                                                                         |
| Type                        |                                                                                   |
| Sensitivity                 |                                                                                   |
| Actions                     |                                                                                   |
| Threshold or State checking |                                                                                   |
| Indicator Name              |                                                                                   |
| Default                     | = db.db_backup_req                                                                |
| Type                        | = Yes                                                                             |
| Sensitivity                 | = State-based                                                                     |
| Actions                     | = 0                                                                               |
| Threshold or State checking | = Disabled                                                                        |
| Indicator Name              |                                                                                   |
| Default                     |                                                                                   |
| Type                        |                                                                                   |
| Sensitivity                 |                                                                                   |
| Actions                     |                                                                                   |
| Threshold or State checking |                                                                                   |
| Indicator Name              |                                                                                   |
| Default                     | = db.fed_nicknames_op_status                                                      |
| Type                        | = Yes                                                                             |
| Sensitivity                 | = Collection state-based                                                          |
| Actions                     | = 0                                                                               |
| Threshold or State checking | = Disabled                                                                        |
| Indicator Name              |                                                                                   |
| Default                     |                                                                                   |
| Type                        |                                                                                   |
| Sensitivity                 |                                                                                   |
| Actions                     |                                                                                   |
| Threshold or State checking |                                                                                   |
| Indicator Name              |                                                                                   |
| Default                     | = db.fed_servers_op_status                                                        |
| Type                        | = Yes                                                                             |
| Sensitivity                 | = Collection state-based                                                          |
| Actions                     | = 0                                                                               |
| Threshold or State checking | = Disabled                                                                        |
| Indicator Name              |                                                                                   |
| Default                     |                                                                                   |
| Type                        |                                                                                   |
| Sensitivity                 |                                                                                   |
| Actions                     |                                                                                   |
| Threshold or State checking |                                                                                   |
| Indicator Name              |                                                                                   |
| Default                     | = db.tb_runstats_req                                                              |
| Type                        | = Yes                                                                             |
| Sensitivity                 | = Collection state-based                                                          |
| Actions                     | = 0                                                                               |
| Threshold or State checking | = Disabled                                                                        |
| Indicator Name              |                                                                                   |
| Default                     |                                                                                   |
| Type                        |                                                                                   |
| Sensitivity                 |                                                                                   |
| Actions                     |                                                                                   |
| Threshold or State checking |                                                                                   |

## GET CLI CONFIGURATION

Lists the contents of the db2cli.ini file. This command can list the entire file, or a specified section.

The db2cli.ini file is used as the Db2 call level interface (CLI) configuration file. It contains various keywords and values that can be used to modify the behavior of the CLI and the applications using it. The file is divided into sections, each section corresponding to a database alias name.

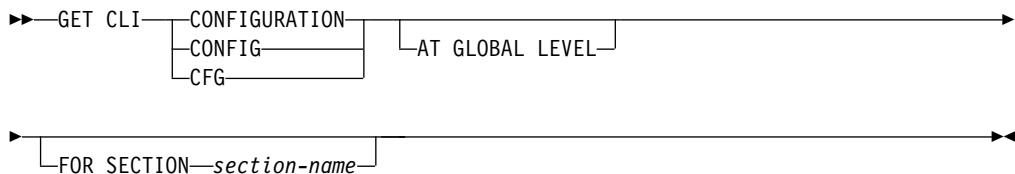
### Authorization

None

### Required connection

None

### Command syntax



### Command parameters

#### AT GLOBAL LEVEL

Displays the default CLI configuration parameters in the LDAP directory. This parameter is only valid on Windows operating systems.

#### FOR SECTION *section-name*

Name of the section whose keywords are to be listed. If not specified, all sections are listed.

### Examples

The following sample output represents the contents of a db2cli.ini file that has two sections:

```
[tstcli1x]
uid=userid
pwd=password
autocommit=0
TableType="'TABLE','VIEW','SYSTEM TABLE'"

[tstcli2x]
SchemaList="'OWNER1','OWNER2',CURRENT SQLID"
```

### Usage notes

The section name specified on this command is not case sensitive. For example, if the section name in the db2cli.ini file (delimited by square brackets) is in lowercase, and the section name specified on the command is in uppercase, the correct section will be listed.

The value of the PWD (password) keyword is never listed; instead, five asterisks (\*\*\*\*\*) are listed.

When LDAP (Lightweight Directory Access Protocol) is enabled, the CLI configuration parameters can be set at the user level, in addition to the machine level. The CLI configuration at the user level is maintained in the LDAP directory. If the specified section exists at the user level, the CLI configuration for that section at the user level is returned; otherwise, the CLI configuration at the machine level is returned.

The CLI configuration at the user level is maintained in the LDAP directory and cached on the local machine. When reading the CLI configuration at the user level, Db2 always reads from the cache. The cache is refreshed when:

- The user updates the CLI configuration.
- The user explicitly forces a refresh of the CLI configuration using the **REFRESH LDAP** command.

In an LDAP environment, users can configure a set of default CLI settings for a database catalogued in the LDAP directory. When an LDAP catalogued database is added as a Data Source Name (DSN) using the CLI/ODBC configuration utility, any default CLI settings, if they exist in the LDAP directory, will be configured for that DSN on the local machine. The **AT GLOBAL LEVEL** clause must be specified to display the default CLI settings.

## GET CONNECTION STATE

Displays the connection state.

Possible states are:

- Connectable and connected
- Connectable and unconnected
- Unconnectable and connected
- Implicitly connectable (if implicit connect is available).

This command also returns information about:

- The database connection mode (SHARE or EXCLUSIVE)
- The alias and name of the database to which a connection exists (if one exists)
- The host name and service name of the connection if the connection is using TCP/IP

### Authorization

None

### Required connection

None

### Command syntax

►►—GET CONNECTION STATE—►►

## Command parameters

None

## Examples

The following example is sample output from **GET CONNECTION STATE**:

Database Connection State

|                      |                             |
|----------------------|-----------------------------|
| Connection state     | = Connectable and Connected |
| Connection mode      | = SHARE                     |
| Local database alias | = SAMPLE                    |
| Database name        | = SAMPLE                    |
| Hostname             | = montero                   |
| Service name         | = 29384                     |

## Usage notes

This command does not apply to type 2 connections.

## GET CONTACTGROUP

Returns the contacts included in a single contact group that is defined on the local system. A contact is a user to whom the Scheduler and Health Monitor send messages.

You create named groups of contacts with the **ADD CONTACTGROUP** command.

## Authorization

None

## Required connection

None. Local execution only: this command cannot be used with a remote connection.

## Command syntax

►—GET CONTACTGROUP—*name*—►

## Command parameters

**CONTACTGROUP** *name*

The name of the group for which you would like to retrieve the contacts.

## Examples

GET CONTACTGROUP support

Description

-----  
Foo Widgets broadloom support unit

| Name    | Type          |
|---------|---------------|
| joe     | contact       |
| support | contact group |
| joline  | contact       |

## GET CONTACTGROUPS

Provides a list of contact groups, which can be either defined locally on the system or in a global list. A contact group is a list of addresses to which monitoring processes such as the Scheduler and Health Monitor can send messages.

The setting of the Database Administration Server (DAS) **contact\_host** configuration parameter determines whether the list is local or global. You create named groups of contacts with the **ADD CONTACTGROUP** command.

### Authorization

None

### Required Connection

None

### Command Syntax

►►—GET CONTACTGROUPS————►►

### Command Parameters

None

### Examples

In the following example, the command **GET CONTACTGROUPS** is issued. The result is as follows:

| Name    | Description                          |
|---------|--------------------------------------|
| support | Foo Widgets broadloom support unit   |
| service | Foo Widgets service and support unit |

## GET CONTACTS

Returns the list of contacts defined on the local system. Contacts are users to whom the monitoring processes such as the Scheduler and Health Monitor send notifications or messages.

To create a contact, use the **ADD CONTACT** command.

### Authorization

None

### Required connection

None

### Command syntax

►►—GET CONTACTS————►►

## Command parameters

None

## Examples

## GET CONTACTS

| Name   | Type   | Address                  | Max | Page | Length | Description  |
|--------|--------|--------------------------|-----|------|--------|--------------|
| joe    | e-mail | joe@somewhere.com        | -   | -    | -      |              |
| joline | e-mail | joline@somewhereelse.com | -   | -    | -      |              |
| john   | page   | john@relay.org           | 50  |      |        | Support 24x7 |

# GET DATABASE CONFIGURATION

Returns the values of individual entries in a specific database configuration file.

## Scope

This command returns information only for the database partition on which you run the command.

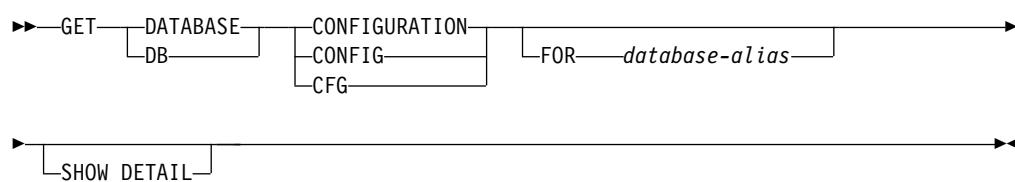
## Authorization

None

## Required connection

Instance. An explicit attachment is not required, but a connection to the database is required when using the **SHOW DETAIL** clause. If the database is listed as remote, an instance attachment to the remote node is established for the duration of the command.

## Command syntax



## Command parameters

FOR *database-alias*

Specifies the alias of the database whose configuration is to be displayed. You do not have to specify the alias if a connection to the database already exists.

[SHOW DETAIL](#)

Shows the current values of database configuration parameters and the value of the parameters the next time you activate the database. This option displays the result of dynamic changes to configuration parameters.

This is a default clause when operating in the CLPPlus interface. **SHOW DETAIL** need not be called when using CLPPlus processor.

If the **SHOW DETAIL** option is not specified, this command only returns the value stored in DISK which might be different from the current value in memory.

## Examples

**Note:** The following points apply to the examples:

- Output on different platforms might show small variations reflecting platform-specific parameters.
- You can change the value of parameters with keywords that are enclosed in parentheses by using the **UPDATE DATABASE CONFIGURATION** command.
- Fields that do not contain keywords are maintained by the database manager and cannot be updated.
- Output might not reflect the latest version of the product.

The following sample output was generated by running the **GET DATABASE CONFIGURATION** command outside a Db2 pureScale environment on a UNIX operating system:

```
Database Configuration for Database sample

Database configuration release level = 0x1000
Database release level = 0x1000

Database territory = US
Database code page = 1208
Database code set = UTF-8
Database country/region code = 1
Database collating sequence = IDENTITY
Alternate collating sequence (ALT_COLLATE) =
Number compatibility = OFF
Varchar2 compatibility = OFF
Date compatibility = OFF
Database page size = 8192

Statement concentrator (STMT_CONC) = OFF

Discovery support for this database (DISCOVER_DB) = ENABLE

Restrict access = NO
Default query optimization class (DFT_QUERYOPT) = 5
Degree of parallelism (DFT_DEGREE) = 1
Continue upon arithmetic exceptions (DFT_SQLMATHWARN) = NO
Default refresh age (DFT_REFRESH_AGE) = 0
Default maintained table types for opt (DFT_MTTB_TYPES) = SYSTEM
Number of frequent values retained (NUM_FREQVALUES) = 10
Number of quantiles retained (NUM_QUANTILES) = 20

Decimal floating point rounding mode (DECFLT_ROUNDING) = ROUND_HALF_EVEN

Backup pending = NO
All committed transactions have been written to disk = YES
Rollforward pending = NO
Restore pending = NO

Multi-page file allocation enabled = YES

Log retain for recovery status = NO
User exit for logging status = NO

Self tuning memory (SELF_TUNING_MEM) = OFF
Size of database shared memory (4KB) (DATABASE_MEMORY) = AUTOMATIC(47088)
Database memory threshold (DB_MEM_THRESH) = 100
Max storage for lock list (4KB) (LOCKLIST) = 4096
Percent. of lock lists per application (MAXLOCKS) = 10
Package cache size (4KB) (PCKCACHESZ) = (MAXAPPLS*8)
Sort heap thres for shared sorts (4KB) (SHEAPTHRES_SHR) = 5000
Sort list heap (4KB) (SORTHEAP) = 256

Database heap (4KB) (DBHEAP) = AUTOMATIC(1200)
```

|                                                         |                                                          |
|---------------------------------------------------------|----------------------------------------------------------|
| Catalog cache size (4KB)                                | (CATALOGCACHE_SZ) = (MAXAPPLS*5)                         |
| Log buffer size (4KB)                                   | (LOGBUFSZ) = 256                                         |
| Utilities heap size (4KB)                               | (UTIL_HEAP_SZ) = 5000                                    |
| SQL statement heap (4KB)                                | (STMTH HEAP) = AUTOMATIC(8192)                           |
| Default application heap (4KB)                          | (APPLHEAPSZ) = AUTOMATIC(256)                            |
| Application Memory Size (4KB)                           | (APPL_MEMORY) = AUTOMATIC(40000)                         |
| Statistics heap size (4KB)                              | (STAT_HEAP_SZ) = AUTOMATIC(4384)                         |
| Interval for checking deadlock (ms)                     | (DLCHKTIME) = 10000                                      |
| Lock timeout (sec)                                      | (LOCKTIMEOUT) = -1                                       |
| Changed pages threshold                                 | (CHNGPGS_THRESH) = 60                                    |
| Number of asynchronous page cleaners                    | (NUM_IOCLEANERS) = AUTOMATIC(1)                          |
| Number of I/O servers                                   | (NUM_IOSERVERS) = AUTOMATIC(3)                           |
| Sequential detect flag                                  | (SEQDETECT) = YES                                        |
| Default prefetch size (pages)                           | (DFT_PREFETCH_SZ) = AUTOMATIC                            |
| Track modified pages                                    | (TRACKMOD) = NO                                          |
| Default number of containers                            | = 1                                                      |
| Default tablespace extentsize (pages)                   | (DFT_EXTENT_SZ) = 32                                     |
| Max number of active applications                       | (MAXAPPLS) = AUTOMATIC(40)                               |
| Average number of active applications                   | (AVG_APPLS) = AUTOMATIC(1)                               |
| Max DB files open per application                       | (MAXFILEOP) = 61440                                      |
| Log file size (4KB)                                     | (LOGFILSZ) = 1000                                        |
| Number of primary log files                             | (LOGPRIMARY) = 3                                         |
| Number of secondary log files                           | (LOGSECOND) = 10                                         |
| Changed path to log files                               | (NEWLOGPATH) =                                           |
| Path to log files                                       | = /home/hote184/jwr/jwr/NODE0000/SQL00001/LOGSTREAM0000/ |
| Overflow log path                                       | (OVERFLOWLOGPATH) =                                      |
| Mirror log path                                         | (MIRRORLOGPATH) =                                        |
| First active log file                                   | =                                                        |
| Block log on disk full                                  | (BLK_LOG_DSK_FUL) = NO                                   |
| Block non logged operations                             | (BLOCKNONLOGGED) = NO                                    |
| Percent max primary log space by transaction            | (MAX_LOG) = 0                                            |
| Num. of active log files for 1 active UOW(NUM_LOG_SPAN) | = 0                                                      |
| Percent log file reclaimed before soft chckpt (SOFTMAX) | = 0                                                      |
| Target for oldest page in LBP                           | (PAGE_AGE_TRGT_MCR) = 240                                |
| HADR database role                                      | = STANDARD                                               |
| HADR local host name                                    | (HADR_LOCAL_HOST) =                                      |
| HADR local service name                                 | (HADR_LOCAL_SVC) =                                       |
| HADR remote host name                                   | (HADR_REMOTE_HOST) =                                     |
| HADR remote service name                                | (HADR_REMOTE_SVC) =                                      |
| HADR instance name of remote server                     | (HADR_REMOTE_INST) =                                     |
| HADR timeout value                                      | (HADR_TIMEOUT) = 120                                     |
| HADR target list                                        | (HADR_TARGET_LIST) =                                     |
| HADR log write synchronization mode                     | (HADR_SYNCMODE) = NEARSYNC                               |
| HADR spool log data limit (4KB)                         | (HADR_SPOOL_LIMIT) = AUTOMATIC(0)                        |
| HADR log replay delay (seconds)                         | (HADR_REPLAY_DELAY) = 0                                  |
| HADR peer window duration (seconds)                     | (HADR_PEER_WINDOW) = 0                                   |
| First log archive method                                | (LOGARCHMETH1) = OFF                                     |
| Archive compression for logarchmeth1                    | (LOGARCHCOMPR1) = OFF                                    |
| Options for logarchmeth1                                | (LOGARCHOPT1) =                                          |
| Second log archive method                               | (LOGARCHMETH2) = OFF                                     |
| Archive compression for logarchmeth2                    | (LOGARCHCOMPR2) = OFF                                    |
| Options for logarchmeth2                                | (LOGARCHOPT2) =                                          |
| Failover log archive path                               | (FAILARCHPATH) =                                         |
| Number of log archive retries on error                  | (NUMARCHRETRY) = 5                                       |
| Log archive retry Delay (secs)                          | (ARCHRETRYDELAY) = 20                                    |
| Vendor options                                          | (VENDOROPT) =                                            |
| Auto restart enabled                                    | (AUTORESTART) = ON                                       |
| Index re-creation time and redo index build             | (INDEXREC) = SYSTEM (RESTART)                            |
| Log pages during index build                            | (LOGINDEXBUILD) = OFF                                    |
| Default number of loadrec sessions                      | (DFT_LOADREC_SES) = 1                                    |
| Number of database backups to retain                    | (NUM_DB_BACKUPS) = 12                                    |
| Recovery history retention (days)                       | (REC_HIS_RETENTN) = 366                                  |
| Auto deletion of recovery objects                       | (AUTO_DEL_REC_OBJ) = OFF                                 |
| TSM management class                                    | (TSM_MGMTCLASS) =                                        |
| TSM node name                                           | (TSM_NODENAME) =                                         |
| TSM owner                                               | (TSM_OWNER) =                                            |
| TSM password                                            | (TSM_PASSWORD) =                                         |

|                                     |                               |
|-------------------------------------|-------------------------------|
| Automatic maintenance               | (AUTO_MAINT) = ON             |
| Automatic database backup           | (AUTO_DB_BACKUP) = OFF        |
| Automatic table maintenance         | (AUTO_TBL_MAINT) = ON         |
| Automatic runstats                  | (AUTO_RUNSTATS) = ON          |
| Real-time statistics                | (AUTO_STMT_STATS) = ON        |
| Statistical views                   | (AUTO_STATS_VIEWS) = OFF      |
| Automatic sampling                  | (AUTO_SAMPLING) = OFF         |
| Automatic reorganization            | (AUTO_REORG) = OFF            |
| Auto-Revalidation                   | (AUTO_REVAL) = DEFERRED       |
| Currently Committed                 | (CUR_COMMIT) = ON             |
| CHAR output with DECIMAL input      | (DEC_TO_CHAR_FMT) = NEW       |
| Enable XML Character operations     | (ENABLE_XMLCHAR) = YES        |
| WLM Collection Interval (minutes)   | (WLM_COLLECT_INT) = 0         |
| Monitor Collect Settings            |                               |
| Request metrics                     | (MON_REQ_METRICS) = BASE      |
| Activity metrics                    | (MON_ACT_METRICS) = BASE      |
| Object metrics                      | (MON_OBJ_METRICS) = EXTENDED  |
| Routine data                        | (MON_RTN_DATA) = NONE         |
| Routine executable list             | (MON_RTN_EXECLIST) = OFF      |
| Unit of work events                 | (MON_UOW_DATA) = NONE         |
| UOW events with package list        | (MON_UOW_PKGLIST) = OFF       |
| UOW events with executable list     | (MON_UOW_EXECLIST) = OFF      |
| Lock timeout events                 | (MON_LOCKTIMEOUT) = NONE      |
| Deadlock events                     | (MON_DEADLOCK) = WITHOUT_HIST |
| Lock wait events                    | (MON_LOCKWAIT) = NONE         |
| Lock wait event threshold           | (MON_LW_THRESH) = 5000000     |
| Number of package list entries      | (MON_PKGLIST_SZ) = 32         |
| Lock event notification level       | (MON_LCK_MSG_LVL) = 1         |
| SMTP Server                         | (SMTP_SERVER) =               |
| SQL conditional compilation flags   | (SQL_CCFLAGS) =               |
| Section actuals setting             | (SECTION_ACTUALS) = NONE      |
| Connect procedure                   | (CONNECT_PROC) =              |
| Adjust temporal SYSTEM_TIME period  | (SYSTIME_PERIOD_ADJ) = NO     |
| Log DDL Statements                  | (LOG_DDL_STMTS) = NO          |
| Log Application Information         | (LOG_APPL_INFO) = NO          |
| Default data capture on new Schemas | (DFT_SCHEMAS_DCC) = NO        |
| Default table organization          | (DFT_TABLE_ORG) = ROW         |
| Default string units                | (STRING_UNITS) = SYSTEM       |
| National character string mapping   | (NCHAR_MAPPING) = CHAR_CU32   |
| Database is in write suspend state  | = NO                          |
| Extended row size support           | (EXTENDED_ROW_SZ) = ENABLE    |

The following example is a sample output after running the **GET DATABASE CONFIGURATION** command in a Db2 pureScale environment on a Linux operating system.

#### Database Configuration for Database sample

|                                        |                                     |
|----------------------------------------|-------------------------------------|
| Database configuration release level   | = 0x1000                            |
| Database release level                 | = 0x1000                            |
| Database territory                     | = US                                |
| Database code page                     | = 1208                              |
| Database code set                      | = UTF-8                             |
| Database country/region code           | = 1                                 |
| Database collating sequence            | = IDENTITY                          |
| Alternate collating sequence           | (ALT_COLLATE) =                     |
| Number compatibility                   | = OFF                               |
| Varchar2 compatibility                 | = OFF                               |
| Date compatibility                     | = OFF                               |
| Database page size                     | = 8192                              |
| Statement concentrator                 | (STMT_CONC) = OFF                   |
| Discovery support for this database    | (DISCOVER_DB) = ENABLE              |
| Restrict access                        | = NO                                |
| Default query optimization class       | (DFT_QUERYOPT) = 5                  |
| Degree of parallelism                  | (DFT_DEGREE) = 1                    |
| Continue upon arithmetic exceptions    | (DFT_SQLMATHWARN) = NO              |
| Default refresh age                    | (DFT_REFRESH_AGE) = 0               |
| Default maintained table types for opt | (DFT_MTTB_TYPES) = SYSTEM           |
| Number of frequent values retained     | (NUM_FREQVALUES) = 10               |
| Number of quantiles retained           | (NUM_QUANTILES) = 20                |
| Decimal floating point rounding mode   | (DECFLT_ROUNDING) = ROUND_HALF_EVEN |

|                                                         |                                                          |
|---------------------------------------------------------|----------------------------------------------------------|
| Backup pending                                          | = NO                                                     |
| All committed transactions have been written to disk    | = NO                                                     |
| Rollforward pending                                     | = NO                                                     |
| Restore pending                                         | = NO                                                     |
| Multi-page file allocation enabled                      | = YES                                                    |
| Log retain for recovery status                          | = NO                                                     |
| User exit for logging status                            | = NO                                                     |
| Self tuning memory                                      | (SELF_TUNING_MEM) = OFF                                  |
| Size of database shared memory (4KB)                    | (DATABASE_MEMORY) = AUTOMATIC(280512)                    |
| Database memory threshold                               | (DB_MEM_THRESH) = 100                                    |
| Max storage for lock list (4KB)                         | (LOCKLIST) = 4096                                        |
| Percent. of lock lists per application                  | (MAXLOCKS) = 10                                          |
| Package cache size (4KB)                                | (PCKCACHESZ) = (MAXAPPLS*8)                              |
| Sort heap thres for shared sorts (4KB)                  | (SHEAPTHRES_SHR) = 5000                                  |
| Sort list heap (4KB)                                    | (SORTHEAP) = 256                                         |
| Database heap (4KB)                                     | (DBHEAP) = AUTOMATIC(1200)                               |
| Catalog cache size (4KB)                                | (CATALOGCACHE_SZ) = (MAXAPPLS*5)                         |
| Log buffer size (4KB)                                   | (LOGBUFSZ) = 256                                         |
| Utilities heap size (4KB)                               | (UTIL_HEAP_SZ) = 5000                                    |
| SQL statement heap (4KB)                                | (STMTH HEAP) = AUTOMATIC(8192)                           |
| Default application heap (4KB)                          | (APPLHEAPSZ) = AUTOMATIC(256)                            |
| Application Memory Size (4KB)                           | (APPL_MEMORY) = AUTOMATIC(40000)                         |
| Statistics heap size (4KB)                              | (STAT_HEAP_SZ) = AUTOMATIC(4384)                         |
| Interval for checking deadlock (ms)                     | (DLCHKTIME) = 10000                                      |
| Lock timeout (sec)                                      | (LOCKTIMEOUT) = -1                                       |
| Changed pages threshold                                 | (CHNGPGS_THRESH) = 60                                    |
| Number of asynchronous page cleaners                    | (NUM_IOCLEANERS) = AUTOMATIC(1)                          |
| Number of I/O servers                                   | (NUM_IOSERVERS) = AUTOMATIC(6)                           |
| Sequential detect flag                                  | (SEQDETECT) = YES                                        |
| Default prefetch size (pages)                           | (DFT_PREFETCH_SZ) = AUTOMATIC                            |
| Track modified pages                                    | (TRACKMOD) = NO                                          |
| Default number of containers                            | = 1                                                      |
| Default tablespace extentsize (pages)                   | (DFT_EXTENT_SZ) = 32                                     |
| Max number of active applications                       | (MAXAPPLS) = AUTOMATIC(40)                               |
| Average number of active applications                   | (AVG_APPLS) = AUTOMATIC(1)                               |
| Max DB files open per application                       | (MAXFILOP) = 61440                                       |
| Log file size (4KB)                                     | (LOGFILSZ) = 1000                                        |
| Number of primary log files                             | (LOGPRIMARY) = 3                                         |
| Number of secondary log files                           | (LOGSECOND) = 10                                         |
| Changed path to log files                               | (NEWLOGPATH) =                                           |
| Path to log files                                       | = /home/hote184/jwr/jwr/NODE0000/SQL00001/LOGSTREAM0000/ |
| Overflow log path                                       | (OVERFLOWLOGPATH) =                                      |
| Mirror log path                                         | (MIRRORLOGPATH) =                                        |
| First active log file                                   | =                                                        |
| Block log on disk full                                  | (BLK_LOG_DSK_FUL) = NO                                   |
| Block non logged operations                             | (BLOCKNONLOGGED) = NO                                    |
| Percent max primary log space by transaction            | (MAX_LOG) = 0                                            |
| Num. of active log files for 1 active UOW(NUM_LOG_SPAN) | = 0                                                      |
| Percent log file reclaimed before soft chckpt           | (SOFTMAX) = 0                                            |
| Target for oldest page in LBP                           | (PAGE_AGE_TRGT_MCR) = 120                                |
| Target for oldest page in GBP                           | (PAGE_AGE_TRGT_GCR) = 240                                |
| HADR database role                                      | = STANDARD                                               |
| HADR local host name                                    | (HADR_LOCAL_HOST) =                                      |
| HADR local service name                                 | (HADR_LOCAL_SVC) =                                       |
| HADR remote host name                                   | (HADR_REMOTE_HOST) =                                     |
| HADR remote service name                                | (HADR_REMOTE_SVC) =                                      |
| HADR instance name of remote server                     | (HADR_REMOTE_INST) =                                     |
| HADR timeout value                                      | (HADR_TIMEOUT) = 120                                     |
| HADR target list                                        | (HADR_TARGET_LIST) =                                     |
| HADR log write synchronization mode                     | (HADR_SYNCMODE) = ASYNC                                  |
| HADR spool log data limit (4KB)                         | (HADR_SPOOL_LIMIT) = AUTOMATIC(0)                        |
| HADR log replay delay (seconds)                         | (HADR_REPLY_DELAY) = 0                                   |
| HADR peer window duration (seconds)                     | (HADR_PEER_WINDOW) = 0                                   |
| First log archive method                                | (LOGARCHMETH1) = OFF                                     |

```

Archive compression for logarchmeth1 (LOGARCHCOMPR1) = OFF
Options for logarchmeth1 (LOGARCHOPT1) =
Second log archive method (LOGARCHMETH2) = OFF
Archive compression for logarchmeth2 (LOGARCHCOMPR2) = OFF
Options for logarchmeth2 (LOGARCHOPT2) =
Failover log archive path (FAILARCHPATH) =
Number of log archive retries on error (NUMARCHRETRY) = 5
Log archive retry Delay (secs) (ARCHRETRYDELAY) = 20
Vendor options (VENDOROPT) =

Auto restart enabled (AUTORESTART) = ON
Index re-creation time and redo index build (INDEXREC) = SYSTEM (RESTART)
Log pages during index build (LOGINDEXBUILD) = OFF
Default number of loadrec sessions (DFT_LOADREC_SES) = 1
Number of database backups to retain (NUM_DB_BACKUPS) = 12
Recovery history retention (days) (REC_HIS_RETENTN) = 366
Auto deletion of recovery objects (AUTO_DEL_REC_OBJ) = OFF

TSM management class (TSM_MGMTCLASS) =
TSM node name (TSM_NODENAME) =
TSM owner (TSM_OWNER) =
TSM password (TSM_PASSWORD) =

Automatic maintenance (AUTO_MAINT) = ON
Automatic database backup (AUTO_DB_BACKUP) = OFF
Automatic table maintenance (AUTO_TBL_MAINT) = ON
Automatic runstats (AUTO_RUNSTATS) = ON
Real-time statistics (AUTO_STMT_STATS) = ON
Statistical views (AUTO_STATS_VIEWS) = OFF
Automatic sampling (AUTO_SAMPLING) = OFF
Automatic reorganization (AUTO_REORG) = OFF

Auto-Revalidation (AUTO_REVAL) = DEFERRED
CF Resource Configuration:
 CF database memory size (4KB) (CF_DB_MEM_SZ) = AUTOMATIC(126464)
 Group buffer pool size (4KB) (CF_GBP_SZ) = AUTOMATIC(78336)
 Directory-Entry-to-Data-Area ratio (CF_DEDA_RATIO) = AUTOMATIC(4)
 Global lock memory size (4KB) (CF_LOCK_SZ) = AUTOMATIC(19200)
 Shared communication area size (4KB) (CF_SCA_SZ) = AUTOMATIC(26112)

Catch up target for secondary CF (mins) (CF_CATCHUP_TRGT) = AUTOMATIC(15)

Currently Committed (CUR_COMMIT) = ON
CHAR output with DECIMAL input (DEC_TO_CHAR_FMT) = NEW
Enable XML Character operations (ENABLE_XMLCHAR) = YES
WLM Collection Interval (minutes) (WLM_COLLECT_INT) = 0

Monitor Collect Settings
 Request metrics (MON_REQ_METRICS) = BASE
 Activity metrics (MON_ACT_METRICS) = BASE
 Object metrics (MON_OBJ_METRICS) = EXTENDED
 Routine data (MON_RTN_DATA) = NONE
 Routine executable list (MON_RTN_EXECLIST) = OFF
 Unit of work events (MON_UOW_DATA) = NONE
 UOW events with package list (MON_UOW_PKGLIST) = OFF
 UOW events with executable list (MON_UOW_EXECLIST) = OFF
 Lock timeout events (MON_LOCKTIMEOUT) = NONE
 Deadlock events (MON_DEADLOCK) = WITHOUT_HIST
 Lock wait events (MON_LOCKWAIT) = NONE
 Lock wait event threshold (MON_LW_THRESH) = 5000000
 Number of package list entries (MON_PKGLIST_SZ) = 32
 Lock event notification level (MON_LCK_MSG_LVL) = 1

SMTP Server (SMTP_SERVER) =
SQL conditional compilation flags (SQL_CCFLAGS) =
Section actuals setting (SECTION_ACTUALS) = NONE
Connect procedure (CONNECT_PROC) =
Adjust temporal SYSTEM_TIME period (SYSTIME_PERIOD_ADJ) = NO
Log DDL Statements (LOG_DDL_STMTS) = NO
Log Application Information (LOG_APPL_INFO) = NO
Default data capture on new Schemas (DFT_SCHEMAS_DCC) = NO
Default table organization (DFT_TABLE_ORG) = ROW
Default string units (STRING_UNITS) = SYSTEM
National character string mapping (NCHAR_MAPPING) = CHAR CU32
Database is in write suspend state (EXTENDED_ROW_SZ) = ENABLE
Extended row size support (OPT_DIRECT_WRKLD) = NO
Optimize directed workloads (OPT_DIRECT_WRKLD) = NO

```

The following example shows the output of the command when you specify the **SHOW DETAIL** option in a Db2 pureScale environment. The value in the Delayed Value column is the value that will be applied the next time that you start the instance.

#### Database Configuration for Database sample

| Description                                          | Parameter         | Current Value       | Delayed Value     |
|------------------------------------------------------|-------------------|---------------------|-------------------|
| Database configuration release level                 |                   | = 0x1000            |                   |
| Database release level                               |                   | = 0x1000            |                   |
| Database territory                                   |                   | = US                |                   |
| Database code page                                   |                   | = 1208              |                   |
| Database code set                                    |                   | = UTF-8             |                   |
| Database country/region code                         |                   | = 1                 |                   |
| Database collating sequence                          |                   | = IDENTITY          |                   |
| Alternate collating sequence                         | (ALT_COLLATE)     | =                   | IDENTITY          |
| Number compatibility                                 |                   | = OFF               |                   |
| Varchar2 compatibility                               |                   | = OFF               |                   |
| Date compatibility                                   |                   | = OFF               |                   |
| Database page size                                   |                   | = 8192              | 8192              |
| Statement concentrator                               | (STMT_CONC)       | = OFF               | OFF               |
| Discovery support for this database                  | (DISCOVER_DB)     | = ENABLE            | ENABLE            |
| Restrict access                                      |                   | = NO                |                   |
| Default query optimization class                     | (DFT_QUERYOPT)    | = 5                 | 5                 |
| Degree of parallelism                                | (DFT_DEGREE)      | = 1                 | 1                 |
| Continue upon arithmetic exceptions                  | (DFT_SQLMATHWARN) | = NO                | NO                |
| Default refresh age                                  | (DFT_REFRESH_AGE) | = 0                 | 0                 |
| Default maintained table types for opt               | (DFT_MTTB_TYPES)  | = SYSTEM            | SYSTEM            |
| Number of frequent values retained                   | (NUM_FREQVALUES)  | = 10                | 10                |
| Number of quantiles retained                         | (NUM_QUANTILES)   | = 20                | 20                |
| Decimal floating point rounding mode                 | (DECFLT_ROUNDING) | = ROUND_HALF_EVEN   | ROUND_HALF_EVEN   |
| Backup pending                                       |                   | = NO                |                   |
| All committed transactions have been written to disk |                   | = NO                |                   |
| Rollforward pending                                  |                   | = NO                |                   |
| Restore pending                                      |                   | = NO                |                   |
| Multi-page file allocation enabled                   |                   | = YES               |                   |
| Log retain for recovery status                       |                   | = NO                |                   |
| User exit for logging status                         |                   | = NO                |                   |
| Self tuning memory                                   | (SELF_TUNING_MEM) | = OFF               | OFF               |
| Size of database shared memory (4KB)                 | (DATABASE_MEMORY) | = AUTOMATIC(280512) | AUTOMATIC(280512) |
| Database memory threshold                            | (DB_MEM_THRESH)   | = 100               | 100               |
| Max storage for lock list (4KB)                      | (LOCKLIST)        | = 4096              | 4096              |
| Percent. of lock lists per application               | (MAXLOCKS)        | = 10                | 10                |
| Package cache size (4KB)                             | (PCKCACHESZ)      | = (MAXAPPLS*8)      | (MAXAPPLS*8)      |
| Sort heap thres for shared sorts (4KB)               | (SHEAPTHRES_SHR)  | = 5000              | 5000              |
| Sort list heap (4KB)                                 | (SORTHEAP)        | = 256               | 256               |
| Database heap (4KB)                                  | (DBHEAP)          | = AUTOMATIC(1200)   | AUTOMATIC(1200)   |
| Catalog cache size (4KB)                             | (CATALOGCACHE_SZ) | = (MAXAPPLS*5)      | (MAXAPPLS*5)      |
| Log buffer size (4KB)                                | (LOGBUFSZ)        | = 256               | 256               |
| Utilities heap size (4KB)                            | (UTIL_HEAP_SZ)    | = 5000              | 5000              |
| SQL statement heap (4KB)                             | (STMTH HEAP)      | = AUTOMATIC(8192)   | AUTOMATIC(8192)   |
| Default application heap (4KB)                       | (APPLHEAPSZ)      | = AUTOMATIC(256)    | AUTOMATIC(256)    |
| Application Memory Size (4KB)                        | (APPL_MEMORY)     | = AUTOMATIC(40016)  | AUTOMATIC(40000)  |
| Statistics heap size (4KB)                           | (STAT_HEAP_SZ)    | = AUTOMATIC(4384)   | AUTOMATIC(4384)   |

|                                              |                                                                  |                                                                |
|----------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------|
| Interval for checking deadlock (ms)          | (DLCHKTIME) =                                                    | 10000                                                          |
| Lock timeout (sec)                           | (LOCKTIMEOUT) =                                                  | -1                                                             |
| Changed pages threshold                      | (CHNGPGS_THRESH) =                                               | 60                                                             |
| Number of asynchronous page cleaners         | (NUM_IOCLEANERS) =                                               | AUTOMATIC(6)                                                   |
| Number of I/O servers                        | (NUM_IOSERVERS) =                                                | AUTOMATIC(6)                                                   |
| Sequential detect flag                       | (SEQDETECT) =                                                    | YES                                                            |
| Default prefetch size (pages)                | (DFT_PREFETCH_SZ) =                                              | AUTOMATIC                                                      |
| Track modified pages                         | (TRACKMOD) =                                                     | NO                                                             |
| Default number of containers                 | = 1                                                              | 1                                                              |
| Default tablespace extentsize (pages)        | (DFT_EXTENT_SZ) =                                                | 32                                                             |
| Max number of active applications            | (MAXAPPLS) =                                                     | AUTOMATIC(40)                                                  |
| Average number of active applications        | (AVG_APPLS) =                                                    | AUTOMATIC(1)                                                   |
| Max DB files open per application            | (MAXFIL0P) =                                                     | 61440                                                          |
| Log file size (4KB)                          | (LOGFILSZ) =                                                     | 1000                                                           |
| Number of primary log files                  | (LOGPRIMARY) =                                                   | 3                                                              |
| Number of secondary log files                | (LOGSECOND) =                                                    | 10                                                             |
| Changed path to log files                    | (NEWLOGPATH) =                                                   |                                                                |
| Path to log files                            | = /home/hotel84/jwr/jwr/<br>NODE0000/SQL00001/<br>LOGSTREAM0000/ | /home/hotel84/jwr/jwr/<br>NODE0000/SQL00001/<br>LOGSTREAM0000/ |
| Overflow log path                            | (OVERFLOWLOGPATH) =                                              |                                                                |
| Mirror log path                              | (MIRRORLOGPATH) =                                                |                                                                |
| First active log file                        | =                                                                |                                                                |
| Block log on disk full                       | (BLK_LOG_DSK_FUL) =                                              | NO                                                             |
| Block non logged operations                  | (BLOCKNONLOGGED) =                                               | NO                                                             |
| Percent max primary log space by transaction | (MAX_LOG) =                                                      | 0                                                              |
| Num. of active log files for 1 active UOW    | (NUM_LOG_SPAN) =                                                 | 0                                                              |
| Percent log file reclaimed before soft ckpt  | (SOFTMAX) =                                                      | 0                                                              |
| Target for oldest page in LBP                | (PAGE_AGE_TRGT_MCR) =                                            | 120                                                            |
| Target for oldest page in GBP                | (PAGE_AGE_TRGT_GCR) =                                            | 240                                                            |
| HADR database role                           | = STANDARD                                                       | STANDARD                                                       |
| HADR local host name                         | (HADR_LOCAL_HOST) =                                              |                                                                |
| HADR local service name                      | (HADR_LOCAL_SVC) =                                               |                                                                |
| HADR remote host name                        | (HADR_REMOTE_HOST) =                                             |                                                                |
| HADR remote service name                     | (HADR_REMOTE_SVC) =                                              |                                                                |
| HADR instance name of remote server          | (HADR_REMOTE_INST) =                                             |                                                                |
| HADR timeout value                           | (HADR_TIMEOUT) =                                                 | 120                                                            |
| HADR target list                             | (HADR_TARGET_LIST) =                                             |                                                                |
| HADR log write synchronization mode          | (HADR_SYNCMODE) =                                                | ASYNC                                                          |
| HADR peer window duration (seconds)          | (HADR_PEER_WINDOW) =                                             | 0                                                              |
| First log archive method                     | (LOGARCHMETH1) =                                                 | OFF                                                            |
| Archive compression for logarchmeth1         | (LOGARCHCOMP1) =                                                 | OFF                                                            |
| Options for logarchmeth1                     | (LOGARCHOPT1) =                                                  |                                                                |
| Second log archive method                    | (LOGARCHMETH2) =                                                 | OFF                                                            |
| Archive compression for logarchmeth2         | (LOGARCHCOMP2) =                                                 | OFF                                                            |
| Options for logarchmeth2                     | (LOGARCHOPT2) =                                                  |                                                                |
| Failover log archive path                    | (FAILARCHPATH) =                                                 |                                                                |
| Number of log archive retries on error       | (NUMARCHRETRY) =                                                 | 5                                                              |
| Log archive retry Delay (secs)               | (ARCHTRYDELAY) =                                                 | 20                                                             |
| Vendor options                               | (VENDOROPT) =                                                    |                                                                |
| Auto restart enabled                         | (AUTORESTART) =                                                  | ON                                                             |
| Index re-creation time and redo index build  | (INDEXREC) =                                                     | SYSTEM (RESTART)                                               |
| Log pages during index build                 | (LOGINDEXBUILD) =                                                | OFF                                                            |
| Default number of loadrec sessions           | (DFT_LOADREC_SES) =                                              | 1                                                              |
| Number of database backups to retain         | (NUM_DB_BACKUPS) =                                               | 12                                                             |
| Recovery history retention (days)            | (REC_HIS_RETENTN) =                                              | 366                                                            |
| Auto deletion of recovery objects            | (AUTO_DEL_REC_OBJ) =                                             | OFF                                                            |

|                                         |                                    |                   |
|-----------------------------------------|------------------------------------|-------------------|
| TSM management class                    | (TSM_MGMTCLASS) =                  |                   |
| TSM node name                           | (TSM_NODENAME) =                   |                   |
| TSM owner                               | (TSM_OWNER) =                      |                   |
| TSM password                            | (TSM_PASSWORD) =                   |                   |
| Automatic maintenance                   | (AUTO_MAINT) = ON                  | ON                |
| Automatic database backup               | (AUTO_DB_BACKUP) = OFF             | OFF               |
| Automatic table maintenance             | (AUTO_TBL_MAINT) = ON              | ON                |
| Automatic runstats                      | (AUTO_RUNSTATS) = ON               | ON                |
| Real-time statistics                    | (AUTO_STMT_STATS) = ON             | ON                |
| Statistical views                       | (AUTO_STATS_VIEWS) = OFF           | OFF               |
| Automatic sampling                      | (AUTO_SAMPLING) = OFF              | OFF               |
| Automatic reorganization                | (AUTO_REORG) = OFF                 | OFF               |
| Auto-Revalidation                       | (AUTO_REVAL) = DEFERRED            | DEFERRED          |
| CF Resource Configuration:              |                                    |                   |
| CF database memory size (4KB)           | (CF_DB_MEM_SZ) = AUTOMATIC(126464) | AUTOMATIC(126464) |
| Group buffer pool size (4KB)            | (CF_GBP_SZ) = AUTOMATIC(78336)     | AUTOMATIC(78336)  |
| Directory-Entry-to-Data-Area ratio      | (CF_DEDA_RATIO) = AUTOMATIC(3)     | AUTOMATIC(4)      |
| Global lock memory size (4KB)           | (CF_LOCK_SZ) = AUTOMATIC(19200)    | AUTOMATIC(19200)  |
| Shared communication area size (4KB)    | (CF_SCA_SZ) = AUTOMATIC(26112)     | AUTOMATIC(26112)  |
| Catch up target for secondary CF (mins) | (CF_CATCHUP_TRGT) = AUTOMATIC(15)  | AUTOMATIC(15)     |
| Currently Committed                     | (CUR_COMMIT) = ON                  | ON                |
| CHAR output with DECIMAL input          | (DEC_TO_CHAR_FMT) = NEW            | NEW               |
| Enable XML Character operations         | (ENABLE_XMLCHAR) = YES             | YES               |
| WLM Collection Interval (minutes)       | (WLM_COLLECT_INT) = 0              | 0                 |
| Monitor Collect Settings                |                                    |                   |
| Request metrics                         | (MON_REQ_METRICS) = BASE           | BASE              |
| Activity metrics                        | (MON_ACT_METRICS) = BASE           | BASE              |
| Object metrics                          | (MON_OBJ_METRICS) = EXTENDED       | EXTENDED          |
| Routine data                            | (MON_RTN_DATA) = NONE              | NONE              |
| Routine executable list                 | (MON_RTN_EXECLIST) = OFF           | OFF               |
| Unit of work events                     | (MON_UOW_DATA) = NONE              | NONE              |
| UOW events with package list            | (MON_UOW_PKGLIST) = OFF            | OFF               |
| UOW events with executable list         | (MON_UOW_EXECLIST) = OFF           | OFF               |
| Lock timeout events                     | (MON_LOCKTIMEOUT) = NONE           | NONE              |
| Deadlock events                         | (MON_DEADLOCK) = WITHOUT_HIST      | WITHOUT_HIST      |
| Lock wait events                        | (MON_LOCKWAIT) = NONE              | NONE              |
| Lock wait event threshold               | (MON_LW_THRESH) = 5000000          | 5000000           |
| Number of package list entries          | (MON_PKGLIST_SZ) = 32              | 32                |
| Lock event notification level           | (MON_LCK_MSG_LVL) = 1              | 1                 |
| SMTP Server                             | (SMTP_SERVER) =                    |                   |
| SQL conditional compilation flags       | (SQL_CFLAGS) =                     |                   |
| Section actuals setting                 | (SECTION_ACTUALS) = NONE           | NONE              |
| Connect procedure                       | (CONNECT_PROC) =                   |                   |
| Adjust temporal SYSTEM_TIME period      | (SYSTIME_PERIOD_ADJ) = NO          | NO                |
| Log DDL Statements                      | (LOG_DDL_STMTS) = NO               | NO                |
| Log Application Information             | (LOG_APPL_INFO) = NO               | NO                |
| Default data capture on new Schemas     | (DFT_SCHEMAS_DCC) = NO             | NO                |
| HADR spool log data limit (4KB)         | (HADR_SPOOL_LIMIT) = AUTOMATIC(0)  | AUTOMATIC(0)      |
| HADR log replay delay (seconds)         | (HADR_REPLAY_DELAY) = 0            | 0                 |
| Default table organization              | (DFT_TABLE_ORG) = ROW              | ROW               |
| Default string units                    | (STRING_UNITS) = SYSTEM            | SYSTEM            |
| National character string mapping       | (NCHAR_MAPPING) = CHAR_CU32        | CHAR_CU32         |
| Database is in write suspend state      | = NO                               |                   |
| Extended row size support               | (EXTENDED_ROW_SZ) = ENABLE         | ENABLE            |
| Optimize directed workloads             | (OPT_DIRECT_WRKLD) = NO            | NO                |

The following example is a sample output after running the **GET DATABASE CONFIGURATION** command on a Db2 environment with a Windows operating system:

```

Database Configuration for Database sample

Database configuration release level = 0x1000
Database release level = 0x1000

Database territory = US
Database code page = 1208
Database code set = UTF-8
Database country/region code = 1
Database collating sequence = IDENTITY
Alternate collating sequence (ALT_COLLATE) =
Number compatibility = OFF
Varchar2 compatibility = OFF
Date compatibility = OFF
Database page size = 8192

Statement concentrator (STMT_CONC) = OFF
Discovery support for this database (DISCOVER_DB) = ENABLE

Restrict access = NO
Default query optimization class (DFT_QUERYOPT) = 5
Degree of parallelism (DFT_DEGREE) = 1
Continue upon arithmetic exceptions (DFT_SQLMATHWARN) = NO
Default refresh age (DFT_REFRESH_AGE) = 0
Default maintained table types for opt (DFT_MTTB_TYPES) = SYSTEM
Number of frequent values retained (NUM_FREQVALUES) = 10
Number of quantiles retained (NUM_QUANTILES) = 20

Decimal floating point rounding mode (DECFLT_ROUNDING) = ROUND_HALF_EVEN

Backup pending = NO
All committed transactions have been written to disk = NO
Rollforward pending = NO
Restore pending = NO

Multi-page file allocation enabled = YES

Log retain for recovery status = NO
User exit for logging status = NO

Self tuning memory (SELF_TUNING_MEM) = OFF
Size of database shared memory (4KB) (DATABASE_MEMORY) = AUTOMATIC(44688)
Database memory threshold (DB_MEM_THRESH) = 100
Max storage for lock list (4KB) (LOCKLIST) = 4096
Percent. of lock lists per application (MAXLOCKS) = 22
Package cache size (4KB) (PCKCACHESZ) = (MAXAPPLS*8)
Sort heap thres for shared sorts (4KB) (SHEAPTHRES_SHR) = 5000
Sort list heap (4KB) (SORTHEAP) = 256

Database heap (4KB) (DBHEAP) = AUTOMATIC(600)
Catalog cache size (4KB) (CATALOGCACHE_SZ) = (MAXAPPLS*5)
Log buffer size (4KB) (LOGBUFSZ) = 256
Utilities heap size (4KB) (UTIL_HEAP_SZ) = 5000
SQL statement heap (4KB) (STMTH HEAP) = AUTOMATIC(8192)
Default application heap (4KB) (APPLHEAPSZ) = AUTOMATIC(256)
Application Memory Size (4KB) (APPL_MEMORY) = AUTOMATIC(40000)
Statistics heap size (4KB) (STAT_HEAP_SZ) = AUTOMATIC(4384)

Interval for checking deadlock (ms) (DLCHKTIME) = 10000
Lock timeout (sec) (LOCKTIMEOUT) = -1

```

|                                               |                                           |
|-----------------------------------------------|-------------------------------------------|
| Changed pages threshold                       | (CHNGPGS_THRESH) = 60                     |
| Number of asynchronous page cleaners          | (NUM_IOCLEANERS) = AUTOMATIC(1)           |
| Number of I/O servers                         | (NUM_IOSERVERS) = AUTOMATIC(3)            |
| Sequential detect flag                        | (SEQDETECT) = YES                         |
| Default prefetch size (pages)                 | (DFT_PREFETCH_SZ) = AUTOMATIC             |
| Track modified pages                          | (TRACKMOD) = NO                           |
| Default number of containers                  | = 1                                       |
| Default tablespace extentsize (pages)         | (DFT_EXTENT_SZ) = 32                      |
| Max number of active applications             | (MAXAPPLS) = AUTOMATIC(40)                |
| Average number of active applications         | (AVG_APPLS) = AUTOMATIC(1)                |
| Max DB files open per application             | (MAXFILOP) = 65535                        |
| Log file size (4KB)                           | (LOGFILSZ) = 1000                         |
| Number of primary log files                   | (LOGPRIMARY) = 3                          |
| Number of secondary log files                 | (LOGSECOND) = 10                          |
| Changed path to log files                     | (NEWLOGPATH) =                            |
| Path to log files                             | = D:\DB3\NODE0000\SQL00001\LOGSTREAM0000\ |
| Overflow log path                             | (OVERFLOWLOGPATH) =                       |
| Mirror log path                               | (MIRRORLOGPATH) =                         |
| First active log file                         | =                                         |
| Block log on disk full                        | (BLK_LOG_DSK_FUL) = NO                    |
| Block non logged operations                   | (BLOCKNONLOGGED) = NO                     |
| Percent max primary log space by transaction  | (MAX_LOG) = 0                             |
| Num. of active log files for 1 active UOW     | (NUM_LOG_SPAN) = 0                        |
| Percent log file reclaimed before soft chckpt | (SOFTMAX) = 0                             |
| Target for oldest page in LBP                 | (PAGE_AGE_TRGT_MCR) = 240                 |
| HADR database role                            | = STANDARD                                |
| HADR local host name                          | (HADR_LOCAL_HOST) =                       |
| HADR local service name                       | (HADR_LOCAL_SVC) =                        |
| HADR remote host name                         | (HADR_REMOTE_HOST) =                      |
| HADR remote service name                      | (HADR_REMOTE_SVC) =                       |
| HADR instance name of remote server           | (HADR_REMOTE_INST) =                      |
| HADR timeout value                            | (HADR_TIMEOUT) = 120                      |
| HADR target list                              | (HADR_TARGET_LIST) =                      |
| HADR log write synchronization mode           | (HADR_SYNCMODE) = NEARSYNC                |
| HADR spool log data limit (4KB)               | (HADR_SPOOL_LIMIT) = AUTOMATIC(0)         |
| HADR log replay delay (seconds)               | (HADR_REPLAY_DELAY) = 0                   |
| HADR peer window duration (seconds)           | (HADR_PEER_WINDOW) = 0                    |
| First log archive method                      | (LOGARCHMETH1) = OFF                      |
| Archive compression for logarchmeth1          | (LOGARCHCOMPR1) = OFF                     |
| Options for logarchmeth1                      | (LOGARCHOPT1) =                           |
| Second log archive method                     | (LOGARCHMETH2) = OFF                      |
| Archive compression for logarchmeth2          | (LOGARCHCOMPR2) = OFF                     |
| Options for logarchmeth2                      | (LOGARCHOPT2) =                           |
| Failover log archive path                     | (FAILARCHPATH) =                          |
| Number of log archive retries on error        | (NUMARCHRETRY) = 5                        |
| Log archive retry Delay (secs)                | (ARCHRETRYDELAY) = 20                     |
| Vendor options                                | (VENDOROPT) =                             |
| Auto restart enabled                          | (AUTORESTART) = ON                        |
| Index re-creation time and redo index build   | (INDEXREC) = SYSTEM (RESTART)             |
| Log pages during index build                  | (LOGINDEXBUILD) = OFF                     |
| Default number of loadrec sessions            | (DFT_LOADREC_SES) = 1                     |
| Number of database backups to retain          | (NUM_DB_BACKUPS) = 12                     |
| Recovery history retention (days)             | (REC_HIS_RETENTN) = 366                   |
| Auto deletion of recovery objects             | (AUTO_DEL_REC_OBJ) = OFF                  |
| TSM management class                          | (TSM_MGMTCLASS) =                         |
| TSM node name                                 | (TSM_NODENAME) =                          |
| TSM owner                                     | (TSM_OWNER) =                             |

|                                     |                               |
|-------------------------------------|-------------------------------|
| TSM password                        | (TSM_PASSWORD) =              |
| Automatic maintenance               | (AUTO_MAINT) = ON             |
| Automatic database backup           | (AUTO_DB_BACKUP) = OFF        |
| Automatic table maintenance         | (AUTO_TBL_MAINT) = ON         |
| Automatic runstats                  | (AUTO_RUNSTATS) = ON          |
| Real-time statistics                | (AUTO_STMT_STATS) = ON        |
| Statistical views                   | (AUTO_STATS_VIEWS) = OFF      |
| Automatic sampling                  | (AUTO_SAMPLING) = OFF         |
| Automatic reorganization            | (AUTO_REORG) = OFF            |
| Auto-Revalidation                   | (AUTO_REVAL) = DEFERRED       |
| Currently Committed                 | (CUR_COMMIT) = ON             |
| CHAR output with DECIMAL input      | (DEC_TO_CHAR_FMT) = NEW       |
| Enable XML Character operations     | (ENABLE_XMLCHAR) = YES        |
| WLM Collection Interval (minutes)   | (WLM_COLLECT_INT) = 0         |
| Monitor Collect Settings            |                               |
| Request metrics                     | (MON_REQ_METRICS) = BASE      |
| Activity metrics                    | (MON_ACT_METRICS) = BASE      |
| Object metrics                      | (MON_OBJ_METRICS) = EXTENDED  |
| Routine data                        | (MON_RTN_DATA) = NONE         |
| Routine executable list             | (MON_RTN_EXECLIST) = OFF      |
| Unit of work events                 | (MON_UOW_DATA) = NONE         |
| UOW events with package list        | (MON_UOW_PKGLIST) = OFF       |
| UOW events with executable list     | (MON_UOW_EXECLIST) = OFF      |
| Lock timeout events                 | (MON_LOCKTIMEOUT) = NONE      |
| Deadlock events                     | (MON_DEADLOCK) = WITHOUT_HIST |
| Lock wait events                    | (MON_LOCKWAIT) = NONE         |
| Lock wait event threshold           | (MON_LW_THRESH) = 5000000     |
| Number of package list entries      | (MON_PKGLIST_SZ) = 32         |
| Lock event notification level       | (MON_LCK_MSG_LVL) = 1         |
| SMTP Server                         | (SMTP_SERVER) =               |
| SQL conditional compilation flags   | (SQL_CCFLAGS) =               |
| Section actuals setting             | (SECTION_ACTUALS) = NONE      |
| Connect procedure                   | (CONNECT_PROC) =              |
| Adjust temporal SYSTEM_TIME period  | (SYSTIME_PERIOD_ADJ) = NO     |
| Log DDL Statements                  | (LOG_DDL_STMTS) = NO          |
| Log Application Information         | (LOG_APPL_INFO) = NO          |
| Default data capture on new Schemas | (DFT_SCHEMAS_DCC) = NO        |
| Default table organization          | (DFT_TABLE_ORG) = ROW         |
| Default string units                | (STRING_UNITS) = SYSTEM       |
| National character string mapping   | (NCHAR_MAPPING) = CHAR_CU32   |
| Database is in write suspend state  | = NO                          |
| Extended row size support           | (EXTENDED_ROW_SZ) = ENABLE    |

**Important:** The **softmax** database configuration parameter is deprecated is deprecated in Version 10.5 and might be removed in a future release. For more information, see Some database configuration parameters are deprecated in *What's New for Db2 Version 10.5*.

## Usage notes

If the database configuration file is invalid, the database must be restored from a backup version.

To set the database configuration parameters to the database manager defaults, use the **RESET DATABASE CONFIGURATION** command.

To retrieve information from all database partitions, use the SYSIBMADM.DBCFG administrative view.

The configuration parameter values that are returned by issuing the **GET DATABASE CONFIGURATION** command might vary slightly from the configuration parameter values allocated in DISK.

## GET DATABASE MANAGER CONFIGURATION

Returns the values of individual entries in the database manager configuration file.

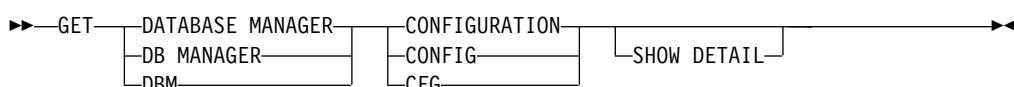
### Authorization

None

### Required connection

None or instance. An instance attachment is not required to perform local database manager configuration operations, but is required to perform remote database manager configuration operations. To display the database manager configuration for a remote instance, it is necessary to first attach to that instance. The **SHOW DETAIL** clause requires an instance attachment.

### Command syntax



### Command parameters

#### SHOW DETAIL

Shows the current values of database configuration parameters and the value of the parameters that will be used the next time that you start the database manager. This option displays the result of dynamic changes to configuration parameters.

This is a default clause when operating in the CLPPlus interface. **SHOW DETAIL** need not be called when using CLPPlus processor.

### Examples

Both node type and platform determine which configuration parameters are listed.

The following example is a sample output after running the **GET DATABASE MANAGER CONFIGURATION** command on a Linux operating system with a Db2 pureScale instance:

Database Manager Configuration

Node type = Enterprise Server Edition with local and remote clients

Database manager configuration release level = 0x0e00

CPU speed (millisec/instruction) (CPUSPEED) = 4.000000e-05  
Communications bandwidth (MB/sec) (COMM\_BANDWIDTH) = 1.000000e+02

Max number of concurrently active databases (NUMDB) = 1  
Federated Database System Support (FEDERATED) = NO  
Transaction processor monitor name (TP\_MON\_NAME) =

Default charge-back account (DFT\_ACCOUNT\_STR) =

```

Java Development Kit installation path (JDK_PATH) = /home/db2inst1/sql1ib/java/jdk64

Diagnostic error capture level (DIAGLEVEL) = 3
Notify Level (NOTIFYLEVEL) = 3
Diagnostic data directory path (DIAGPATH) = /home/hotel67/db2inst1/sql1ib/db2dump/ $m
Current member resolved DIAGPATH = /home/hotel67/db2inst1/sql1ib/db2dump/DIAG0000
Alternate diagnostic data directory path (ALT_DIAGPATH) = /home/hotel67/db2inst1/sql1ib/db2altdump/ $m
Current member resolved ALT_DIAGPATH = /home/hotel67/db2inst1/sql1ib/db2altdump/DIAG0000
Size of rotating db2diag & notify logs (MB) (DIAGSIZE) = 0

Default database monitor switches
 Buffer pool (DFT_MON_BUFPOLL) = OFF
 Lock (DFT_MON_LOCK) = OFF
 Sort (DFT_MON_SORT) = OFF
 Statement (DFT_MON_STMT) = OFF
 Table (DFT_MON_TABLE) = OFF
 Timestamp (DFT_MON_TIMESTAMP) = ON
 Unit of work (DFT_MON_UOW) = OFF
Monitor health of instance and databases (HEALTH_MON) = OFF

 SYSADM group name (SYSADM_GROUP) = DB2ADMIN
 SYSCTRL group name (SYSCTRL_GROUP) =
 SYSMAINT group name (SYSMAINT_GROUP) =
 SYSMON group name (SYSMON_GROUP) =

 Client Userid-Password Plugin (CLNT_PW_PLUGIN) =
 Client Kerberos Plugin (CLNT_KRB_PLUGIN) =
 Group Plugin (GROUP_PLUGIN) =
 GSS Plugin for Local Authorization (LOCAL_GSSPLUGIN) =
 Server Plugin Mode (SRV_PLUGIN_MODE) = UNFENCED
 Server List of GSS Plugins (SRVCON_GSSPLUGIN_LIST) =
 Server Userid-Password Plugin (SRVCON_PW_PLUGIN) =
 Server Connection Authentication (SRVCON_AUTH) = NOT_SPECIFIED
 Cluster manager (TSA) = TSA

 Database manager authentication (AUTHENTICATION) = SERVER
 Alternate authentication (ALTERNATE_AUTH_ENC) = NOT_SPECIFIED
 Cataloging allowed without authority (CATALOG_NOAUTH) = NO
 Trust all clients (TRUST_ALLCLNTS) = YES
 Trusted client authentication (TRUST_CLNTAUTH) = CLIENT
 Bypass federated authentication (FED_NOAUTH) = NO

Default database path (DFTDBPATH) = /home/db2inst1

 Database monitor heap size (4KB) (MON_HEAP_SZ) = AUTOMATIC(90)
 Java Virtual Machine heap size (4KB) (JAVA_HEAP_SZ) = 2048
 Audit buffer size (4KB) (AUDIT_BUF_SZ) = 0
 Size of instance shared memory (4KB) (INSTANCE_MEMORY) = AUTOMATIC(1705741)
 Instance memory for restart light (%) (RSTRT_LIGHT_MEM) = AUTOMATIC(10)
 Backup buffer default size (4KB) (BACKBUFSZ) = 1024
 Restore buffer default size (4KB) (RESTBUFSZ) = 1024

 Agent stack size (AGENT_STACK_SZ) = 1024
 Sort heap threshold (4KB) (SHEAPTHRES) = 0

Directory cache support (DIR_CACHE) = YES

 Application support layer heap size (4KB) (ASLHEAPSZ) = 15
 Max requester I/O block size (bytes) (RQRIOBLK) = 65535
 Query heap size (4KB) (QUERY_HEAP_SZ) = 1000

Workload impact by throttled utilities (UTIL_IMPACT_LIM) = 10

 Priority of agents (AGENTPRI) = SYSTEM
 Agent pool size (NUM_POOLAGENTS) = AUTOMATIC(100)
 Initial number of agents in pool (NUM_INITAGENTS) = 0
 Max number of coordinating agents (MAX_COORDAGENTS) = AUTOMATIC(200)
 Max number of client connections (MAX_CONNECTIONS) = AUTOMATIC(MAX_COORDAGENTS)

Keep fenced process (KEEPFENCED) = YES

```

```

Number of pooled fenced processes (FENCED_POOL) = AUTOMATIC(MAX_COORDAGENTS)
Initial number of fenced processes (NUM_INITFENCED) = 0

Index re-creation time and redo index build (INDEXREC) = RESTART

Transaction manager database name (TM_DATABASE) = 1ST_CONN
Transaction resync interval (sec) (RESYNC_INTERVAL) = 180

SPM name (SPM_NAME) =
SPM log size (SPM_LOG_FILE_SZ) = 256
SPM resync agent limit (SPM_MAX_RESYNC) = 20
SPM log path (SPM_LOG_PATH) =

TCP/IP Service name (SVCENAME) =
Discovery mode (DISCOVER) = SEARCH
Discover server instance (DISCOVER_INST) = ENABLE

SSL server keydb file (SSL_SVR_KEYDB) =
SSL server stash file (SSL_SVR_STASH) =
SSL server certificate label (SSL_SVR_LABEL) =
SSL service name (SSL_SVCENAME) =
SSL cipher specs (SSL_CIPHERSPEC) =
SSL versions (SSL_VERSIONS) =
SSL client keydb file (SSL_CLNT_KEYDB) =
SSL client stash file (SSL_CLNT_STASH) =

Maximum query degree of parallelism (MAX_QUERYDEGREE) = ANY
Enable intra-partition parallelism (INTRA_PARALLEL) = NO

Maximum Asynchronous TQs per query (FEDERATED_ASYNC) = 0

No. of int. communication buffers(4KB) (FCM_NUM_BUFFERS) = AUTOMATIC(4096)
No. of int. communication channels (FCM_NUM_CHANNELS) = AUTOMATIC(2048)
Node connection elapse time (sec) (CONN_ELAPSE) = 3
Max number of node connection retries (MAX_CONNRETRIES) = 3
Max time difference between nodes (min) (MAX_TIME_DIFF) = 1

db2start/db2stop timeout (min) (START_STOP_TIME) = 10

CF Server Configuration:
Memory size (4KB) (CF_MEM_SZ) = AUTOMATIC
Number of worker threads (CF_NUM_WORKERS) = AUTOMATIC
Number of connections (CF_NUM_CONNS) = AUTOMATIC
Diagnostic error capture level (CF_DIAGLEVEL) = 2
Diagnostic data directory path (CF_DIAGPATH) = /home/hotel67/db2inst1/sql1ib/db2dump/ $m
Current member resolved CF_DIAGPATH = /home/hotel67/db2inst1/sql1ib/db2dump/DIAG0000/

```

The following output sample shows the information that is displayed when you specify the **SHOW DETAIL** option. The value that appears in the Delayed Value column is the value that will be in effect the next time you start the database manager instance.

#### Database Manager Configuration

Node type = Enterprise Server Edition with local and remote clients

| Description                                  | Parameter         | Current Value                                                       | Delayed Value |
|----------------------------------------------|-------------------|---------------------------------------------------------------------|---------------|
| Database manager configuration release level |                   | = 0x0e00                                                            |               |
| CPU speed (millisecond/instruction)          | (CPUSPEED)        | = 4.000000e-05                                                      | 4.000000e-05  |
| Communications bandwidth (MB/sec)            | (COMM_BANDWIDTH)  | = 1.000000e+02                                                      | 1.000000e+02  |
| Max number of concurrently active databases  | (NUMDB)           | = 1                                                                 | 1             |
| Federated Database System Support            | (FEDERATED)       | = NO                                                                | NO            |
| Transaction processor monitor name           | (TP_MON_NAME)     | =                                                                   |               |
| Default charge-back account                  | (DFT_ACCOUNT_STR) | =                                                                   |               |
| Java Development Kit installation path       | (JDK_PATH)        | = /home/db2inst1/sql1ib/java/jdk64 /home/db2inst1/sql1ib/java/jdk64 |               |
| Diagnostic error capture level               | (DIAGLEVEL)       | = 3                                                                 | 3             |
| Notify Level                                 | (NOTIFYLEVEL)     | = 3                                                                 | 3             |
| Diagnostic data directory path               | (DIAGPATH)        | = /home/hotel67/db2inst1/sql1ib/db2dump/ \$m                        |               |

```

Current member resolved DIAGPATH = /home/hotel67/db2inst1/sql1ib/db2dump/DIAG0000
Alternate diagnostic data directory path (ALT_DIAGPATH) = /home/hotel67/db2inst1/sql1ib/db2altdump/ $m
Current member resolved ALT_DIAGPATH = /home/hotel67/db2inst1/sql1ib/db2altdump/DIAG0000
Size of rotating db2diag & notify logs (MB) (DIAGSIZE) = 0

Default database monitor switches
 Buffer pool (DFT_MON_BUFPOLL) = OFF OFF
 Lock (DFT_MON_LOCK) = OFF OFF
 Sort (DFT_MON_SORT) = OFF OFF
 Statement (DFT_MON_STMT) = OFF OFF
 Table (DFT_MON_TABLE) = OFF OFF
 Timestamp (DFT_MON_TIMESTAMP) = ON ON
 Unit of work (DFT_MON_UOW) = OFF OFF
Monitor health of instance and databases (HEALTH_MON) = OFF OFF

SYSADM group name (SYSADM_GROUP) = DB2ADMIN DB2ADMIN
SYSCTRL group name (SYSCTRL_GROUP) =
SYSMAINT group name (SYSMAINT_GROUP) =
SYSMON group name (SYSMON_GROUP) =

Client Userid-Password Plugin (CLNT_PW_PLUGIN) =
Client Kerberos Plugin (CLNT_KRB_PLUGIN) =
Group Plugin (GROUP_PLUGIN) =
GSS Plugin for Local Authorization (LOCAL_GSSPLUGIN) =
Server Plugin Mode (SRV_PLUGIN_MODE) = UNFENCED UNFENCED
Server List of GSS Plugins (SRVCON_GSSPLUGIN_LIST) =
Server Userid-Password Plugin (SRVCON_PW_PLUGIN) =
Server Connection Authentication (SRVCON_AUTH) = NOT_SPECIFIED NOT_SPECIFIED
Cluster manager (SRVCON_AUTH) = TSA TSA
Database manager authentication (AUTHENTICATION) = SERVER SERVER
Alternate authentication (ALTERNATE_AUTH_ENC) = NOT_SPECIFIED NOT_SPECIFIED
Cataloging allowed without authority (CATALOG_NOAUTH) = NO NO
Trust all clients (TRUST_ALLCLNTS) = YES YES
Trusted client authentication (TRUST_CLNTAUTH) = CLIENT CLIENT
Bypass federated authentication (FED_NOAUTH) = NO NO

Default database path (DFTDBPATH) = /home/db2inst1 /home/db2inst1

Database monitor heap size (4KB) (MON_HEAP_SZ) = AUTOMATIC(90) AUTOMATIC(90)
Java Virtual Machine heap size (4KB) (JAVA_HEAP_SZ) = 2048 2048
Audit buffer size (4KB) (AUDIT_BUF_SZ) = 0 0
Size of instance shared memory (4KB) (INSTANCE_MEMORY) = AUTOMATIC(1705741) AUTOMATIC(1705741)
Instance memory for restart light (%) (RSTRT_LIGHT_MEM) = AUTOMATIC(10) AUTOMATIC(10)
Agent stack size (AGENT_STACK_SZ) = 1024 1024
Sort heap threshold (4KB) (SHEAPTHRES) = 0 0

Directory cache support (DIR_CACHE) = YES YES

Application support layer heap size (4KB) (ASLHEAPSZ) = 15 15
Max requester I/O block size (bytes) (QRIOBLK) = 65535 65535
Workload impact by throttled utilities(UTIL_IMPACT_LIM) = 10 10

Priority of agents (AGENTPRI) = SYSTEM SYSTEM
Agent pool size (NUM_POOLAGENTS) = AUTOMATIC(100) AUTOMATIC(100)
Initial number of agents in pool (NUM_INITAGENTS) = 0 0
Max number of coordinating agents (MAX_COORDAGENTS) = AUTOMATIC(200) AUTOMATIC(200)
Max number of client connections (MAX_CONNECTIONS) = AUTOMATIC(MAX_COORDAGENTS) AUTOMATIC(MAX_COORDAGENTS)

Keep fenced process (KEEPFENCED) = YES YES
Number of pooled fenced processes (FENCED_POOL) = AUTOMATIC(MAX_COORDAGENTS) AUTOMATIC(MAX_COORDAGENTS)
Initial number of fenced processes (NUM_INITFENCED) = 0 0

Index re-creation time and redo index build (INDEXREC) = RESTART RESTART

Transaction manager database name (TM_DATABASE) = 1ST_CONN 1ST_CONN
Transaction resync interval (sec) (RESYNC_INTERVAL) = 180 180

SPM name (SPM_NAME) =
SPM log size (SPM_LOG_FILE_SZ) = 256 256
SPM resync agent limit (SPM_MAX_RESYNC) = 20 20
SPM log path (SPM_LOG_PATH) =

TCP/IP Service name (SVCENAME) =
Discovery mode (DISCOVER) = SEARCH SEARCH
Discover server instance (DISCOVER_INST) = ENABLE ENABLE

SSL server keydb file (SSL_SVR_KEYDB) =
SSL server stash file (SSL_SVR_STASH) =
SSL server certificate label (SSL_SVR_LABEL) =
SSL service name (SSL_SVCENAME) =
SSL cipher specs (SSL_CIPHERSPECS) =
SSL versions (SSL_VERSIONS) =

```

|                                                          |                                                    |                   |
|----------------------------------------------------------|----------------------------------------------------|-------------------|
| SSL client keydb file                                    | (SSL_CLNT_KEYDB) =                                 |                   |
| SSL client stash file                                    | (SSL_CLNT_STASH) =                                 |                   |
| Maximum query degree of parallelism                      | (MAX_QUERYDEGREE) = ANY                            | ANY               |
| Enable intra-partition parallelism                       | (INTRA_PARALLEL) = NO                              | NO                |
| Maximum Asynchronous TQs per query                       | (FEDERATED_ASYNC) = 0                              | 0                 |
| No. of int. communication buffers(4KB) (FCM_NUM_BUFFERS) | = AUTOMATIC(4096)                                  | AUTOMATIC(4096)   |
| No. of int. communication channels (FCM_NUM_CHANNELS)    | = AUTOMATIC(2048)                                  | AUTOMATIC(2048)   |
| Node connection elapse time (sec)                        | (CONN_ELAPSE) = 3                                  | 3                 |
| Max number of node connection retries (MAX_CONNRETRIES)  | = 3                                                | 3                 |
| Max time difference between nodes (min) (MAX_TIME_DIFF)  | = 1                                                | 1                 |
| db2start/db2stop timeout (min)                           | (START_STOP_TIME) = 10                             | 10                |
| <b>CF Server Configuration:</b>                          |                                                    |                   |
| Memory size (4KB)                                        | (CF_MEM_SZ) = AUTOMATIC(131072)                    | AUTOMATIC(131072) |
| Number of worker threads                                 | (CF_NUM_WORKERS) = AUTOMATIC(1)                    | AUTOMATIC(1)      |
| Number of connections                                    | (CF_NUM_CONNS) = AUTOMATIC(19)                     | AUTOMATIC(19)     |
| Diagnostic error capture level                           | (CF_DIAGLEVEL) = 2                                 | 2                 |
| Diagnostic data directory path                           | (CF_DIAGPATH) = /home/hotel67/db2inst1/sqllib/ \$m |                   |
| Current member resolved CF_DIAGPATH                      | = /home/hotel67/db2inst1/sqllib/db2dump/DIAG0000/  |                   |

The following example is a sample output after running the **GET DATABASE MANAGER CONFIGURATION** command on a Windows operating system:

#### Database Manager Configuration

Node type = Enterprise Server Edition with local and remote clients

|                                              |                                  |
|----------------------------------------------|----------------------------------|
| Database manager configuration release level | = 0x0c00                         |
| Maximum total of files open                  | (MAXTOTFILEP) = 16000            |
| CPU speed (millisecond/instruction)          | (CPUSPEED) = 4.251098e-007       |
| Communications bandwidth (MB/sec)            | (COMM_BANDWIDTH) = 1.000000e+002 |
| Max number of concurrently active databases  | (NUMDB) = 8                      |
| Federated Database System Support            | (FEDERATED) = NO                 |
| Transaction processor monitor name           | (TP_MON_NAME) =                  |
| Default charge-back account                  | (DFT_ACCOUNT_STR) =              |
| Java Development Kit installation path       | (JDK_PATH) =                     |
| Diagnostic error capture level               | (DIAGLEVEL) = 3                  |
| Notify Level                                 | (NOTIFYLEVEL) = 3                |
| Diagnostic data directory path               | (DIAGPATH) =                     |
| Default database monitor switches            |                                  |
| Buffer pool                                  | (DFT_MON_BUFPOLL) = OFF          |
| Lock                                         | (DFT_MON_LOCK) = OFF             |
| Sort                                         | (DFT_MON_SORT) = OFF             |
| Statement                                    | (DFT_MON_STMT) = OFF             |
| Table                                        | (DFT_MON_TABLE) = OFF            |
| Timestamp                                    | (DFT_MON_TIMESTAMP) = ON         |
| Unit of work                                 | (DFT_MON_UOW) = OFF              |
| Monitor health of instance and databases     | (HEALTH_MON) = ON                |
| SYSADM group name                            | (SYSADM_GROUP) =                 |
| SYSCTRL group name                           | (SYSCTRL_GROUP) =                |
| SYSMAINT group name                          | (SYSMAINT_GROUP) =               |
| SYSMON group name                            | (SYSMON_GROUP) =                 |
| Client Userid-Password Plugin                | (CLNT_PW_PLUGIN) =               |
| Client Kerberos Plugin                       | (CLNT_KRB_PLUGIN) = IBMkrb5      |
| Group Plugin                                 | (GROUP_PLUGIN) =                 |
| GSS Plugin for Local Authorization           | (LOCAL_GSSPLUGIN) =              |
| Server Plugin Mode                           | (SRV_PLUGIN_MODE) = UNFENCED     |
| Server List of GSS Plugins                   | (SRVCON_GSSPLUGIN_LIST) =        |
| Server Userid-Password Plugin                | (SRVCON_PW_PLUGIN) =             |
| Server Connection Authentication             | (SRVCON_AUTH) = NOT_SPECIFIED    |
| Cluster manager                              | (CLUSTER_MGR) =                  |

|                                                         |                                |
|---------------------------------------------------------|--------------------------------|
| Database manager authentication                         | (AUTHENTICATION) = SERVER      |
| Cataloging allowed without authority                    | (CATALOG_NOAUTH) = NO          |
| Trust all clients                                       | (TRUST_ALLCLNTS) = YES         |
| Trusted client authentication                           | (TRUST_CLNTAUTH) = CLIENT      |
| Bypass federated authentication                         | (FED_NOAUTH) = NO              |
| Default database path                                   | (DFTDBPATH) = C:               |
| Database monitor heap size (4KB)                        | (MON_HEAP_SZ) = AUTOMATIC      |
| Java Virtual Machine heap size (4KB)                    | (JAVA_HEAP_SZ) = 2048          |
| Audit buffer size (4KB)                                 | (AUDIT_BUF_SZ) = 0             |
| Size of instance shared memory (4KB)                    | (INSTANCE_MEMORY) = AUTOMATIC  |
| Backup buffer default size (4KB)                        | (BACKBUFSZ) = 1024             |
| Restore buffer default size (4KB)                       | (RESTBUFSZ) = 1024             |
| Agent stack size                                        | (AGENT_STACK_SZ) = 16          |
| Minimum committed private memory (4KB)                  | (MIN_PRIV_MEM) = 32            |
| Private memory threshold (4KB)                          | (PRIV_MEM_THRESH) = 20000      |
| Sort heap threshold (4KB)                               | (SHEAPTHRES) = 0               |
| Directory cache support                                 | (DIR_CACHE) = YES              |
| Application support layer heap size (4KB)               | (ASLHEAPSZ) = 15               |
| Max requester I/O block size (bytes)                    | (QRIOBLK) = 65535              |
| Query heap size (4KB)                                   | (QUERY_HEAP_SZ) = 1000         |
| Workload impact by throttled utilities(UTIL_IMPACT_LIM) | = 10                           |
| Priority of agents                                      | (AGENTPRI) = SYSTEM            |
| Agent pool size                                         | (NUM_POOLAGENTS) = AUTOMATIC   |
| Initial number of agents in pool                        | (NUM_INITAGENTS) = 0           |
| Max number of coordinating agents                       | (MAX_COORDAGENTS) = AUTOMATIC  |
| Max number of client connections                        | (MAX_CONNECTIONS) = AUTOMATIC  |
| Keep fenced process                                     | (KEEPFENCED) = YES             |
| Number of pooled fenced processes                       | (FENCED_POOL) = AUTOMATIC      |
| Initial number of fenced processes                      | (NUM_INITFENCED) = 0           |
| Index re-creation time and redo index build             | (INDEXREC) = RESTART           |
| Transaction manager database name                       | (TM_DATABASE) = 1ST_CONN       |
| Transaction resync interval (sec)                       | (RESYNC_INTERVAL) = 180        |
| SPM name                                                | (SPM_NAME) = KEON14            |
| SPM log size                                            | (SPM_LOG_FILE_SZ) = 256        |
| SPM resync agent limit                                  | (SPM_MAX_RESYNC) = 20          |
| SPM log path                                            | (SPM_LOG_PATH) =               |
| NetBIOS Workstation name                                | (NNNAME) =                     |
| TCP/IP Service name                                     | (SVCENAME) = db2c_DB2          |
| Discovery mode                                          | (DISCOVER) = SEARCH            |
| Discover server instance                                | (DISCOVER_INST) = ENABLE       |
| Maximum query degree of parallelism                     | (MAX_QUERYDEGREE) = ANY        |
| Enable intra-partition parallelism                      | (INTRA_PARALLEL) = NO          |
| Maximum Asynchronous TQs per query                      | (FEDERATED_ASYNC) = 0          |
| No. of int. communication buffers(4KB)                  | (FCM_NUM_BUFFERS) = AUTOMATIC  |
| No. of int. communication channels                      | (FCM_NUM_CHANNELS) = AUTOMATIC |
| Node connection elapse time (sec)                       | (CONN_ELAPSE) = 10             |
| Max number of node connection retries                   | (MAX_CONNRETRIES) = 5          |

```

Max time difference between nodes (min) (MAX_TIME_DIFF) = 60
db2start/db2stop timeout (min) (START_STOP_TIME) = 10

```

The following output sample shows the information that is displayed when you specify the **SHOW DETAIL** option on a Windows operating system. The value that appears in the Delayed Value column is the value that will be in effect the next time you start the database manager instance.

```

db2 => get dbm cfg show detail

Database Manager Configuration

Node type = Enterprise Server Edition with local and remote clients

Description Parameter Current Value Delayed Value
----- = -----
Database manager configuration release level = 0x0c00

Maximum total of files open (MAXTOTFILOP) = 16000 16000
CPU speed (millisec/instruction) (CPUSPEED) = 4.251098e-007 4.251098e-007
Communications bandwidth (MB/sec) (COMM_BANDWIDTH) = 1.000000e+002 1.000000e+002

Max number of concurrently active databases (NUMDB) = 8 8
Federated Database System Support (FEDERATED) = NO NO
Transaction processor monitor name (TP_MON_NAME) =

Default charge-back account (DFT_ACCOUNT_STR) =

Java Development Kit installation path (JDK_PATH) =

Diagnostic error capture level (DIAGLEVEL) = 3 3
Notify Level (NOTIFYLEVEL) = 3 3
Diagnostic data directory path (DIAGPATH) =

Default database monitor switches
 Buffer pool (DFT_MON_BUFPPOOL) = OFF OFF
 Lock (DFT_MON_LOCK) = OFF OFF
 Sort (DFT_MON_SORT) = OFF OFF
 Statement (DFT_MON_STMT) = OFF OFF
 Table (DFT_MON_TABLE) = OFF OFF
 Timestamp (DFT_MON_TIMESTAMP) = ON ON
 Unit of work (DFT_MON_UOW) = OFF OFF
 Monitor health of instance and databases (HEALTH_MON) = ON ON

 SYSADM group name (SYSADM_GROUP) =
 SYSCTRL group name (SYSCTRL_GROUP) =
 SYSMAINT group name (SYSMAINT_GROUP) =
 SYSMON group name (SYSMON_GROUP) =

Client Userid-Password Plugin (CLNT_PW_PLUGIN) =

Client Kerberos Plugin (CLNT_KRB_PLUGIN) = IBMkrb5 IBMkrb5

Group Plugin (GROUP_PLUGIN) =

GSS Plugin for Local Authorization (LOCAL_GSSPLUGIN) =

Server Plugin Mode (SRV_PLUGIN_MODE) = UNFENCED UNFENCED

Server List of GSS Plugins (SRVCON_GSSPLUGIN_LIST) =

Server Userid-Password Plugin (SRVCON_PW_PLUGIN) =

Server Connection Authentication (SRVCON_AUTH) = NOT_SPECIFIED NOT_SPECIFIED
Cluster manager (CLUSTER_MGR) =

Database manager authentication (AUTHENTICATION) = SERVER SERVER
Cataloging allowed without authority (CATALOG_NOAUTH) = NO NO
Trust all clients (TRUST_ALLCLNTS) = YES YES
Trusted client authentication (TRUST_CLNTAUTH) = CLIENT CLIENT
Bypass federated authentication (FED_NOAUTH) = NO NO

Default database path (DFTDBPATH) = C: C:

Database monitor heap size (4KB) (MON_HEAP_SZ) = AUTOMATIC(66) AUTOMATIC(66)
Java Virtual Machine heap size (4KB) (JAVA_HEAP_SZ) = 2048 2048

```

|                                                         |                                                |                            |
|---------------------------------------------------------|------------------------------------------------|----------------------------|
| Audit buffer size (4KB)                                 | (AUDIT_BUF_SZ) = 0                             | 0                          |
| Size of instance shared memory (4KB)                    | (INSTANCE_MEMORY) = AUTOMATIC(73728)           | AUTOMATIC(73728)           |
| Backup buffer default size (4KB)                        | (BACKBUFSZ) = 1024                             | 1024                       |
| Restore buffer default size (4KB)                       | (RESTBUFSZ) = 1024                             | 1024                       |
| Agent stack size                                        | (AGENT_STACK_SZ) = 16                          | 16                         |
| Sort heap threshold (4KB)                               | (SHEAPTHRES) = 0                               | 0                          |
| Directory cache support                                 | (DIR_CACHE) = YES                              | YES                        |
| Application support layer heap size (4KB)               | (ASLHEAPSZ) = 15                               | 15                         |
| Max requester I/O block size (bytes)                    | (QRIOIBLK) = 65535                             | 65535                      |
| Query heap size (4KB)                                   | (QUERY_HEAP_SZ) = 1000                         | 1000                       |
| Workload impact by throttled utilities(UTIL_IMPACT_LIM) | = 10                                           | 10                         |
| Priority of agents                                      | (AGENTPRI) = SYSTEM                            | SYSTEM                     |
| Agent pool size                                         | (NUM_POOLAGENTS) = AUTOMATIC(100)              | AUTOMATIC(100)             |
| Initial number of agents in pool                        | (NUM_INITAGENTS) = 0                           | 0                          |
| Max number of coordinating agents                       | (MAX_COORDAGENTS) = AUTOMATIC(200)             | AUTOMATIC(200)             |
| Max number of client connections                        | (MAX_CONNECTIONS) = AUTOMATIC(MAX_COORDAGENTS) | AUTOMATIC(MAX_COORDAGENTS) |
| Keep fenced process                                     | (KEEPFENCED) = YES                             | YES                        |
| Number of pooled fenced processes                       | (FENCED_POOL) = AUTOMATIC(MAX_COORDAGENTS)     | AUTOMATIC(MAX_COORDAGENTS) |
| Initial number of fenced processes                      | (NUM_INITFENCED) = 0                           | 0                          |
| Index re-creation time and redo index build             | (INDEXREC) = RESTART                           | RESTART                    |
| Transaction manager database name                       | (TM_DATABASE) = 1ST_CONN                       | 1ST_CONN                   |
| Transaction resync interval (sec)                       | (RESYNCR_INTERVAL) = 180                       | 180                        |
| SPM name                                                | (SPM_NAME) = KEON14                            | KEON14                     |
| SPM log size                                            | (SPM_LOG_FILE_SZ) = 256                        | 256                        |
| SPM resync agent limit                                  | (SPM_MAX_RESYNC) = 20                          | 20                         |
| SPM log path                                            | (SPM_LOG_PATH) =                               |                            |
| NetBIOS Workstation name                                | (NNAME) =                                      |                            |
| TCP/IP Service name                                     | (SVCENAME) = db2c_DB2                          | db2c_DB2                   |
| Discovery mode                                          | (DISCOVER) = SEARCH                            | SEARCH                     |
| Discover server instance                                | (DISCOVER_INST) = ENABLE                       | ENABLE                     |
| Maximum query degree of parallelism                     | (MAX_QUERYDEGREE) = ANY                        | ANY                        |
| Enable intra-partition parallelism                      | (INTRA_PARALLEL) = NO                          | NO                         |
| Maximum Asynchronous TQs per query                      | (FEDERATED_ASYNC) = 0                          | 0                          |
| No. of int. communication buffers(4KB)                  | (FCM_NUM_BUFFERS) = AUTOMATIC(4096)            | AUTOMATIC(4096)            |
| No. of int. communication channels                      | (FCM_NUM_CHANNELS) = AUTOMATIC(2048)           | AUTOMATIC(2048)            |
| Node connection elapse time (sec)                       | (CONN_ELAPSE) = 10                             | 10                         |
| Max number of node connection retries                   | (MAX_CONNRETRIES) = 5                          | 5                          |
| Max time difference between nodes (min)                 | (MAX_TIME_DIFF) = 60                           | 60                         |
| db2start/db2stop timeout (min)                          | (START_STOP_TIME) = 10                         | 10                         |

## Usage notes

- If an attachment to a remote instance or a different local instance exists, the values of the database manager configuration parameters for the attached server are returned. Otherwise, the values of the local database manager configuration parameters are returned.
- If an error occurs, the information that is returned is invalid. If the configuration file is invalid, an error message is returned. The user must drop and re-create the instance to recover.
- To set the configuration parameters to the default values shipped with the database manager , use the **RESET DATABASE MANAGER CONFIGURATION** command.
- The AUTOMATIC values that are indicated on **GET DATABASE MANAGER CONFIGURATION SHOW DETAIL** for **fcm\_num\_buffers** and **fcm\_num\_channels** are the initial values at

instance startup time and do not reflect any automatic increasing or decreasing that might have occurred during run time.

- Configuration parameters **max\_connections**, **max\_coordagents**, and **num\_poolagents** are set to AUTOMATIC.
- Configuration parameters **maxagents** and **maxcagents** are deprecated. The following deprecated functions are the result:
  - CLP and the db2CfgSet API will tolerate updates to these parameters. However these updates will be ignored by the Db2 database.
  - CLP will no longer display these database configuration parameters when the client and server are on the Db2 V9.5 code base. If the server is Db2 V9.5, the parameters appear to have a value of 0 output, to earlier clients. If the client is Db2 V9.5, but the server is before Db2 V9.5, these parameters will be displayed with the assigned values.
  - db2CfgGet API will tolerate requests for SQLF\_KTN\_MAXAGENTS and SQLF\_KTN\_MAXCAGENTS, but they will return 0 if the server is Db2 V9.5.
  - The behavior of the db2AutoConfig API will depend on the **db2VersionNumber** passed in to the API. If the version is Db2 V9.5 or later, **maxagents** will not be returned, but for versions before this it will.
  - The **AUTOCONFIGURE** CLP command will display a value for **maxagents** with requests from an earlier version client (current and recommended value of 0). For current version client requests, **maxagents** are displayed with an appropriate value.
  - The **AUTOCONFIGURE ADMIN\_CMD** procedure will not return information about **maxagents** when the server is Db2 V9.5 or later.
  - Updates to **maxagents** or **maxcagents** through the **ADMIN\_CMD** procedure will return successfully but have no effect on the server if the server is Db2 V9.5 or later.
  - Queries of database manager configuration parameters that use the **DBMCFG** administrative view will not return rows for **maxagents** or **maxcagents** if the server is Db2 V9.5 or later.

In a future release, these configuration parameters might be removed completely.

## GET DATABASE MANAGER MONITOR SWITCHES

Displays the status of the database system monitor switches that are currently active. Monitor switches instruct the database manager to collect database activity information.

Each application using the database system monitor interface has its own set of monitor switches. A database system monitor switch is ON when any of the monitoring applications has turned it ON. This command is used to determine what data the database system monitor is currently collecting. It is possible that more data is being collected than is specified in the default monitor switches that are set in the database manager configuration because an application has a switch set to ON in its view.

### Scope

This command is issued on the currently attached member and, by default, returns information only for that member. In the case of multiple members per host, the currently attached member is the first member that is listed in the **db2nodes.cfg** file on that host.

To issue the command for a specific member that is not the currently attached member, specify the **ATTACH\_MEMBER** parameter. To issue the command for all members and receive an aggregated result, specify the **GLOBAL** parameter.

To change the currently attached member, issue the **SET CLIENT** command with the **ATTACH\_MEMBER** parameter . You must issue the **DETACH** command followed by the **ATTACH** command from your application for this change to take effect.

## Authorization

One of the following authorities:

- SYSADM
  - SYSCTRL
  - SYSMaint
  - SYSMON

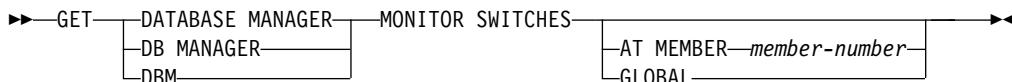
## Required connection

## Instance or database:

- If there is neither an attachment to an instance, nor a connection to a database, a default instance attachment is created.
  - If there is both an attachment to an instance, and a database connection, the instance attachment is used.

To display the settings for a remote instance, or for a different local instance, it is necessary to first attach to that instance.

## Command syntax



## Command parameters

AT MEMBER *member-number*

Specifies the member for which the status of the database manager monitor switches is to be displayed.

GLOBAL

**--** Returns the status of the database manager monitor switches from all members.

## Examples

The following is sample output from **GET DATABASE MANAGER MONITOR SWITCHES**:

DBM System Monitor Information Collected

Switch list for member number 1  
Buffer Pool Activity Information (BUFFERPOOL) = ON 06-11-2003 10:11:01.738377  
Lock Information (LOCK) = OFF  
Sorting Information (SORT) = ON 06-11-2003 10:11:01.738400  
SQL Statement Information (STATEMENT) = OFF  
Table Activity Information (TABLE) = OFF  
Take Timestamp Information (TIMESTAMP) = ON 06-11-2003 10:11:01.738525  
Unit of Work Information (UOW) = ON 06-11-2003 10:11:01.738535

## Usage notes

The recording switches BUFFERPOOL, LOCK, SORT, STATEMENT, TABLE, and UOW are OFF by default, but can be switched ON using the **UPDATE MONITOR SWITCHES** command. If any of these switches are ON, this command also displays the time stamp for when the switch was turned ON.

The recording switch TIMESTAMP is ON by default, but can be switched OFF using **UPDATE MONITOR SWITCHES**. When this switch is ON, the system issues timestamp calls when collecting information for timestamp monitor elements. Examples of these elements are:

- `agent_sys_cpu_time`
- `agent_usr_cpu_time`
- `appl_con_time`
- `con_elapsed_time`
- `con_response_time`
- `conn_complete_time`
- `db_conn_time`
- `elapsed_exec_time`
- `gw_comm_error_time`
- `gw_con_time`
- `gw_exec_time`
- `host_response_time`
- `last_backup`
- `last_reset`
- `lock_wait_start_time`
- `network_time_bottom`
- `network_time_top`
- `prev_uow_stop_time`
- `rf_timestamp`
- `ss_sys_cpu_time`
- `ss_usr_cpu_time`
- `status_change_time`
- `stmt_elapsed_time`
- `stmt_start`
- `stmt_stop`
- `stmt_sys_cpu_time`
- `stmt_usr_cpu_time`
- `uow_elapsed_time`
- `uow_start_time`
- `uow_stop_time`

If the TIMESTAMP switch is OFF, timestamp operating system calls are not issued to determine these elements and these elements will contain zero. Turning this switch OFF becomes important as CPU utilization approaches 100%; when this occurs, the CPU time required for issuing timestamps increases dramatically.

## Compatibilities

For compatibility with previous versions:

- **DBPARTITIONNUM** or **NODE** can be substituted for **MEMBER**, except when the **DB2\_ENFORCE\_MEMBER\_SYNTAX** registry variable is set to **ON**.

## GET DESCRIPTION FOR HEALTH INDICATOR

Returns a description for the specified health indicator. A Health Indicator measures the healthiness of a particular state, capacity, or behavior of the database system. The state defines whether or not the database object or resource is operating normally.

### Authorization

None

### Required connection

Instance. If there is no instance attachment, a default instance attachment is created.

To obtain a snapshot of a remote instance, it is necessary to first attach to that instance.

### Command syntax

►►GET DESCRIPTION FOR HEALTH INDICATOR—*shortname*►►

### Command parameters

#### HEALTH INDICATOR *shortname*

The name of the health indicator for which you would like to retrieve the description. Health indicator names consist of a two- or three-letter object identifier followed by a name which describes what the indicator measures. For example:

db.sort\_privmem\_util

### Examples

The following example is sample output from the **GET DESCRIPTION FOR HEALTH INDICATOR** command.

```
GET DESCRIPTION FOR HEALTH INDICATOR db2.sort_privmem_util
```

```
DESCRIPTION FOR db2.sort_privmem_util
```

Sorting is considered healthy if there is sufficient heap space in which to perform sorting and sorts do not overflow unnecessarily. This indicator tracks the utilization of the private sort memory. If db2.sort\_heap\_allocated (system monitor data element) >= SHEAPTHRES (DBM configuration parameter), sorts may not be getting full sort heap as defined by the SORTHEAP parameter and an alert may be generated. The indicator is calculated using the formula: (db2.sort\_heap\_allocated / SHEAPTHRES) \* 100. The Post Threshold Sorts snapshot monitor element measures the number of sorts that have requested heaps after the sort heap threshold has been exceeded. The value of this indicator, shown in the Additional Details, indicates the degree of severity of the problem for this health indicator. The Maximum Private Sort Memory Used snapshot monitor element maintains a private sort memory high-water mark for the instance. The value of

this indicator, shown in the Additional Information, indicates the maximum amount of private sort memory that has been in use at any one point in time since the instance was last recycled. This value can be used to help determine an appropriate value for SHEAPTHRES.

## GET HEALTH NOTIFICATION CONTACT LIST

Returns the list of contacts and contact groups that are notified about the health of an instance. A contact list consists of email addresses or pager Internet addresses of individuals who are to be notified when non-normal health conditions are present for an instance or any of its database objects.

### Authorization

None

### Required Connection

Instance. An explicit attachment is not required.

### Command Syntax

```
►—GET—[HEALTH NOTIFICATION CONTACT]—LIST—►
```

The command syntax diagram shows 'GET' followed by a bracketed section '[HEALTH NOTIFICATION CONTACT]' which contains 'NOTIFICATION' and 'CONTACT'. This is followed by 'LIST' and a final '►' symbol.

### Command Parameters

None

### Examples

Issuing the command **GET NOTIFICATION LIST** results in a report similar to the following output:

| Name      | Type          |
|-----------|---------------|
| <hr/>     |               |
| Joe Brown | Contact       |
| Support   | Contact group |

## GET HEALTH SNAPSHOT

Retrieves the health status information for the database manager and its databases. The information returned represents a snapshot of the health state at the time the command was issued.

**Important:** This command or API has been deprecated and might be removed in a future release because the health monitor has been deprecated in Version 9.7. It is not supported in Db2 pureScale environments. For more information, see “Health monitor has been deprecated” at [http://www.ibm.com/support/knowledgecenter/SSEPGG\\_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0055045.html](http://www.ibm.com/support/knowledgecenter/SSEPGG_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0055045.html).

### Scope

This command is issued on the currently attached member and, by default, returns information only for that member. In the case of multiple members per host, the currently attached member is the first member that is listed in the db2nodes.cfg file on that host.

To issue the command for a specific member that is not the currently attached member, specify the **ATTACH\_MEMBER** parameter. To issue the command for all members and receive an aggregated result, specify the **GLOBAL** parameter.

To change the currently attached member, issue the **SET CLIENT** command with the **ATTACH\_MEMBER** parameter . You must issue the **DETACH** command followed by the **ATTACH** command from your application for this change to take effect.

## Authorization

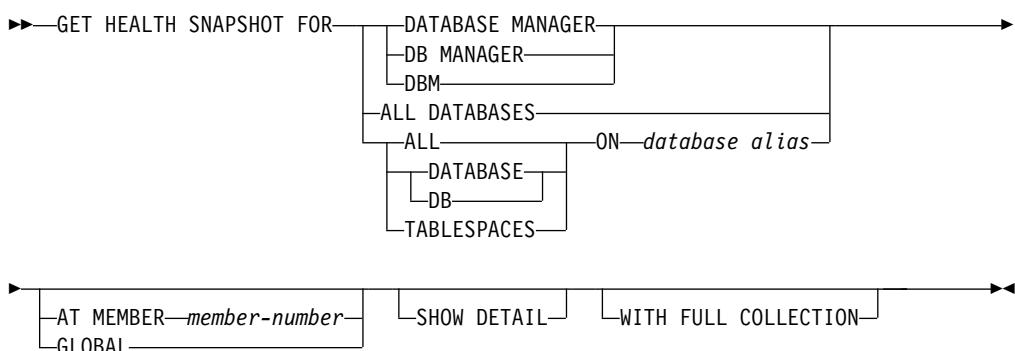
None

## Required connection

Instance. If there is no instance attachment, a default instance attachment is created.

To obtain a snapshot of a remote instance, it is necessary to first attach to that instance.

## Command syntax



## Command parameters

DATABASE MANAGER

Provides statistics for the active database manager instance.

## ALL DATABASES

**sys.dm\_db\_partition\_stats** Provides health states for all active databases on the current database partition.

**ALL ON** *database-alias*

**SHOW ENGINE INNODB STATUS**  
Provides health states and information about all table spaces and buffer pools for a specified database.

## DATABASE ON *database-alias*

#### TABLESPACES ON *database-alias*

**SPACES ON *database-name*** Provides information about table spaces for a specified database.

AT MEMBER *member-number*

**MBER member number** Returns results for the member specified

GLOBAL

**XE** Returns the health monitor status for all members

## **SHOW DETAIL**

Specifies that the output should include the historical data for each health monitor data element in the form of `{(Timestamp, Value, Formula)}`, where the bracketed parameters (Timestamp, Value, Formula), will be repeated for each history record that is returned. For example,

```
(03-19-2002 13:40:24.138865,50,((1-(4/8))*100)),
(03-19-2002 13:40:13.1386300,50,((1-(4/8))*100)),
(03-19-2002 13:40:03.1988858,0,((1-(3/3))*100))
```

Collection object history is returned for all collection objects in ATTENTION or AUTOMATE FAILED state.

The **SHOW DETAIL** option also provides additional contextual information that can be useful to understanding the value and alert state of the associated Health Indicator. For example, if the table space storage utilization Health Indicator is being used to determine how full the table space is, the rate at which the table space is growing will also be provided by **SHOW DETAIL**.

## **WITH FULL COLLECTION**

Specifies that full collection information for all collection state-based health indicators is to be returned. This option considers both the name and size filter criteria. If a user requests a health snapshot with full collection, the report will show all tables that meet the name and size criteria in the policy. This can be used to validate which tables will be evaluated in a given refresh cycle. The output returned when this option is specified is for collection objects in NORMAL, AUTOMATED, ATTENTION, or AUTOMATE FAILED state. This option can be specified in conjunction with the **SHOW DETAIL** option.

Without this option, only tables that have been evaluated for automatic reorganization and require manual intervention (that is, manual reorg or automation failed) will be displayed in a get health snapshot report.

## **Examples**

The following section is typical output resulting from a request for database manager information:

```
D:\>DB2 GET HEALTH SNAPSHOT FOR DBM
```

### Database Manager Health Snapshot

|                                       |                                                              |
|---------------------------------------|--------------------------------------------------------------|
| Node name                             | =                                                            |
| Node type                             | = Enterprise Server Edition<br>with local and remote clients |
| Instance name                         | = DB2                                                        |
| Snapshot timestamp                    | = 02/17/2004 12:39:44.818949                                 |
| Number of members in Db2 instance     | = 1                                                          |
| Start Database Manager timestamp      | = 02/17/2004 12:17:21.000119                                 |
| Instance highest severity alert state | = Normal                                                     |

### Health Indicators:

|                      |                              |
|----------------------|------------------------------|
| Indicator Name       | = db2.db2_op_status          |
| Value                | = 0                          |
| Evaluation timestamp | = 02/17/2004 12:37:23.393000 |
| Alert state          | = Normal                     |
| Indicator Name       | = db2.sort_privmem_util      |
| Value                | = 0                          |

|                      |                              |
|----------------------|------------------------------|
| Unit                 | = %                          |
| Evaluation timestamp | = 02/17/2004 12:37:23.393000 |
| Alert state          | = Normal                     |
| Indicator Name       | = db2.mon_heap_util          |
| Value                | = 6                          |
| Unit                 | = %                          |
| Evaluation timestamp | = 02/17/2004 12:37:23.393000 |
| Alert state          | = Normal                     |

## Usage notes

When the **GET HEALTH SNAPSHOT** command returns a recommendation to reorganize the data or index on a data partitioned table, the recommendation is only at the table level and not specific to any individual partitions of the table. Starting with Db2 Version 9.7 Fix Pack 1, the data or the partitioned indexes of a specific data partition can be reorganized using the **REORG INDEXES/TABLE** command or the db2Reorg API. To determine if only specific data partitions of a data partitioned table need to be reorganized, use the **REORGCHK** command to retrieve statistics and reorganization recommendations for the data partitions of the data partitioned table. Use the **REORG TABLE** or **REORG INDEXES ALL** command with the **ON DATA PARTITION** clause to reorganize the data or the partitioned indexes of a specific data partition.

## Compatibilities

For compatibility with previous versions:

- **DBPARTITIONNUM** can be substituted for **MEMBER**, except when the **DB2\_ENFORCE\_MEMBER\_SYNTAX** registry variable is set to **ON**.

## GET INSTANCE

Returns the value of the **DB2INSTANCE** environment variable.

### Authorization

None

### Required connection

None

### Command syntax

**>> GET INSTANCE <<**

### Command parameters

None

### Examples

The following example is sample output from **GET INSTANCE**:

The current database manager instance is: smith

## GET MONITOR SWITCHES

Displays the status of the database system monitor switches for the current session. Monitor switches instruct the database manager to collect database activity information.

Each application using the database system monitor interface has its own set of monitor switches. This command displays them. To display the database manager-level switches, use the **GET DBM MONITOR SWITCHES** command.

### Scope

This command is issued on the currently attached member and, by default, returns information only for that member. In the case of multiple members per host, the currently attached member is the first member that is listed in the db2nodes.cfg file on that host.

To issue the command for a specific member that is not the currently attached member, specify the **ATTACH\_MEMBER** parameter. To issue the command for all members and receive an aggregated result, specify the **GLOBAL** parameter.

To change the currently attached member, issue the **SET CLIENT** command with the **ATTACH\_MEMBER** parameter . You must issue the **DETACH** command followed by the **ATTACH** command from your application for this change to take effect.

### Authorization

One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT
- SYSMON

### Required connection

Instance. If there is no instance attachment, a default instance attachment is created.

To display the settings for a remote instance, or for a different local instance, it is necessary to first attach to that instance.

### Command syntax

```
►►—GET MONITOR SWITCHES—
 |
 | AT MEMBER—member-number
 |
 | GLOBAL
```

### Command parameters

#### AT MEMBER *member-number*

Specifies the member for which the status of the monitor switches is to be displayed.

#### GLOBAL

Returns the status of the monitor switches from all members.

## Examples

The following is sample output from **GET MONITOR SWITCHES**:

### Monitor Recording Switches

```
Switch list for member number 1
Buffer Pool Activity Information (BUFFERPOOL) = ON 02-20-2003 16:04:30.070073
Lock Information (LOCK) = OFF
Sorting Information (SORT) = OFF
SQL Statement Information (STATEMENT) = ON 02-20-2003 16:04:30.070073
Table Activity Information (TABLE) = OFF
Take Timestamp Information (TIMESTAMP) = ON 02-20-2003 16:04:30.070073
Unit of Work Information (UOW) = ON 02-20-2003 16:04:30.070073
```

## Usage notes

The recording switch **TIMESTAMP** is on by default, but can be switched off using **UPDATE MONITOR SWITCHES**. When this switch is on the system issues timestamp calls when collecting information for timestamp monitor elements.

The recording switch **TIMESTAMP** is on by default, but can be switched off using **UPDATE MONITOR SWITCHES**. If this switch is off, this command also displays the time stamp for when the switch was turned off. When this switch is on the system issues timestamp calls when collecting information for timestamp monitor elements. Examples of these elements are:

- **agent\_sys\_cpu\_time**
- **agent\_usr\_cpu\_time**
- **appl\_con\_time**
- **con\_elapsed\_time**
- **con\_response\_time**
- **conn\_complete\_time**
- **db\_conn\_time**
- **elapsed\_exec\_time**
- **gw\_comm\_error\_time**
- **gw\_con\_time**
- **gw\_exec\_time**
- **host\_response\_time**
- **last\_backup**
- **last\_reset**
- **lock\_wait\_start\_time**
- **network\_time\_bottom**
- **network\_time\_top**
- **prev\_uow\_stop\_time**
- **rf\_timestamp**
- **ss\_sys\_cpu\_time**
- **ss\_usr\_cpu\_time**
- **status\_change\_time**
- **stmt\_elapsed\_time**
- **stmt\_start**
- **stmt\_stop**
- **stmt\_sys\_cpu\_time**

- `stmt_usr_cpu_time`
- `uow_elapsed_time`
- `uow_start_time`
- `uow_stop_time`

If the `TIMESTAMP` switch is off, timestamp operating system calls are not issued to determine these elements and these elements will contain zero. Turning this switch off becomes important as CPU utilization approaches 100%; when this occurs, the CPU time required for issuing timestamps increases dramatically.

## Compatibilities

For compatibility with previous versions:

- `DBPARTITIONNUM` or `NODE` can be substituted for `MEMBER`, except when the `DB2_ENFORCE_MEMBER_SYNTAX` registry variable is set to `ON`.

## GET RECOMMENDATIONS FOR HEALTH INDICATOR

Returns descriptions of recommendations for improving the health of the aspect of the database system that is monitored by the specified health indicator.

Recommendations can be returned for a health indicator that is in an alert state on a specific object, or the full set of recommendations for a given health indicator can be queried.

**Important:** This command or API has been deprecated and might be removed in a future release because the health monitor has been deprecated in Version 9.7. It is not supported in Db2 pureScale environments. For more information, see “Health monitor has been deprecated” at [http://www.ibm.com/support/knowledgecenter/SSEPGG\\_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0055045.html](http://www.ibm.com/support/knowledgecenter/SSEPGG_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0055045.html).

## Scope

This command is issued on the currently attached member and, by default, returns information only for that member. In the case of multiple members per host, the currently attached member is the first member that is listed in the `db2nodes.cfg` file on that host.

To issue the command for a specific member that is not the currently attached member, specify the `ATTACH_MEMBER` parameter. To issue the command for all members and receive an aggregated result, specify the `GLOBAL` parameter.

To change the currently attached member, issue the `SET CLIENT` command with the `ATTACH_MEMBER` parameter . You must issue the `DETACH` command followed by the `ATTACH` command from your application for this change to take effect.

In a partitioned database or Db2 pureScale environment, this command can be invoked from any member defined in the `db2nodes.cfg` file. It acts only on that member unless the `GLOBAL` parameter is specified.

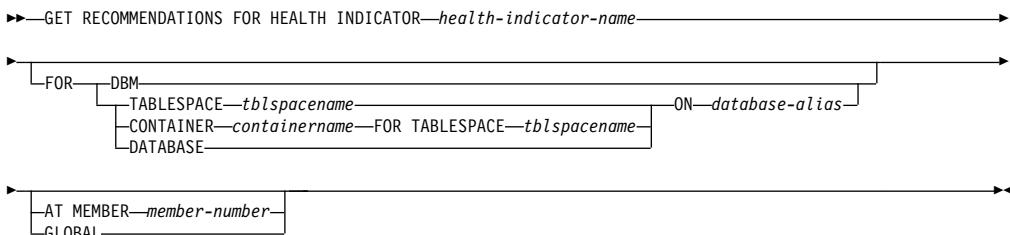
## Authorization

None

## Required connection

Instance. If there is no instance attachment, a default instance attachment is created. To retrieve recommendations for a remote instance, it is necessary to first attach to that instance.

## Command syntax



## Command parameters

### HEALTH INDICATOR *health-indicator-name*

The name of the health indicator for which you would like to retrieve the recommendations. Health indicator names consist of a two- or three-letter object identifier followed by a name that describes what the indicator measures.

**DBM** Returns recommendations for a database manager health indicator that has entered an alert state.

### TABLESPACE *tblspacename*

Returns recommendation for a health indicator that has entered an alert state on the specified table space and database.

### CONTAINER *containername*

Returns recommendation for a health indicator that has entered an alert state on the specified container in the specified table space and database.

### DATABASE

Returns recommendations for a health indicator that has entered an alert state on the specified database.

### ON *databasealias*

Specifies a database.

### AT MEMBER *member-number*

Specifies the member number at which the health indicator has entered an alert state. If a member number is not specified and **GLOBAL** is not specified, the command will return information for the currently connected member.

### GLOBAL

Retrieves recommendations for the specified health indicator across all members. In cases where the recommendations are the same on different members, those recommendations are returned as a single set of recommendations that solve the health indicator on the affected members.

## Examples

```
db2 get recommendations for health indicator db.db_heap_util
for database on sample
```

Problem:

|                        |                       |
|------------------------|-----------------------|
| Indicator Name         | = db.db_heap_util     |
| Value                  | = 42                  |
| Evaluation timestamp   | = 11/25/2003 19:04:54 |
| Alert state            | = Alarm               |
| Additional information | =                     |

Recommendations:

Recommendation: Increase the database heap size.

Rank: 1

Increase the database configuration parameter dbheap sufficiently to move utilization to normal operating levels. To increase the value, set the new value of dbheap to be equal to  $(pool\_cur\_size / (4096*U))$  where U is the required utilization rate. For example, if your required utilization rate is 60% of the warning threshold level, which you have set at 75%, then  $U = 0.6 * 0.75 = 0.45$  (or 45%).

Execute the following commands at the Db2 server:

```
CONNECT TO SAMPLE;
UPDATE DB CFG USING DBHEAP 149333;
CONNECT_RESET;
```

Recommendation: Investigate memory usage of database heap.

Rank: 2

There is one database heap per database and the database manager uses it on behalf of all applications connected to the database. The data area is expanded as needed up to the maximum specified by dbheap.

For more information about the database heap, refer to the Db2 Information Center.

Investigate the amount of memory that was used for the database heap over time to determine the most appropriate value for the database heap configuration parameter. The database system monitor tracks the highest amount of memory that was used for the database heap.

## Usage notes

The **GET RECOMMENDATIONS FOR HEALTH INDICATOR** command can be used in two different ways:

- Specify only the health indicator to get an informational list of all possible recommendations. If no object is specified, the command will return a full listing of all recommendations that can be used to resolve an alert on the given health indicator.
- Specify an object to resolve a specific alert on that object. If an object (for example, a database or a table space) is specified, the recommendations returned will be specific to an alert on the object identified. In this case, the recommendations will be more specific and will contain more information about resolving the alert. If the health indicator identified is not in an alert state on the specified object, no recommendations will be returned.

When the **GET RECOMMENDATIONS FOR HEALTH INDICATOR** command returns a recommendation to reorganize the data or index on a data partitioned table, the recommendation is only at the table level and not specific to any individual data partitions of the table. Starting with Db2 Version 9.7 Fix Pack 1, the data or the partitioned indexes of a specific data partition can be reorganized using the **REORG INDEXES/TABLE** command or the db2Reorg API. To determine if only specific data partitions of a data partitioned table need to be reorganized, use the **REORGCHK**

command to retrieve statistics and reorganization recommendations for the data partitions of the data partitioned table. Use the **REORG TABLE** or **REORG INDEXES ALL** command with the **ON DATA PARTITION** clause to reorganize the data or the partitioned indexes of a specific data partition.

## GET ROUTINE

Retrieves a routine SQL Archive (SAR) file for a specified SQL routine.

**Important:** The GET ROUTINE command is deprecated, use the CREATE PROCEDURE statement to copy a procedure to another database.

### Authorization

EXECUTE privilege on SYSFUN.GET\_ROUTINE\_SAR procedure

### Required connection

Database. If implicit connect is enabled, a connection to the default database is established.

### Command syntax

```
►--GET ROUTINE--INTO--file_name--FROM--[SPECIFIC]--PROCEDURE--routine_name--►
►--[HIDE BODY]--►
```

### Command parameters

#### INTO *file\_name*

Names the file where routine SQL archive (SAR) is stored.

#### FROM

Indicates the start of the specification of the routine to be retrieved.

#### SPECIFIC

The specified routine name is given as a specific name.

#### PROCEDURE

The routine is an SQL procedure.

#### *routine\_name*

The name of the procedure. If **SPECIFIC** is specified then it is the specific name of the procedure. If the name is not qualified with a schema name, the CURRENT SCHEMA is used as the schema name of the routine. The *routine-name* must be an existing procedure that is defined as an SQL procedure.

#### HIDE BODY

Specifies that the body of the routine must be replaced by an empty body when the routine text is extracted from the catalogs.

This does not affect the compiled code; it only affects the text.

## Examples

```
GET ROUTINE INTO procs/proc1.sar FROM PROCEDURE myappl.proc1;
```

## Usage notes

If a **GET ROUTINE** or a **PUT ROUTINE** operation (or their corresponding procedure) fails to execute successfully, it will always return an error (SQLSTATE 38000), along with diagnostic text providing information about the cause of the failure. For example, if the procedure name provided to **GET ROUTINE** does not identify an SQL procedure, diagnostic "-204, 42704" text will be returned, where "-204" is SQLCODE and "42704" is SQLSTATE, that identify the cause of the problem. The SQLCODE and SQLSTATE in this example indicate that the procedure name provided in the **GET ROUTINE** command is undefined.

The **GET ROUTINE** command cannot archive routines whose specific name exceeds 18 characters in length. When you create an SQL routine with an explicit specific name, restrict the specific name to a maximum of 18 characters if you want to use the **GET ROUTINE** command.

## GET SNAPSHOT

Collects status information and formats the output. The information that is returned is a *snapshot* of the database manager operational status at the time that you issued the command.

### Scope

This command is issued on the currently attached member and, by default, returns information only for that member. In the case of multiple members per host, the currently attached member is the first member that is listed in the db2nodes.cfg file on that host.

To issue the command for a specific member that is not the currently attached member, specify the **ATTACH\_MEMBER** parameter. To issue the command for all members and receive an aggregated result, specify the **GLOBAL** parameter.

To change the currently attached member, issue the **SET CLIENT** command with the **ATTACH\_MEMBER** parameter . You must issue the **DETACH** command followed by the **ATTACH** command from your application for this change to take effect.

### Authorization

one of the following authorities:

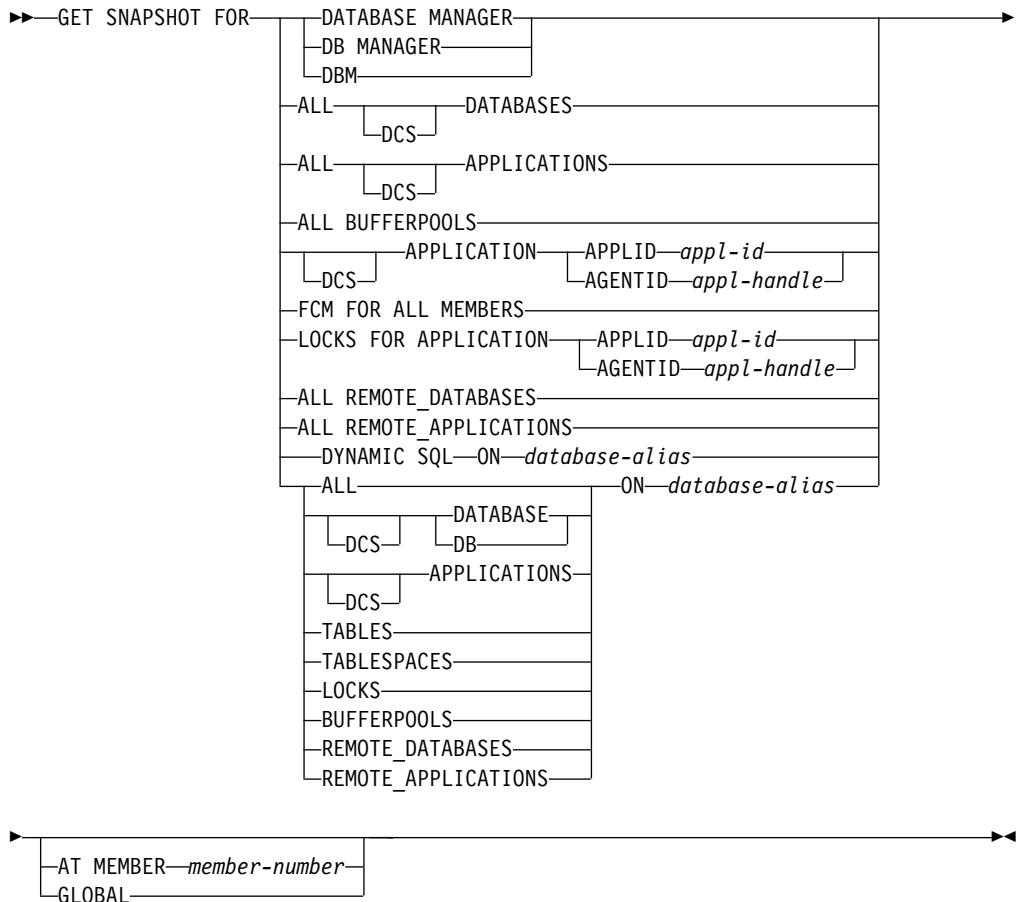
- SYSADM
- SYSCTRL
- SYSMAINT
- SYSMON

### Required connection

Instance. If there is no instance attachment, a default instance attachment is created.

To obtain a snapshot of a remote instance, it is necessary to first attach to that instance.

## Command syntax



The monitor switches must be turned on in order to collect some statistics.

## Command parameters

### DATABASE MANAGER

Provides statistics for the active database manager instance.

### ALL DATABASES

Provides general statistics for all active databases on the current member.

### ALL APPLICATIONS

Provides information about all active applications that are connected to a database on the current member.

### ALL BUFFERPOOLS

Provides information about buffer pool activity for all active databases.

### APPLICATION APPLID *appl-id*

Provides information only about the application whose ID is specified. To get a specific application ID, use the **LIST APPLICATIONS** command.

### APPLICATION AGENTID *appl-handle*

Provides information only about the application whose application handle is specified. The application handle is a 32-bit number that uniquely identifies an application that is currently running. Use the **LIST APPLICATIONS** command to get a specific application handle.

**FCM FOR ALL MEMBERS**

Provides Fast Communication Manager (FCM) statistics between the member against which the **GET SNAPSHOT** command was issued and the other members in the partitioned database environment or in a Db2 pureScale environment.

**LOCKS FOR APPLICATION APPLID *appl-id***

Provides information about all locks held by the specified application, identified by application ID.

**LOCKS FOR APPLICATION AGENTID *appl-handle***

Provides information about all locks held by the specified application, identified by application handle.

**ALL REMOTE DATABASES**

Provides general statistics about all active remote databases on the current member.

**ALL REMOTE APPLICATIONS**

Provides information about all active remote applications that are connected to the current member.

**ALL ON *database-alias***

Provides general statistics and information about all applications, tables, table spaces, buffer pools, and locks for a specified database.

**DATABASE ON *database-alias***

Provides general statistics for a specified database.

**APPLICATIONS ON *database-alias***

Provides information about all applications connected to a specified database.

**TABLES ON *database-alias***

Provides information about tables in a specified database. This will include only those tables that have been accessed since the TABLE recording switch was turned ON.

**TABLESPACES ON *database-alias***

Provides information about table spaces for a specified database.

**LOCKS ON *database-alias***

Provides information about every lock held by each application connected to a specified database.

**BUFFERPOOLS ON *database-alias***

Provides information about buffer pool activity for the specified database.

**REMOTE DATABASES ON *database-alias***

Provides general statistics about all active remote databases for a specified database.

**REMOTE APPLICATIONS ON *database-alias***

Provides information about remote applications for a specified database.

**DYNAMIC SQL ON *database-alias***

Returns a point-in-time picture of the contents of the SQL statement cache for the database.

**DCS** Depending on which clause it is specified, this keyword requests statistics about:

- A specific DCS application currently running on the Db2 Connect Gateway

- All DCS applications
- All DCS applications currently connected to a specific DCS database
- A specific DCS database
- All DCS databases.

**AT MEMBER *member-number***

Returns results for the member specified.

**GLOBAL** Returns snapshot results for all members.

## Examples

- To request snapshot information about the database manager, issue:  

```
get snapshot for database manager
```

The following is a sample output listing from the preceding command:

Database Manager Snapshot

|                                               |                                                           |
|-----------------------------------------------|-----------------------------------------------------------|
| Node name                                     | =                                                         |
| Node type                                     | = Enterprise Server Edition with local and remote clients |
| Instance name                                 | = DB2                                                     |
| Number of members in Db2 instance             | = 1                                                       |
| Database manager status                       | = Active                                                  |
|                                               |                                                           |
| Product name                                  | = Db2 v9.5.0.535                                          |
| Service level                                 | = s070101 (NT32)                                          |
|                                               |                                                           |
| Private Sort heap allocated                   | = 0                                                       |
| Private Sort heap high water mark             | = 0                                                       |
| Post threshold sorts                          | = Not Collected                                           |
| Piped sorts requested                         | = 0                                                       |
| Piped sorts accepted                          | = 0                                                       |
|                                               |                                                           |
| Start Database Manager timestamp              | = 01/10/2007 15:18:36.241035                              |
| Last reset timestamp                          | =                                                         |
| Snapshot timestamp                            | = 01/10/2007 15:28:26.989789                              |
|                                               |                                                           |
| Remote connections to db manager              | = 3                                                       |
| Remote connections executing in db manager    | = 0                                                       |
| Local connections                             | = 1                                                       |
| Local connections executing in db manager     | = 0                                                       |
| Active local databases                        | = 1                                                       |
|                                               |                                                           |
| High water mark for agents registered         | = 0                                                       |
| Agents registered                             | = 8                                                       |
| Idle agents                                   | = 0                                                       |
|                                               |                                                           |
| Committed private Memory (Bytes)              | = 8912896                                                 |
|                                               |                                                           |
| Switch list for member number 0               |                                                           |
| Buffer Pool Activity Information (BUFFERPOOL) | = OFF                                                     |
| Lock Information (LOCK)                       | = ON 01/10/2007 15:22:43.145437                           |
| Sorting Information (SORT)                    | = OFF                                                     |
| SQL Statement Information (STATEMENT)         | = OFF                                                     |
| Table Activity Information (TABLE)            | = OFF                                                     |
| Take Timestamp Information (TIMESTAMP)        | = ON 01/10/2007 15:18:36.241035                           |
| Unit of Work Information (UOW)                | = OFF                                                     |
|                                               |                                                           |
| Agents assigned from pool                     | = 3                                                       |
| Agents created from empty pool                | = 11                                                      |
| Agents stolen from another application        | = 0                                                       |
| High water mark for coordinating agents       | = 9                                                       |
| Hash joins after heap threshold exceeded      | = 0                                                       |
| OLAP functions after heap threshold exceeded  | = 0                                                       |

Total number of gateway connections = 0  
 Current number of gateway connections = 0  
 Gateway connections waiting for host reply = 0  
 Gateway connections waiting for client request = 0  
 Gateway connection pool agents stolen = 0

Node FCM information corresponds to = 1  
 Free FCM buffers = 13425  
 Total FCM buffers = 13425  
 Free FCM buffers low water mark = 13420  
 Maximum number of FCM buffers = 28640  
 Free FCM channels = 8036  
 Total FCM channels = 8055  
 Free FCM channels low water mark = 8036  
 Maximum number of FCM channels = 28640  
 Number of FCM nodes = 3

| Node Number | Total Buffers Sent | Total Buffers Received | Connection Status |
|-------------|--------------------|------------------------|-------------------|
| 1           | 1                  | 1                      | Active            |
| 2           | 1                  | 0                      | Active            |
| 10          | 1                  | 0                      | Active            |

Node FCM information corresponds to = 2  
 Free FCM buffers = 13425  
 Total FCM buffers = 13425  
 Free FCM buffers low water mark = 13420  
 Maximum number of FCM buffers = 28640  
 Free FCM channels = 8036  
 Total FCM channels = 8055  
 Free FCM channels low water mark = 8036  
 Maximum number of FCM channels = 28640  
 Number of FCM nodes = 3

| Node Number | Total Buffers Sent | Total Buffers Received | Connection Status |
|-------------|--------------------|------------------------|-------------------|
| 1           | 0                  | 1                      | Active            |
| 2           | 1                  | 1                      | Active            |
| 10          | 0                  | 0                      | Active            |

Node FCM information corresponds to = 10  
 Free FCM buffers = 13425  
 Total FCM buffers = 13425  
 Free FCM buffers low water mark = 13420  
 Maximum number of FCM buffers = 28640  
 Free FCM channels = 8036  
 Total FCM channels = 8055  
 Free FCM channels low water mark = 8036  
 Maximum number of FCM channels = 28640  
 Number of FCM nodes = 3

| Node Number | Total Buffers Sent | Total Buffers Received | Connection Status |
|-------------|--------------------|------------------------|-------------------|
| 1           | 0                  | 1                      | Active            |
| 2           | 0                  | 0                      | Active            |
| 10          | 1                  | 1                      | Active            |

Memory usage for database manager:

|                         |                |
|-------------------------|----------------|
| Node number             | = 0            |
| Memory Pool Type        | = Other Memory |
| Current size (bytes)    | = 11534336     |
| High water mark (bytes) | = 11599872     |

|                         |                         |
|-------------------------|-------------------------|
| Configured size (bytes) | = 34275328              |
| Node number             | = 0                     |
| Memory Pool Type        | = Database Monitor Heap |
| Current size (bytes)    | = 65536                 |
| High water mark (bytes) | = 65536                 |
| Configured size (bytes) | = 327680                |
| Node number             | = 0                     |
| Memory Pool Type        | = FCMBP Heap            |
| Current size (bytes)    | = 655360                |
| High water mark (bytes) | = 655360                |
| Configured size (bytes) | = 851968                |

- To request snapshot information about an application with agent ID 29:

```
get snapshot for application agentid 29
```

The following is a sample output listing from the preceding command, assuming the lock and statement monitor switches are ON:

#### Application Snapshot

|                                      |                                    |
|--------------------------------------|------------------------------------|
| Application handle                   | = 29                               |
| Application status                   | = Lock-wait                        |
| Status change time                   | = Not Collected                    |
| Application code page                | = 819                              |
| Application country/region code      | = 1                                |
| DUOW correlation token               | = *LOCAL.jwr.070222182152          |
| Application name                     | = db2bp                            |
| Application ID                       | = *LOCAL.jwr.070222182152          |
| Sequence number                      | = 00001                            |
| TP Monitor client user ID            | =                                  |
| TP Monitor client workstation name   | =                                  |
| TP Monitor client application name   | =                                  |
| TP Monitor client accounting string  | =                                  |
| Connection request start timestamp   | = 02/22/2007 13:21:52.587168       |
| Connect request completion timestamp | = 02/22/2007 13:21:53.291779       |
| Application idle time                | =                                  |
| CONNECT Authorization ID             | = JWR                              |
| Client login ID                      | = jwr                              |
| Configuration NNAME of client        | = gilera                           |
| Client database manager product ID   | = SQL09050                         |
| Process ID of client application     | = 843852                           |
| Platform of client application       | = AIX 64BIT                        |
| Communication protocol of client     | = Local Client                     |
| Inbound communication address        | = *LOCAL.jwr                       |
| Database name                        | = SAMPLE                           |
| Database path                        | = /home/jwr/jwr/NODE0000/SQL00001/ |
| Client database alias                | = SAMPLE                           |
| Input database alias                 | =                                  |
| Last reset timestamp                 | =                                  |
| Snapshot timestamp                   | = 02/22/2007 13:22:39.766300       |
| Authorization level granted          | =                                  |
| User authority:                      |                                    |
| DBADM authority                      |                                    |
| CREATETAB authority                  |                                    |
| BINDADD authority                    |                                    |
| CONNECT authority                    |                                    |
| CREATE_NOT_FENC authority            |                                    |
| LOAD authority                       |                                    |
| IMPLICIT_SCHEMA authority            |                                    |
| CREATE_EXT_RT authority              |                                    |
| QUIESCE_CONN authority               |                                    |
| Group authority:                     |                                    |

|                                             |                 |
|---------------------------------------------|-----------------|
| SYSADM authority                            | = 0             |
| CREATETAB authority                         | = 0             |
| BINDADD authority                           | = 0             |
| CONNECT authority                           | = 0             |
| IMPLICIT_SCHEMA authority                   | = 0             |
| Coordinator member number                   | = 0             |
| Current member number                       | = 0             |
| Coordinator agent process or thread ID      | = 1801          |
| Current Workload ID                         | = 1             |
| Agents stolen                               | = 0             |
| Agents waiting on locks                     | = 1             |
| Maximum associated agents                   | = 1             |
| Priority at which application agents work   | = 0             |
| Priority type                               | = Dynamic       |
| Lock timeout (seconds)                      | = -1            |
| Locks held by application                   | = 4             |
| Lock waits since connect                    | = 1             |
| Time application waited on locks (ms)       | = 20268         |
| Deadlocks detected                          | = 0             |
| Lock escalations                            | = 0             |
| Exclusive lock escalations                  | = 0             |
| Number of Lock Timeouts since connected     | = 0             |
| Total time UOW waited on locks (ms)         | = Not Collected |
| Total sorts                                 | = 0             |
| Total sort time (ms)                        | = Not Collected |
| Total sort overflows                        | = 0             |
| Buffer pool data logical reads              | = Not Collected |
| Buffer pool data physical reads             | = Not Collected |
| Buffer pool temporary data logical reads    | = Not Collected |
| Buffer pool temporary data physical reads   | = Not Collected |
| Buffer pool data writes                     | = Not Collected |
| Buffer pool index logical reads             | = Not Collected |
| Buffer pool index physical reads            | = Not Collected |
| Buffer pool temporary index logical reads   | = Not Collected |
| Buffer pool temporary index physical reads  | = Not Collected |
| Buffer pool index writes                    | = Not Collected |
| Buffer pool xda logical reads               | = Not Collected |
| Buffer pool xda physical reads              | = Not Collected |
| Buffer pool temporary xda logical reads     | = Not Collected |
| Buffer pool temporary xda physical reads    | = Not Collected |
| Buffer pool xda writes                      | = Not Collected |
| Total buffer pool read time (milliseconds)  | = Not Collected |
| Total buffer pool write time (milliseconds) | = Not Collected |
| Time waited for prefetch (ms)               | = Not Collected |
| Unread prefetch pages                       | = Not Collected |
| Direct reads                                | = Not Collected |
| Direct writes                               | = Not Collected |
| Direct read requests                        | = Not Collected |
| Direct write requests                       | = Not Collected |
| Direct reads elapsed time (ms)              | = Not Collected |
| Direct write elapsed time (ms)              | = Not Collected |
| Number of SQL requests since last commit    | = 3             |
| Commit statements                           | = 0             |
| Rollback statements                         | = 0             |
| Dynamic SQL statements attempted            | = 3             |
| Static SQL statements attempted             | = 0             |
| Failed statement operations                 | = 0             |
| Select SQL statements executed              | = 1             |
| Xquery statements executed                  | = 0             |
| Update/Insert/Delete statements executed    | = 0             |
| DDL statements executed                     | = 0             |
| Inactive stmt history memory usage (bytes)  | = 0             |
| Internal automatic rebinds                  | = 0             |

|                                             |                              |
|---------------------------------------------|------------------------------|
| Internal rows deleted                       | = 0                          |
| Internal rows inserted                      | = 0                          |
| Internal rows updated                       | = 0                          |
| Internal commits                            | = 1                          |
| Internal rollbacks                          | = 0                          |
| Internal rollbacks due to deadlock          | = 0                          |
| Binds/precompiles attempted                 | = 0                          |
| Rows deleted                                | = 0                          |
| Rows inserted                               | = 0                          |
| Rows updated                                | = 0                          |
| Rows selected                               | = 0                          |
| Rows read                                   | = 95                         |
| Rows written                                | = 0                          |
| <br>UOW log space used (Bytes)              | = Not Collected              |
| Previous UOW completion timestamp           | = Not Collected              |
| Elapsed time of last completed uow (sec.ms) | = Not Collected              |
| UOW start timestamp                         | = Not Collected              |
| UOW stop timestamp                          | = Not Collected              |
| UOW completion status                       | = Not Collected              |
| <br>Open remote cursors                     | = 0                          |
| Open remote cursors with blocking           | = 0                          |
| Rejected Block Remote Cursor requests       | = 0                          |
| Accepted Block Remote Cursor requests       | = 1                          |
| Open local cursors                          | = 1                          |
| Open local cursors with blocking            | = 1                          |
| Total User CPU Time used by agent (s)       | = 0.019150                   |
| Total System CPU Time used by agent (s)     | = 0.001795                   |
| Host execution elapsed time                 | = 0.012850                   |
| <br>Package cache lookups                   | = 2                          |
| Package cache inserts                       | = 1                          |
| Application section lookups                 | = 3                          |
| Application section inserts                 | = 1                          |
| Catalog cache lookups                       | = 11                         |
| Catalog cache inserts                       | = 8                          |
| Catalog cache overflows                     | = 0                          |
| Catalog cache high water mark               | = 0                          |
| <br>Workspace Information                   |                              |
| Shared high water mark                      | = 0                          |
| Total shared overflows                      | = 0                          |
| Total shared section inserts                | = 0                          |
| Total shared section lookups                | = 0                          |
| Private high water mark                     | = 0                          |
| Total private overflows                     | = 0                          |
| Total private section inserts               | = 0                          |
| Total private section lookups               | = 0                          |
| <br>Most recent operation                   | = Fetch                      |
| Cursor name                                 | = SQLCUR201                  |
| Most recent operation start timestamp       | = 02/22/2007 13:22:19.497439 |
| Most recent operation stop timestamp        | =                            |
| Agents associated with the application      | = 1                          |
| Number of hash joins                        | = 0                          |
| Number of hash loops                        | = 0                          |
| Number of hash join overflows               | = 0                          |
| Number of small hash join overflows         | = 0                          |
| Number of OLAP functions                    | = 0                          |
| Number of OLAP function overflows           | = 0                          |
| <br>Statement type                          | = Dynamic SQL Statement      |
| Statement                                   | = Fetch                      |
| Section number                              | = 201                        |

|                                             |                                 |
|---------------------------------------------|---------------------------------|
| Application creator                         | = NULLID                        |
| Package name                                | = SQLC2G11                      |
| Consistency Token                           | = AAAAANBX                      |
| Package Version ID                          | =                               |
| Cursor name                                 | = SQLCUR201                     |
| Statement member number                     | = 0                             |
| Statement start timestamp                   | = 02/22/2007 13:22:19.497439    |
| Statement stop timestamp                    | =                               |
| Elapsed time of last completed stmt(sec.ms) | = 0.000289                      |
| Total Statement user CPU time               | = 0.002172                      |
| Total Statement system CPU time             | = 0.001348                      |
| SQL compiler cost estimate in timerons      | = 14                            |
| SQL compiler cardinality estimate           | = 57                            |
| Degree of parallelism requested             | = 1                             |
| Number of agents working on statement       | = 1                             |
| Number of subagents created for statement   | = 1                             |
| Statement sorts                             | = 0                             |
| Total sort time                             | = 0                             |
| Sort overflows                              | = 0                             |
| Rows read                                   | = 0                             |
| Rows written                                | = 0                             |
| Rows deleted                                | = 0                             |
| Rows updated                                | = 0                             |
| Rows inserted                               | = 0                             |
| Rows fetched                                | = 0                             |
| Buffer pool data logical reads              | = Not Collected                 |
| Buffer pool data physical reads             | = Not Collected                 |
| Buffer pool temporary data logical reads    | = Not Collected                 |
| Buffer pool temporary data physical reads   | = Not Collected                 |
| Buffer pool index logical reads             | = Not Collected                 |
| Buffer pool index logical reads             | = Not Collected                 |
| Buffer pool temporary index logical reads   | = Not Collected                 |
| Buffer pool temporary index physical reads  | = Not Collected                 |
| Buffer pool xda logical reads               | = Not Collected                 |
| Buffer pool xda physical reads              | = Not Collected                 |
| Buffer pool temporary xda logical reads     | = Not Collected                 |
| Buffer pool temporary xda physical reads    | = Not Collected                 |
| Blocking cursor                             | = YES                           |
| Dynamic SQL statement text:                 |                                 |
| select * from org                           |                                 |
| Agent process/thread ID                     | = 1801                          |
| Memory usage for application:               |                                 |
| Memory Pool Type                            | = Application Heap              |
| Current size (bytes)                        | = 65536                         |
| High water mark (bytes)                     | = 65536                         |
| Configured size (bytes)                     | = 1048576                       |
| Agent process/thread ID                     | = 1801                          |
| Agent Lock timeout (seconds)                | = -1                            |
| Memory usage for agent:                     |                                 |
| Memory Pool Type                            | = Other Memory                  |
| Current size (bytes)                        | = 589824                        |
| High water mark (bytes)                     | = 786432                        |
| Configured size (bytes)                     | = 34359738368                   |
| ID of agent holding lock                    | = 34                            |
| Application ID holding lock                 | = *LOCAL.jwr.070222182158       |
| Lock name                                   | = 0x0002000E0000000000000000054 |
| Lock attributes                             | = 0x00000000                    |
| Release flags                               | = 0x00000001                    |
| Lock object type                            | = Table                         |
| Lock mode                                   | = Exclusive Lock (X)            |
| Lock mode requested                         | = Intention Share Lock (IS)     |

|                                         |                              |
|-----------------------------------------|------------------------------|
| Name of tablespace holding lock         | = USERSPACE1                 |
| Schema of table holding lock            | = JWR                        |
| Name of table holding lock              | = ORG                        |
| Data Partition Id of table holding lock | = 0                          |
| Lock wait start timestamp               | = 02/22/2007 13:22:19.497833 |

- To request snapshot information about all of the databases:

get snapshot for all databases

The following is a sample output listing from the preceding command:

#### Database Snapshot

|                                             |                              |
|---------------------------------------------|------------------------------|
| Database name                               | = SAMPLE                     |
| Database path                               | = C:\DB2\NODE0000\SQL00001\  |
| Input database alias                        | =                            |
| Database status                             | = Active                     |
| Catalog database partition number           | = 0                          |
| Catalog network node name                   | =                            |
| Operating system running at database server | = NT                         |
| Location of the database                    | = Local                      |
| First database connect timestamp            | = 06/21/2007 14:46:49.771064 |
| Last reset timestamp                        | =                            |
| Last backup timestamp                       | =                            |
| Snapshot timestamp                          | = 06/21/2007 14:51:50.235993 |
| <br>Number of automatic storage paths       | = 1                          |
| Automatic storage path                      | = C:                         |
| Node number                                 | = 0                          |
| <br>High water mark for connections         | = 6                          |
| Application connects                        | = 4                          |
| Secondary connects total                    | = 4                          |
| Applications connected currently            | = 1                          |
| Appls. executing in db manager currently    | = 0                          |
| Agents associated with applications         | = 5                          |
| Maximum agents associated with applications | = 6                          |
| Maximum coordinating agents                 | = 6                          |
| <br>Number of Threshold Violations          | = 0                          |
| Locks held currently                        | = 0                          |
| Lock waits                                  | = 0                          |
| Time database waited on locks (ms)          | = Not Collected              |
| Lock list memory in use (Bytes)             | = 2256                       |
| Deadlocks detected                          | = 0                          |
| Lock escalations                            | = 0                          |
| Exclusive lock escalations                  | = 0                          |
| Agents currently waiting on locks           | = 0                          |
| Lock Timeouts                               | = 0                          |
| Number of indoubt transactions              | = 0                          |
| <br>Total Private Sort heap allocated       | = 0                          |
| Total Shared Sort heap allocated            | = 0                          |
| Shared Sort heap high water mark            | = 0                          |
| Post threshold sorts (shared memory)        | = Not Collected              |
| Total sorts                                 | = 0                          |
| Total sort time (ms)                        | = Not Collected              |
| Sort overflows                              | = 0                          |
| Active sorts                                | = 0                          |
| <br>Buffer pool data logical reads          | = Not Collected              |
| Buffer pool data physical reads             | = Not Collected              |
| Buffer pool temporary data logical reads    | = Not Collected              |
| Buffer pool temporary data physical reads   | = Not Collected              |
| Asynchronous pool data page reads           | = Not Collected              |
| Buffer pool data writes                     | = Not Collected              |
| Asynchronous pool data page writes          | = Not Collected              |
| Buffer pool index logical reads             | = Not Collected              |

|                                             |                 |
|---------------------------------------------|-----------------|
| Buffer pool index physical reads            | = Not Collected |
| Buffer pool temporary index logical reads   | = Not Collected |
| Buffer pool temporary index physical reads  | = Not Collected |
| Asynchronous pool index page reads          | = Not Collected |
| Buffer pool index writes                    | = Not Collected |
| Asynchronous pool index page writes         | = Not Collected |
| Buffer pool xda logical reads               | = Not Collected |
| Buffer pool xda physical reads              | = Not Collected |
| Buffer pool temporary xda logical reads     | = Not Collected |
| Buffer pool temporary xda physical reads    | = Not Collected |
| Buffer pool xda writes                      | = Not Collected |
| Asynchronous pool xda page reads            | = Not Collected |
| Asynchronous pool xda page writes           | = Not Collected |
| Total buffer pool read time (milliseconds)  | = Not Collected |
| Total buffer pool write time (milliseconds) | = Not Collected |
| Total elapsed asynchronous read time        | = Not Collected |
| Total elapsed asynchronous write time       | = Not Collected |
| Asynchronous data read requests             | = Not Collected |
| Asynchronous index read requests            | = Not Collected |
| Asynchronous xda read requests              | = Not Collected |
| No victim buffers available                 | = Not Collected |
| LSN Gap cleaner triggers                    | = Not Collected |
| Dirty page steal cleaner triggers           | = Not Collected |
| Dirty page threshold cleaner triggers       | = Not Collected |
| Time waited for prefetch (ms)               | = Not Collected |
| Unread prefetch pages                       | = Not Collected |
| Direct reads                                | = Not Collected |
| Direct writes                               | = Not Collected |
| Direct read requests                        | = Not Collected |
| Direct write requests                       | = Not Collected |
| Direct reads elapsed time (ms)              | = Not Collected |
| Direct write elapsed time (ms)              | = Not Collected |
| Database files closed                       | = Not Collected |
| Vectored I/Os                               | = Not Collected |
| Pages from vectored I/Os                    | = Not Collected |
| Block I/Os                                  | = Not Collected |
| Pages from block I/Os                       | = Not Collected |
| Host execution elapsed time                 | = Not Collected |
| Commit statements attempted                 | = 0             |
| Rollback statements attempted               | = 0             |
| Dynamic statements attempted                | = 6             |
| Static statements attempted                 | = 3             |
| Failed statement operations                 | = 0             |
| Select SQL statements executed              | = 0             |
| Xquery statements executed                  | = 0             |
| Update/Insert/Delete statements executed    | = 0             |
| DDL statements executed                     | = 0             |
| Inactive stmt history memory usage (bytes)  | = 0             |
| Internal automatic rebinds                  | = 0             |
| Internal rows deleted                       | = 0             |
| Internal rows inserted                      | = 0             |
| Internal rows updated                       | = 0             |
| Internal commits                            | = 6             |
| Internal rollbacks                          | = 0             |
| Internal rollbacks due to deadlock          | = 0             |
| Number of MDC table blocks pending cleanup  | = 0             |
| Rows deleted                                | = 0             |
| Rows inserted                               | = 0             |
| Rows updated                                | = 0             |
| Rows selected                               | = 0             |
| Rows read                                   | = 98            |
| Binds/precompiles attempted                 | = 0             |

|                                                 |                  |
|-------------------------------------------------|------------------|
| Log space available to the database (Bytes)     | = 20400000       |
| Log space used by the database (Bytes)          | = 0              |
| Maximum secondary log space used (Bytes)        | = 0              |
| Maximum total log space used (Bytes)            | = 0              |
| Secondary logs allocated currently              | = 0              |
| Log pages read                                  | = 0              |
| Log read time (sec.ns)                          | = 0.000000004    |
| Log pages written                               | = 0              |
| Log write time (sec.ns)                         | = 0.000000004    |
| Number write IOs                                | = 0              |
| Number read log IOs                             | = 0              |
| Number partial page log IOs                     | = 0              |
| Number log buffer full                          | = 0              |
| Log data found in buffer                        | = 0              |
| Appl id holding the oldest transaction          | = 93             |
| Log to be redone for recovery (Bytes)           | = 0              |
| Log accounted for by dirty pages (Bytes)        | = 0              |
| Node number                                     | = 0              |
| File number of first active log                 | = 0              |
| File number of last active log                  | = 2              |
| File number of current active log               | = 0              |
| File number of log being archived               | = Not applicable |
| Package cache lookups                           | = 6              |
| Package cache inserts                           | = 0              |
| Package cache overflows                         | = 0              |
| Package cache high water mark (Bytes)           | = 196608         |
| Application section lookups                     | = 6              |
| Application section inserts                     | = 0              |
| Catalog cache lookups                           | = 37             |
| Catalog cache inserts                           | = 10             |
| Catalog cache overflows                         | = 0              |
| Catalog cache high water mark                   | = 65536          |
| Catalog cache statistics size                   | = 0              |
| <b>Workspace Information</b>                    |                  |
| Shared high water mark                          | = 0              |
| Corresponding shared overflows                  | = 0              |
| Total shared section inserts                    | = 0              |
| Total shared section lookups                    | = 0              |
| Private high water mark                         | = 0              |
| Corresponding private overflows                 | = 0              |
| Total private section inserts                   | = 0              |
| Total private section lookups                   | = 0              |
| Number of hash joins                            | = 0              |
| Number of hash loops                            | = 0              |
| Number of hash join overflows                   | = 0              |
| Number of small hash join overflows             | = 0              |
| Post threshold hash joins (shared memory)       | = 0              |
| Active hash joins                               | = 0              |
| Number of OLAP functions                        | = 0              |
| Number of OLAP function overflows               | = 0              |
| Active OLAP functions                           | = 0              |
| Statistic fabrications                          | = Not Collected  |
| Synchronous runstats                            | = Not Collected  |
| Asynchronous runstats                           | = Not Collected  |
| Total statistic fabrication time (milliseconds) | = Not Collected  |
| Total synchronous runstats time (milliseconds)  | = Not Collected  |

Memory usage for database:

|                         |                            |
|-------------------------|----------------------------|
| Node number             | = 0                        |
| Memory Pool Type        | = Backup/Restore/Util Heap |
| Current size (bytes)    | = 65536                    |
| High water mark (bytes) | = 65536                    |
| Configured size (bytes) | = 20512768                 |
| Node number             | = 0                        |
| Memory Pool Type        | = Package Cache Heap       |
| Current size (bytes)    | = 196608                   |
| High water mark (bytes) | = 196608                   |
| Configured size (bytes) | = 402653184                |
| Node number             | = 0                        |
| Memory Pool Type        | = Other Memory             |
| Current size (bytes)    | = 131072                   |
| High water mark (bytes) | = 131072                   |
| Configured size (bytes) | = 20971520                 |
| Node number             | = 0                        |
| Memory Pool Type        | = Catalog Cache Heap       |
| Current size (bytes)    | = 65536                    |
| High water mark (bytes) | = 65536                    |
| Configured size (bytes) | = 402653184                |
| Node number             | = 0                        |
| Memory Pool Type        | = Buffer Pool Heap         |
| Secondary ID            | = 1                        |
| Current size (bytes)    | = 2424832                  |
| High water mark (bytes) | = 2424832                  |
| Configured size (bytes) | = 402653184                |
| Node number             | = 0                        |
| Memory Pool Type        | = Buffer Pool Heap         |
| Secondary ID            | = System 32k buffer pool   |
| Current size (bytes)    | = 851968                   |
| High water mark (bytes) | = 851968                   |
| Configured size (bytes) | = 402653184                |
| Node number             | = 0                        |
| Memory Pool Type        | = Buffer Pool Heap         |
| Secondary ID            | = System 16k buffer pool   |
| Current size (bytes)    | = 589824                   |
| High water mark (bytes) | = 589824                   |
| Configured size (bytes) | = 402653184                |
| Node number             | = 0                        |
| Memory Pool Type        | = Buffer Pool Heap         |
| Secondary ID            | = System 8k buffer pool    |
| Current size (bytes)    | = 458752                   |
| High water mark (bytes) | = 458752                   |
| Configured size (bytes) | = 402653184                |
| Node number             | = 0                        |
| Memory Pool Type        | = Buffer Pool Heap         |
| Secondary ID            | = System 4k buffer pool    |
| Current size (bytes)    | = 393216                   |
| High water mark (bytes) | = 393216                   |
| Configured size (bytes) | = 402653184                |
| Node number             | = 0                        |
| Memory Pool Type        | = Shared Sort Heap         |
| Current size (bytes)    | = 0                        |
| High water mark (bytes) | = 0                        |
| Configured size (bytes) | = 20512768                 |
| Node number             | = 0                        |

|                         |                            |
|-------------------------|----------------------------|
| Memory Pool Type        | = Lock Manager Heap        |
| Current size (bytes)    | = 327680                   |
| High water mark (bytes) | = 327680                   |
| Configured size (bytes) | = 393216                   |
| Node number             | = 0                        |
| Memory Pool Type        | = Database Heap            |
| Current size (bytes)    | = 10551296                 |
| High water mark (bytes) | = 10551296                 |
| Configured size (bytes) | = 12582912                 |
| Node number             | = 0                        |
| Memory Pool Type        | = Application Heap         |
| Secondary ID            | = 97                       |
| Current size (bytes)    | = 65536                    |
| High water mark (bytes) | = 65536                    |
| Configured size (bytes) | = 1048576                  |
| Node number             | = 0                        |
| Memory Pool Type        | = Application Heap         |
| Secondary ID            | = 96                       |
| Current size (bytes)    | = 65536                    |
| High water mark (bytes) | = 65536                    |
| Configured size (bytes) | = 1048576                  |
| Node number             | = 0                        |
| Memory Pool Type        | = Application Heap         |
| Secondary ID            | = 95                       |
| Current size (bytes)    | = 65536                    |
| High water mark (bytes) | = 65536                    |
| Configured size (bytes) | = 1048576                  |
| Node number             | = 0                        |
| Memory Pool Type        | = Application Heap         |
| Secondary ID            | = 94                       |
| Current size (bytes)    | = 65536                    |
| High water mark (bytes) | = 65536                    |
| Configured size (bytes) | = 1048576                  |
| Node number             | = 0                        |
| Memory Pool Type        | = Application Heap         |
| Secondary ID            | = 93                       |
| Current size (bytes)    | = 65536                    |
| High water mark (bytes) | = 65536                    |
| Configured size (bytes) | = 1048576                  |
| Node number             | = 0                        |
| Memory Pool Type        | = Applications Shared Heap |
| Current size (bytes)    | = 65536                    |
| High water mark (bytes) | = 65536                    |
| Configured size (bytes) | = 20512768                 |

User authority represents all authorizations and roles granted to the user, and Group authority represents all authorizations and roles granted to the group.

- To request snapshot information about a specific application with application handle 765 connected to the SAMPLE database, issue:

```
get snapshot for application agentid 765
```

- To request dynamic SQL snapshot information about the SAMPLE database, issue:

```
get snapshot for dynamic sql on sample
```

- To request fast communication manager (FCM) statistics, issue the following command:

```
get snapshot for fcm for all dbpartitionnums
```

The following is a sample output listing from the preceding command:

### FCM Snapshot

|                                     |                              |
|-------------------------------------|------------------------------|
| Node FCM information corresponds to | = 1                          |
| Free FCM buffers                    | = 10740                      |
| Total FCM buffers                   | = 10740                      |
| Free FCM buffers low water mark     | = 10740                      |
| Maximum number of FCM buffers       | = 28640                      |
| Free FCM channels                   | = 6265                       |
| Total FCM channels                  | = 6265                       |
| Free FCM channels low water mark    | = 6265                       |
| Maximum number of FCM channels      | = 28640                      |
| Snapshot timestamp                  | = 02/17/2010 15:54:57.094901 |
| Number of FCM nodes                 | = 3                          |

| Node<br>Number | Total<br>Buffers<br>Sent | Total<br>Buffers<br>Received | Connection<br>Status |
|----------------|--------------------------|------------------------------|----------------------|
| 1              | 2                        | 2                            | Active               |
| 2              | 1                        | 1                            | Active               |
| 10             | 1                        | 1                            | Active               |

### Usage notes

- The GET SNAPSHOT command displays the num\_gw\_conn\_switches monitor element as "Gateway connection pool agents stolen".
- When write suspend is ON against a database, snapshots cannot be issued against that database until write suspend is turned OFF. When a snapshot is issued against a database for which write suspend was turned ON, a diagnostic probe is written to the **db2diag** log file and that database is skipped.
- To obtain a snapshot from a remote instance (or a different local instance), it is necessary to first attach to that instance. If an alias for a database residing at a different instance is specified, an error message is returned.
- To obtain some statistics, it is necessary that the database system monitor switches are turned on. If the recording switch TIMESTAMP has been set to OFF, timestamp related elements will report "Not Collected".
- No data is returned following a request for table information if any of the following is true:
  - The TABLE recording switch is turned off.
  - No tables have been accessed since the switch was turned on.
  - No tables have been accessed since the last **RESET MONITOR** command was issued.

However, if a **REORG TABLE** is being performed or has been performed during this period, some information is returned although some fields are not displayed. For a partitioned table, information for each reorganized data partition is returned.

- To obtain snapshot information from all members (which is different than the aggregate result of all members), the snapshot administrative views should be used.
- In a partitioned database environment or in a Db2 pureScale environment, specifying the command with the **GLOBAL** option will return a value for the High water mark for connections parameter which represents the greatest high water mark for connections among all the members and not the sum of the individual high water marks of all the members. For example:
  - Member 1 has 5 applications connected currently and the high water mark for connections is 5.
  - Member 2 has 4 applications connected currently and the high water mark for connections is 6.

In the previous example, the High water mark for connections value is 6, and the Applications connected currently value is 9.

- If you are using storage groups, the snapshot monitor reports information only for the default storage group. To view information about the storage paths in all database storage groups use the ADMIN\_GET\_STORAGE\_PATHS table function.

## Compatibilities

For compatibility with previous versions:

- **DBPARTITIONNUM** or **NODE** can be substituted for **MEMBER**, except when the **DB2\_ENFORCE\_MEMBER\_SYNTAX** registry variable is set to ON.
- **DBPARTITIONNUMS** or **NODES** can be substituted for **MEMBERS**, except when the **DB2\_ENFORCE\_MEMBER\_SYNTAX** registry variable is set to ON.
- The new registry variable in Version 9.5, **DB2\_SYSTEM\_MONITOR\_SETTINGS** impacts the behavior of monitoring the CPU usage on Linux. If you need to use the method of reading CPU usage that returns both system and user CPU usage times on Linux, perform one of the following actions.

On Linux on RHEL4 and SLES9:

```
db2set DB2_SYSTEM_MONITOR_SETTINGS=DISABLE_CPU_USAGE:FALSE
```

On Linux on RHEL5 and SLES10:

```
db2set DB2_SYSTEM_MONITOR_SETTINGS=OLD_CPU_USAGE:TRUE
```

## HELP

Permits the user to invoke help from the Information Center.

This command is not available on UNIX operating systems.

### Authorization

None

### Required connection

None

### Command syntax

►►HELP————►►

### Examples

The following example shows how to use the **HELP** command:

- **db2 help**

This command opens the *Db2 Information Center*, which contains information about Db2 divided into categories, such as tasks, reference, books, and so on. This is equivalent to invoking the **db2ic** command with no parameters.

### Usage notes

The command line processor will not know if the command succeeds or fails, and cannot report error conditions.

## HISTORY

Displays the history of commands run within a CLP interactive mode session.

### Scope

This command can only be run within CLP interactive mode. Specifically, it cannot be run from the CLP command mode or the CLP batch mode.

### Authorization

None

### Required connection

None

### Command syntax



### Command parameters

#### REVERSE | R

Displays the command history in reverse order, with the most-recently run command listed first. If this parameter is not specified, the commands are listed in chronological order, with the most recently run command listed last.

**num** Displays only the most recent *num* commands. If this parameter is not specified, a maximum of 20 commands are displayed. However, the number of commands that are displayed is also restricted by the number of commands that are stored in the command history.

### Usage notes

1. The value of the **DB2\_CLP\_HISTSIZE** registry variable specifies the maximum number of commands to be stored in the command history. This registry variable can be set to any value between 1 and 500 inclusive. If this registry variable is not set or is set to a value outside the valid range, a maximum of 20 commands is stored in the command history.
2. Since the **HISTORY** command will always be listed in the command history, the maximum number of commands displayed will always be one greater than the user-specified maximum.
3. The command history is not persistent across CLP interactive mode sessions, which means that the command history is not saved at the end of an interactive mode session.
4. The command histories of multiple concurrently running CLP interactive mode sessions are independent of one another.

## IMPORT

Inserts data from an external file with a supported file format into a table, hierarchy, view or nickname. **LOAD** is a faster alternative, but the load utility does not support loading data at the hierarchy level.

Quick link to “File type modifiers for the import utility” on page 232.

## Authorization

- **IMPORT** using the **INSERT** option requires one of the following authorities:
  - DATAACCESS authority
  - CONTROL privilege on each participating table, view, or nickname
  - INSERT and SELECT privilege on each participating table or view
- **IMPORT** to an existing table using the **INSERT\_UPDATE** option, requires one of the following authorities:
  - DATAACCESS authority
  - CONTROL privilege on each participating table, view, or nickname
  - INSERT, SELECT, UPDATE and DELETE privilege on each participating table or view
- **IMPORT** to an existing table using the **REPLACE** or **REPLACE\_CREATE** option, requires one of the following authorities:
  - DATAACCESS authority
  - CONTROL privilege on the table or view
  - INSERT, SELECT, and DELETE privilege on the table or view
- **IMPORT** to a new table using the **CREATE** or **REPLACE\_CREATE** option, requires one of the following authorities:
  - DBADM authority
  - CREATETAB authority on the database and USE privilege on the table space, as well as one of:
    - IMPLICIT\_SCHEMA authority on the database, if the implicit or explicit schema name of the table does not exist
    - CREATEIN privilege on the schema, if the schema name of the table refers to an existing schema
- **IMPORT** to a hierarchy that does not exist using the **CREATE**, or the **REPLACE\_CREATE** option, requires one of the following authorities:
  - DBADM authority
  - CREATETAB authority on the database and USE privilege on the table space and one of:
    - IMPLICIT\_SCHEMA authority on the database, if the schema name of the table does not exist
    - CREATEIN privilege on the schema, if the schema of the table exists
    - CONTROL privilege on every sub-table in the hierarchy, if the **REPLACE\_CREATE** option on the entire hierarchy is used
- **IMPORT** to an existing hierarchy using the **REPLACE** option requires one of the following authorities:
  - DATAACCESS authority
  - CONTROL privilege on every sub-table in the hierarchy
- To import data into a table that has protected columns, the session authorization ID must have LBAC credentials that allow write access to all protected columns in the table. Otherwise the import fails and an error (SQLSTATE 42512) is returned.
- To import data into a table that has protected rows, the session authorization ID must hold LBAC credentials that meet these criteria:
  - It is part of the security policy protecting the table

- It was granted to the session authorization ID for write access

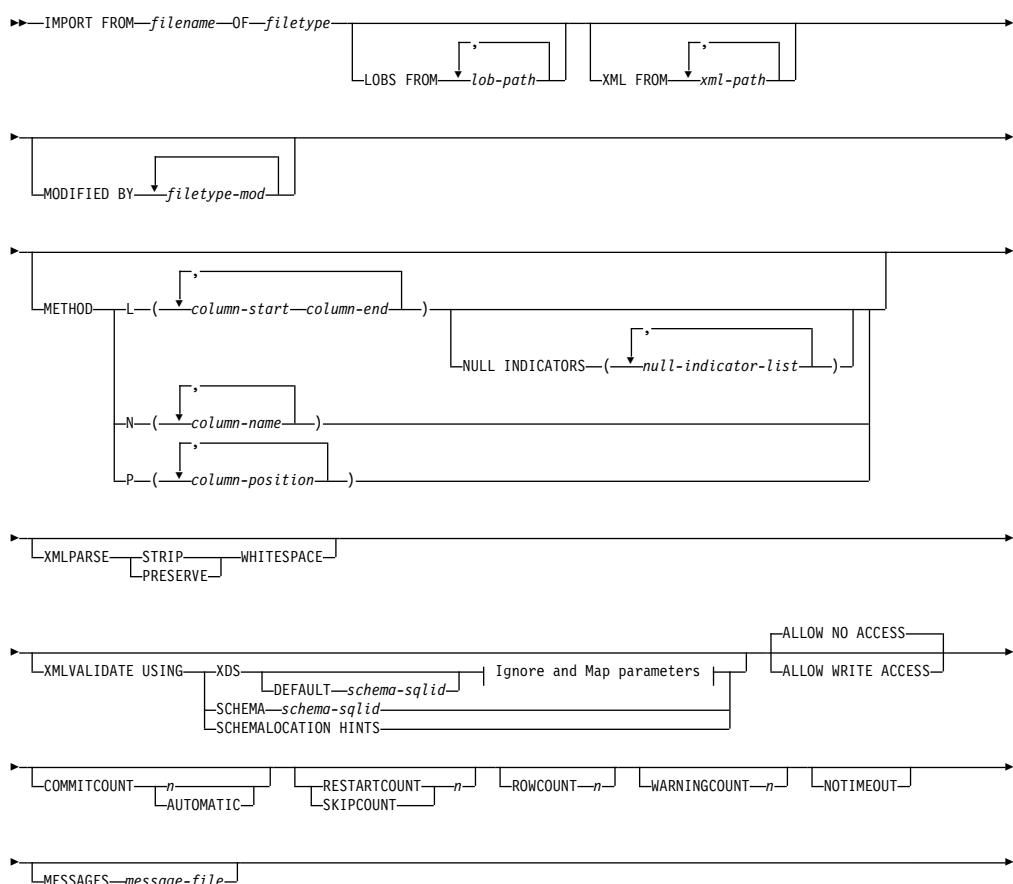
The label on the row to insert, the user's LBAC credentials, the security policy definition, and the LBAC rules determine the label on the row.

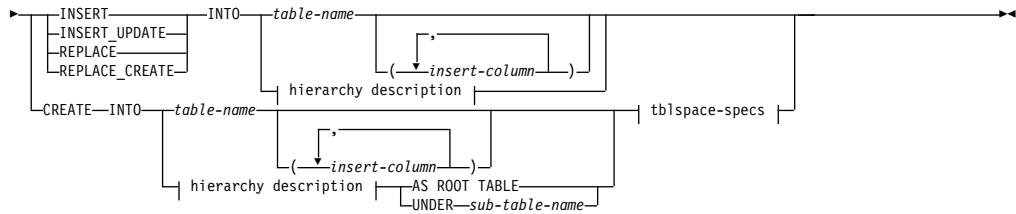
- For a table with protected rows, if the **REPLACE** or **REPLACE\_CREATE** option is specified, the session authorization ID must have the authority to drop the table.
  - To import data into a nickname, the session authorization ID must have the privilege to access and use a specified data source in pass-through mode.
  - If the table has row access control activated, then **IMPORT REPLACE** on that table would require the ability to drop the table. Specifically, you must have either CONTROL or DBADM on the table.

## Required connection

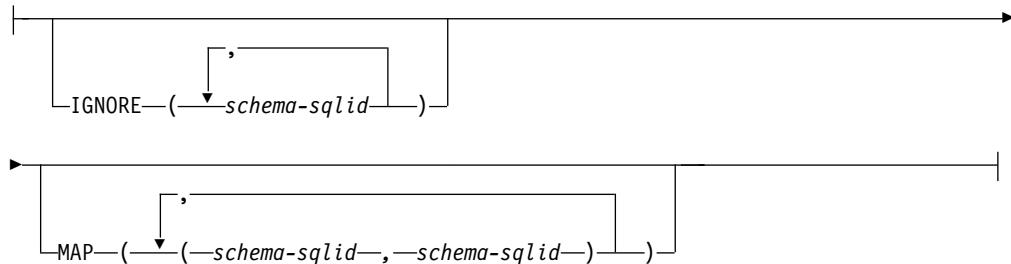
Database. If implicit connect is enabled, a connection to the default database is established. Utility access to Linux, UNIX, or Windows database servers from Linux, UNIX, or Windows clients must be a direct connection through the engine and not through a Db2 Connect gateway or loop back environment.

## Command syntax





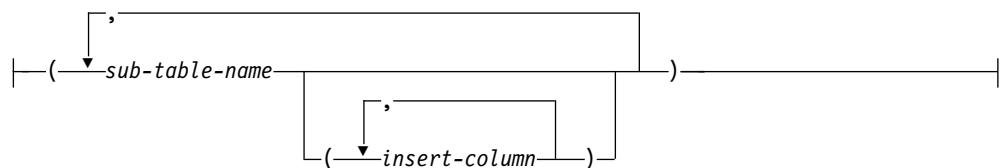
#### Ignore and Map parameters:



#### hierarchy description:



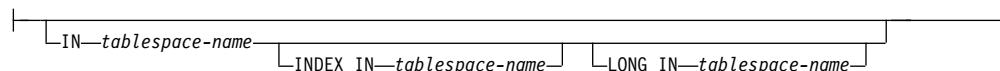
#### sub-table-list:



#### traversal-order-list:



#### tblspace-specs:



### Command parameters

#### FROM filename

Specifies the file that contains the data to be imported. If the path is omitted, the current working directory is used.

**OF *filetype***

Specifies the format of the data in the input file:

- ASC (non-delimited ASCII format)
- DEL (delimited ASCII format), which is used by a variety of database manager and file manager programs
- IXF (Integration Exchange Format, PC version) is a binary format that is used exclusively by Db2.

**LOBS FROM *lob-path***

Specifies one or more paths that store LOB files. The names of the LOB data files are stored in the main data file (ASC, DEL, or IXF), in the column that will be loaded into the LOB column. The maximum number of paths that can be specified is 999. This will implicitly activate the LOBSINFILE behavior.

This parameter is not valid when you import to a nickname.

**XML FROM *xml-path***

Specifies one or more paths that contain the XML files.

**MODIFIED BY *filetype-mod***

Specifies file type modifier options. See “File type modifiers for the import utility” on page 232.

**METHOD**

**L** Specifies the start and end column numbers from which to import data. A column number is a byte offset from the beginning of a row of data. It is numbered starting from 1.

**Note:** This method can only be used with ASC files, and is the only valid option for that file type.

**N** Specifies the names of the columns in the data file to be imported. The case of these column names must match the case of the corresponding names in the system catalogs. Each table column that is not nullable should have a corresponding entry in the **METHOD N** list. For example, given data fields F1, F2, F3, F4, F5, and F6, and table columns C1 INT, C2 INT NOT NULL, C3 INT NOT NULL, and C4 INT, method N (F2, F1, F4, F3) is a valid request, while method N (F2, F1) is not valid.

**Note:** This method can only be used with IXF files.

**P** Specifies the field numbers (numbered from 1) of the input data fields to be imported. Each table column that is not nullable should have a corresponding entry in the **METHOD P** list. For example, given data fields F1, F2, F3, F4, F5, and F6, and table columns C1 INT, C2 INT NOT NULL, C3 INT NOT NULL, and C4 INT, method P (2, 1, 4, 3) is a valid request, while method P (2, 1) is not valid. This method can only be used with file types IXF or DEL, and is the only valid method for the DEL file type.

For each of the fields specified by method P, you need to define a corresponding column in the action statement, unless all columns are accounted for or the first *x* columns are going to be loaded, as shown in the following example:

```
db2 load from datafile1.del of del method P(1, 3, 4)
 replace into table1 (c1, c3, c4)
```

#### **NULL INDICATORS** *null-indicator-list*

This option can only be used when the **METHOD L** parameter is specified. That is, the input file is an ASC file. The null indicator list is a comma-separated list of positive integers specifying the column number of each null indicator field. The column number is the byte offset of the null indicator field from the beginning of a row of data. There must be one entry in the null indicator list for each data field defined in the **METHOD L** parameter. A column number of zero indicates that the corresponding data field always contains data.

A value of Y in the NULL indicator column specifies that the column data is NULL. Any character *other than* Y in the NULL indicator column specifies that the column data is not NULL, and that column data specified by the **METHOD L** option will be imported.

The NULL indicator character can be changed using the **MODIFIED BY** option, with the **nullindchar** file type modifier.

#### **XMLPARSE**

Specifies how XML documents are parsed. If this option is not specified, the parsing behavior for XML documents will be determined by the value of the CURRENT IMPLICIT XMLPARSE OPTION special register.

#### **STRIP WHITESPACE**

Specifies to remove whitespace when the XML document is parsed.

#### **PRESERVE WHITESPACE**

Specifies not to remove whitespace when the XML document is parsed.

#### **XMLVALIDATE**

Specifies that XML documents are validated against a schema, when applicable.

#### **USING XDS**

XML documents are validated against the XML schema identified by the XML Data Specifier (XDS) in the main data file. By default, if the **XMLVALIDATE** option is invoked with the **USING XDS** clause, the schema used to perform validation will be determined by the SCH attribute of the XDS. If an SCH attribute is not present in the XDS, no schema validation will occur unless a default schema is specified by the **DEFAULT** clause.

The **DEFAULT**, **IGNORE**, and **MAP** clauses can be used to modify the schema determination behavior. These three optional clauses apply directly to the specifications of the XDS, and not to each other. For example, if a schema is selected because it is specified by the **DEFAULT** clause, it will not be ignored if also specified by the **IGNORE** clause. Similarly, if a schema is selected because it is specified as the first part of a pair in the **MAP** clause, it will not be re-mapped if also specified in the second part of another **MAP** clause pair.

#### **USING SCHEMA** *schema-sqid*

XML documents are validated against the XML schema with the specified SQL identifier. In this case, the SCH attribute of the XML Data Specifier (XDS) will be ignored for all XML columns.

#### **USING SCHEMALLOCATION HINTS**

XML documents are validated against the schemas identified by XML schema location hints in the source XML documents. If a schemaLocation attribute is not found in the XML document, no

validation will occur. When the **USING SCHEMALOCATION HINTS** clause is specified, the SCH attribute of the XML Data Specifier (XDS) will be ignored for all XML columns.

See examples of the **XMLVALIDATE** option in the following section.

#### **DEFAULT** *schema-sqlid*

This option can only be used when the **USING XDS** parameter is specified. The schema specified through the **DEFAULT** clause identifies a schema to use for validation when the XML Data Specifier (XDS) of an imported XML document does not contain an SCH attribute identifying an XML Schema.

The **DEFAULT** clause takes precedence over the **IGNORE** and **MAP** clauses. If an XDS satisfies the **DEFAULT** clause, the **IGNORE** and **MAP** specifications will be ignored.

#### **IGNORE** *schema-sqlid*

This option can only be used when the **USING XDS** parameter is specified. The **IGNORE** clause specifies a list of one or more schemas to ignore if they are identified by an SCH attribute. If an SCH attribute exists in the XML Data Specifier for an imported XML document, and the schema identified by the SCH attribute is included in the list of schemas to ignore, then no schema validation will occur for the imported XML document.

If a schema is specified in the **IGNORE** clause, it cannot also be present in the left side of a schema pair in the **MAP** clause.

The **IGNORE** clause applies only to the XDS. A schema that is mapped by the **MAP** clause will not be subsequently ignored if specified by the **IGNORE** clause.

#### **MAP** *schema-sqlid*

This option can only be used when the **USING XDS** parameter is specified. Use the **MAP** clause to specify alternate schemas to use in place of those specified by the SCH attribute of an XML Data Specifier (XDS) for each imported XML document. The **MAP** clause specifies a list of one or more schema pairs, where each pair represents a mapping of one schema to another. The first schema in the pair represents a schema that is referred to by an SCH attribute in an XDS. The second schema in the pair represents the schema that should be used to perform schema validation.

If a schema is present in the left side of a schema pair in the **MAP** clause, it cannot also be specified in the **IGNORE** clause.

Once a schema pair mapping is applied, the result is final. The mapping operation is non-transitive, and therefore the schema chosen will not be subsequently applied to another schema pair mapping.

A schema cannot be mapped more than once, meaning that it cannot appear on the left side of more than one pair.

#### **ALLOW NO ACCESS**

Runs import in the offline mode. An exclusive (X) lock on the target table is acquired before any rows are inserted. This prevents concurrent applications from accessing table data. This is the default import behavior.

#### **ALLOW WRITE ACCESS**

Runs import in the online mode. An intent exclusive (IX) lock on the target table is acquired when the first row is inserted. This allows concurrent readers and writers to access table data. Online mode is not compatible with the **REPLACE**, **CREATE**, or **REPLACE\_CREATE** import options. Online mode

is not supported in conjunction with buffered inserts. The import operation will periodically commit inserted data to prevent lock escalation to a table lock and to avoid running out of active log space. These commits will be performed even if the **COMMITCOUNT** option was not used. During each commit, import will lose its IX table lock, and will attempt to reacquire it after the commit. This parameter is required when you import to a nickname and **COMMITCOUNT** must be specified with a valid number (AUTOMATIC is not considered a valid option).

#### **COMMITCOUNT *n* | AUTOMATIC**

Performs a COMMIT after every *n* records are imported. When a number *n* is specified, import performs a COMMIT after every *n* records are imported. When compound inserts are used, a user-specified commit frequency of *n* is rounded up to the first integer multiple of the compound count value. When AUTOMATIC is specified, import internally determines when a commit needs to be performed. The utility will commit for either one of two reasons:

- to avoid running out of active log space
- to avoid lock escalation from row level to table level

If the **ALLOW WRITE ACCESS** option is specified, and the **COMMITCOUNT** option is not specified, the import utility will perform commits as if **COMMITCOUNT AUTOMATIC** had been specified.

The ability of the import operation to avoid running out of active log space is affected by the Db2 registry variable **DB2\_FORCE\_APP\_ON\_MAX\_LOG**:

- If **DB2\_FORCE\_APP\_ON\_MAX\_LOG** is set to FALSE and the **COMMITCOUNT AUTOMATIC** command option is specified, the import utility will be able to automatically avoid running out of active log space.
- If **DB2\_FORCE\_APP\_ON\_MAX\_LOG** is set to FALSE and the **COMMITCOUNT *n*** command option is specified, the import utility will attempt to resolve the log full condition if it encounters an SQL0964C (Transaction Log Full) while inserting or updating a record. It will perform an unconditional commit and then will reattempt to insert or update the record. If this does not help resolve the issue (which would be the case when the log full is attributed to other activity on the database), then the **IMPORT** command will fail as expected, however the number of rows committed may not be a multiple of the **COMMITCOUNT *n*** value. To avoid processing the rows that were already committed when you retry the import operation, use the **RESTARTCOUNT** or **SKIPCOUNT** command parameters.
- If **DB2\_FORCE\_APP\_ON\_MAX\_LOG** is set to TRUE (which is the default), the import operation will fail if it encounters an SQL0964C while inserting or updating a record. This can occur irrespective of whether you specify **COMMITCOUNT AUTOMATIC** or **COMMITCOUNT *n***.

The application is forced off the database and the current unit of work is rolled back. To avoid processing the rows that were already committed when you retry the import operation, use the **RESTARTCOUNT** or **SKIPCOUNT** command parameters.

#### **RESTARTCOUNT *n***

Specifies that an import operation is to be started at record *n*+1. The first *n* records are skipped. This option is functionally equivalent to **SKIPCOUNT**.

**RESTARTCOUNT** and **SKIPCOUNT** are mutually exclusive.

**SKIPCOUNT *n***

Specifies that an import operation is to be started at record *n*+1. The first *n* records are skipped. This option is functionally equivalent to **RESTARTCOUNT**. **SKIPCOUNT** and **RESTARTCOUNT** are mutually exclusive.

**ROWCOUNT *n***

Specifies the number *n* of physical records in the file to be imported (inserted or updated). Allows a user to import only *n* rows from a file, starting from the record determined by the **SKIPCOUNT** or **RESTARTCOUNT** options. If the **SKIPCOUNT** or **RESTARTCOUNT** options are not specified, the first *n* rows are imported. If **SKIPCOUNT *m*** or **RESTARTCOUNT *m*** is specified, rows *m*+1 to *m+n* are imported. When compound inserts are used, user specified **ROWCOUNT *n*** is rounded up to the first integer multiple of the compound count value.

**WARNINGCOUNT *n***

Stops the import operation after *n* warnings. Set this parameter if no warnings are expected, but verification that the correct file and table are being used is required. If the import file or the target table is specified incorrectly, the import utility will generate a warning for each row that it attempts to import, which will cause the import to fail. If *n* is zero, or this option is not specified, the import operation will continue regardless of the number of warnings issued.

**NOTIMEOUT**

Specifies that the import utility will not time out while waiting for locks. This option supersedes the **locktimeout** database configuration parameter. Other applications are not affected.

**MESSAGES *message-file***

Specifies the destination for warning and error messages that occur during an import operation. If the file already exists, the import utility appends the information. If the complete path to the file is not specified, the utility uses the current directory and the default drive as the destination. If *message-file* is omitted, the messages are written to standard output.

**INSERT** Adds the imported data to the table without changing the existing table data.

**INSERT\_UPDATE**

Adds rows of imported data to the target table, or updates existing rows (of the target table) with matching primary keys.

**REPLACE**

Deletes all existing data from the table by truncating the data object, and inserts the imported data. The table definition and the index definitions are not changed. This option can only be used if the table exists. If this option is used when moving data between hierarchies, only the data for an entire hierarchy, not individual subtables, can be replaced.

This parameter is not valid when you import to a nickname.

This option does not honor the CREATE TABLE statement's NOT LOGGED INITIALLY (NLI) clause or the ALTER TABLE statement's ACTIVE NOT LOGGED INITIALLY clause.

This option cannot be used to import data into system-period temporal tables.

If an import with the **REPLACE** option is performed within the same transaction as a CREATE TABLE or ALTER TABLE statement where the NLI clause is invoked, the import will not honor the NLI clause. All inserts will be logged.

#### Workaround 1

Delete the contents of the table using the DELETE statement, then invoke the import with INSERT statement

#### Workaround 2

Drop the table and re-create it, then invoke the import with INSERT statement.

### **REPLACE\_CREATE**

**Note:** The **REPLACE\_CREATE** parameter is deprecated and may be removed in a future release. For additional details, see "IMPORT command options CREATE and REPLACE\_CREATE are deprecated".

If the table exists, deletes all existing data from the table by truncating the data object, and inserts the imported data without changing the table definition or the index definitions.

If the table does not exist, creates the table and index definitions, as well as the row contents, in the code page of the database. See *Imported table re-creation* for a list of restrictions.

This option can only be used with IXF files. If this option is used when moving data between hierarchies, only the data for an entire hierarchy, not individual subtables, can be replaced.

This parameter is not valid when you import to a nickname.

### **INTO table-name**

Specifies the database table into which the data is to be imported. This table cannot be a system table, a created temporary table, a declared temporary table, or a summary table.

One can use an alias for **INSERT**, **INSERT\_UPDATE**, or **REPLACE**, except in the case of an earlier server, when the fully qualified or the unqualified table name should be used. A qualified table name is in the form:

*schema.tablename*. The *schema* is the user name under which the table was created.

If the database table contains implicitly hidden columns, you must specify whether data for the hidden columns is included in the import operation. Use one of the following methods to indicate if data for hidden columns is included:

- Use *insert-column* to explicitly specify the columns into which data is to be inserted.

```
db2 import from delfile1 of del
 insert into table1 (c1, c2, c3,...)
```

- Use one of the hidden column file type modifiers: specify **implicitlyhiddeninclude** when the input file contains data for the hidden columns, or **implicitlyhiddenmissing** when the input file does not.

```
db2 import from delfile1 of del modified by implicitlyhiddeninclude
 insert into table1
```

- Use the DB2\_DMU\_DEFAULT registry variable on the client-side to set the default behavior when data movement utilities encounter tables with implicitly hidden columns.

```
db2set DB2_DMU_DEFAULT=IMPLICITLYHIDDENINCLUDE
db2 import from delfile1 of del insert into table1
```

***insert-column***

Specifies the name of a column in the table or the view into which data is to be inserted.

**ALL TABLES**

An implicit keyword for hierarchy only. When importing a hierarchy, the default is to import all tables specified in the traversal order.

***sub-table-list***

For typed tables with the **INSERT** or the **INSERT\_UPDATE** option, a list of sub-table names is used to indicate the sub-tables into which data is to be imported.

**HIERARCHY**

Specifies that hierarchical data is to be imported.

**STARTING *sub-table-name***

A keyword for hierarchy only, requesting the default order, starting from *sub-table-name*. For PC/IXF files, the default order is the order stored in the input file. The default order is the only valid order for the PC/IXF file format.

***traversal-order-list***

For typed tables with the **INSERT**, **INSERT\_UPDATE**, or the **REPLACE** option, a list of sub-table names is used to indicate the traversal order of the importing sub-tables in the hierarchy.

**CREATE**

**Note:** The **CREATE** parameter is deprecated and may be removed in a future release. For additional details, see “**IMPORT** command options **CREATE** and **REPLACE\_CREATE** are deprecated”.

Creates the table definition and row contents in the code page of the database. If the data was exported from a Db2 table, sub-table, or hierarchy, indexes are created. If this option operates on a hierarchy, and data was exported from Db2, a type hierarchy will also be created. This option can only be used with IXF files.

This parameter is not valid when you import to a nickname.

**Note:** If the data was exported from an MVS™ host database, and it contains LONGVAR fields whose lengths, calculated on the page size, are more than 254, **CREATE** might fail because the rows are too long. See “Imported table re-creation” for a list of restrictions. In this case, the table should be created manually, and **IMPORT** with **INSERT** should be invoked, or, alternatively, the **LOAD** command should be used.

**AS ROOT TABLE**

Creates one or more sub-tables as a stand-alone table hierarchy.

**UNDER *sub-table-name***

Specifies a parent table for creating one or more sub-tables.

**IN *tablespace-name***

Identifies the table space in which the table will be created. The table space

must exist, and must be a REGULAR table space or LARGE table space . If no other table space is specified, all table parts are stored in this table space. If this clause is not specified, the table is created in a table space created by the authorization ID. If none is found, the table is placed into the default table space USERSPACE1. If USERSPACE1 has been dropped, table creation fails.

#### **INDEX IN *tablespace-name***

Identifies the table space in which any indexes on the table will be created. This option is allowed only when the primary table space specified in the **IN** clause is a DMS table space. The specified table space must exist, and must be a REGULAR or LARGE DMS table space.

**Note:** Specifying which table space will contain an index can only be done when the table is created.

#### **LONG IN *tablespace-name***

Identifies the table space in which the values of any long columns (LONG VARCHAR, LONG VARGRAPHIC, LOB data types, or distinct types with any of these as source types) will be stored. This option is allowed only if the primary table space specified in the **IN** clause is a DMS table space. The table space must exist, and must be a LARGE DMS table space.

## **Examples**

### **Example 1**

The following example shows how to import information from `myfile.ixf` to the STAFF table:

```
db2 import from myfile.ixf of ixf messages msg.txt insert into staff
SQL3150N The H record in the PC/IXF file has product "DB2 01.00", date
"19970220", and time "140848".
SQL3153N The T record in the PC/IXF file has name "myfile",
qualifier " ", and source " ".
SQL3109N The utility is beginning to load data from file "myfile".
SQL3110N The utility has completed processing. "58" rows were read
from the input file.
SQL3221W ...Begin COMMIT WORK. Input Record Count = "58".
SQL3222W ...COMMIT of any database changes was successful.
SQL3149N "58" rows were processed from the input file. "58" rows were
successfully inserted into the table. "0" rows were rejected.
```

### **Example 2 (Importing into a table with an identity column)**

TABLE1 has 4 columns:

- C1 VARCHAR(30)
- C2 INT GENERATED BY DEFAULT AS IDENTITY
- C3 DECIMAL(7,2)
- C4 CHAR(1)

TABLE2 is the same as TABLE1, except that C2 is a GENERATED ALWAYS identity column.

Data records in DATAFILE1 (DEL format):

```
"Liszt"
"Hummel",,187.43, H
"Grieg",100, 66.34, G
"Satie",101, 818.23, I
```

Data records in DATAFILE2 (DEL format):

```
"Liszt", 74.49, A
"Hummel", 0.01, H
"Grieg", 66.34, G
"Satie", 818.23, I
```

The following command generates identity values for rows 1 and 2, since no identity values are supplied in DATAFILE1 for those rows. However, row 3 is assigned the user-supplied identity value of 100 and row 4 is assigned the user-supplied identity value of 101.

```
db2 import from datafile1.del of del replace into table1
```

To import DATAFILE1 into TABLE1 so that identity values are generated for all rows, issue one of the following commands:

```
db2 import from datafile1.del of del method P(1, 3, 4)
 replace into table1 (c1, c3, c4)
db2 import from datafile1.del of del modified by identityignore
 replace into table1
```

To import DATAFILE2 into TABLE1 so that identity values are generated for each row, issue one of the following commands:

```
db2 import from datafile2.del of del replace into table1 (c1, c3, c4)
db2 import from datafile2.del of del modified by identitymissing
 replace into table1
```

If DATAFILE1 is imported into TABLE2 without using any of the identity-related file type modifiers, rows 1 and 2 will be inserted, but rows 3 and 4 will be rejected, because they supply their own non-NULL values, and the identity column is GENERATED ALWAYS.

## Examples of using the XMLVALIDATE clause

### Example 1 (XMLVALIDATE USING XDS)

For the following **XMLVALIDATE** clause:

```
XMLVALIDATE USING XDS
 IGNORE (S1.SCHEMA_A)
 MAP ((S1.SCHEMA_A, S2.SCHEMA_B))
```

The import would fail due to invalid syntax, since the **IGNORE** of S1.SCHEMA\_A would conflict with the **MAP** of S1.SCHEMA\_A to S2.SCHEMA\_B.

### Example 2 (XMLVALIDATE USING XDS)

For the following **XMLVALIDATE** clause:

```
XMLVALIDATE USING XDS
 DEFAULT S8.SCHEMA_H
 IGNORE (S9.SCHEMA_I, S10.SCHEMA_J)
 MAP ((S1.SCHEMA_A, S2.SCHEMA_B), (S3.SCHEMA_C, S5.SCHEMA_E),
 (S6.SCHEMA_F, S3.SCHEMA_C), (S4.SCHEMA_D, S7.SCHEMA_G))
```

For an XML column that contains the following XDS:

```
<XDS FIL='xmlfile.001.xml' />
```

The XML schema with SQL identifier "S8.SCHEMA\_H" is used to validate the document in file "xmlfile.001.xml", since "S8.SCHEMA\_H" was specified as the default schema to use.

For an XML column that contains the following XDS:

```
<XDS FIL='xmlfile.002.xml' OFF='10' LEN='500' SCH='S10.SCHEMA_J' />
```

No schema validation occurs for the document in file "xmlfile.002.xml", since although the XDS specifies "S10.SCHEMA\_J" as the schema to use, that schema is part of the **IGNORE** clause. The document contents can be found at byte offset 10 in the file (meaning the 11th byte), and is 500 bytes long.

For an XML column that contains the following XDS:

```
<XDS FIL='xmlfile.003.xml' SCH='S6.SCHEMA_F' />
```

The XML schema with SQL identifier "S3.SCHEMA\_C" is used to validate the document in file "xmlfile.003.xml". This is because the **MAP** clause specifies that schema "S6.SCHEMA\_F" should be mapped to schema "S3.SCHEMA\_C". Note that further mapping does not take place, therefore the mapping of schema "S3.SCHEMA\_C" to schema "S5.SCHEMA\_E" does not apply in this case.

For an XML column that contains the following XDS:

```
<XDS FIL='xmlfile.004.xml' SCH='S11.SCHEMA_K' />
```

The XML schema with SQL identifier "S11.SCHEMA\_K" is used to validate the document in file "xmlfile.004.xml". Note that none of the **DEFAULT**, **IGNORE**, or **MAP** specifications apply in this case.

### Example 3 (XMLVALIDATE USING XDS)

For the following **XMLVALIDATE** clause:

```
XMLVALIDATE USING XDS
 DEFAULT S1.SCHEMA_A
 IGNORE (S1.SCHEMA_A)
```

For an XML column that contains the following XDS:

```
<XDS FIL='xmlfile.001.xml' />
```

The XML schema with SQL identifier "S1.SCHEMA\_A" is used to validate the document in file "xmlfile.001.xml", since "S1.SCHEMA\_A" was specified as the default schema to use.

For an XML column that contains the following XDS:

```
<XDS FIL='xmlfile.002.xml' SCH='S1.SCHEMA_A' />
```

No schema validation occurs for the document in file "xmlfile.002", since although the XDS specifies "S1.SCHEMA\_A" as the schema to use, that schema is part of the **IGNORE** clause.

### Example 4 (XMLVALIDATE USING XDS)

For the following **XMLVALIDATE** clause:

```
XMLVALIDATE USING XDS
 DEFAULT S1.SCHEMA_A
 MAP ((S1.SCHEMA_A, S2.SCHEMA_B), (S2.SCHEMA_B, S1.SCHEMA_A))
```

For an XML column that contains the following XDS:

```
<XDS FIL='xmlfile.001.xml' />
```

The XML schema with SQL identifier "S1.SCHEMA\_A" is used to validate the document in file "xmlfile.001.xml", since "S1.SCHEMA\_A" was specified as the default schema to use. Note that since the **DEFAULT** clause was applied, the **MAP** clause is not subsequently applied. Therefore the mapping of schema "S1.SCHEMA\_A" to schema "S2.SCHEMA\_B" does not apply in this case.

For an XML column that contains the following XDS:

```
<XDS FIL='xmlfile.002.xml' SCH='S1.SCHEMA_A' />
```

The XML schema with SQL identifier "S2.SCHEMA\_B" is used to validate the document in file "xmlfile.002.xml". This is because the **MAP** clause specifies that schema "S1.SCHEMA\_A" should be mapped to schema "S2.SCHEMA\_B". Note that further mapping does not take place, therefore the mapping of schema "S2.SCHEMA\_B" to schema "S1.SCHEMA\_A" does not apply in this case.

For an XML column that contains the following XDS:

```
<XDS FIL='xmlfile.003.xml' SCH='S2.SCHEMA_B' />
```

The XML schema with SQL identifier "S1.SCHEMA\_A" is used to validate the document in file "xmlfile.003.xml". This is because the **MAP** clause specifies that schema "S2.SCHEMA\_B" should be mapped to schema "S1.SCHEMA\_A". Note that further mapping does not take place, therefore the mapping of schema "S1.SCHEMA\_A" to schema "S2.SCHEMA\_B" does not apply in this case.

#### **Example 5 (XMLVALIDATE USING SCHEMA)**

For the following **XMLVALIDATE** clause:

```
XMLVALIDATE USING SCHEMA S2.SCHEMA_B
```

For an XML column that contains the following XDS:

```
<XDS FIL='xmlfile.001.xml' />
```

The document in file `xmlfile.001.xml` is validated using the XML schema with SQL identifier "S2.SCHEMA\_B".

For an XML column that contains the following XDS:

```
<XDS FIL='xmlfile.002.xml' SCH='S1.SCHEMA_A' />
```

The document in file "xmlfile.002.xml" is validated using the XML schema with SQL identifier "S2.SCHEMA\_B". Note that the SCH attribute is ignored, since validation is being performed using a schema specified by the **USING SCHEMA** clause.

#### **Example 6 (XMLVALIDATE USING SCHEMALOCATION HINTS)**

For an XML column that contains the following XDS:

```
<XDS FIL='xmlfile.001.xml' />
```

The XML schema used is determined by the schemaLocation attribute in the document contents, and no validation would occur if one is not present.

For an XML column that contains the following XDS:

```
<XDS FIL='xmlfile.002.xml' SCH='S1.SCHEMA_A' />
```

The XML schema used is determined by the schemaLocation attribute in the document contents, and no validation would occur if one is not present. Note that the SCH attribute is ignored, since validation is being performed using **SCHEMALOCATION HINTS**.

## Usage notes

Be sure to complete all table operations and release all locks before starting an import operation. This can be done by issuing a COMMIT after closing all cursors opened WITH HOLD, or by issuing a ROLLBACK.

The import utility adds rows to the target table using the SQL INSERT statement. The utility issues one INSERT statement for each row of data in the input file. If an INSERT statement fails, one of two actions result:

- If it is likely that subsequent INSERT statements can be successful, a warning message is written to the message file, and processing continues.
- If it is likely that subsequent INSERT statements will fail, and there is potential for database damage, an error message is written to the message file, and processing halts.

The utility performs an automatic COMMIT after the old rows are deleted during a **REPLACE** or a **REPLACE\_CREATE** operation. Therefore, if the system fails, or the application interrupts the database manager after the table object is truncated, all of the old data is lost. Ensure that the old data is no longer needed before using these options.

If the log becomes full during a **CREATE**, **REPLACE**, or **REPLACE\_CREATE** operation, the utility performs an automatic COMMIT on inserted records. If the system fails, or the application interrupts the database manager after an automatic COMMIT, a table with partial data remains in the database. Use the **REPLACE** or the **REPLACE\_CREATE** option to rerun the whole import operation, or use **INSERT** with the **RESTARTCOUNT** parameter set to the number of rows successfully imported.

Updates from the IMPORT command will always be committed at the end of an IMPORT task. The IMPORT command can also perform automatic commits during its execution to reduce the size of the lock list and the active log space. The IMPORT command will roll back if the active log becomes full during IMPORT processing.

- By default, automatic commits are not performed for the **INSERT** or the **INSERT\_UPDATE** option. They are, however, performed if the **COMMITCOUNT** parameter is not zero.
- Offline import does not perform automatic COMMITS if any of the following conditions are true:
  - The target is a view, not a table
  - Compound inserts are used
  - Buffered inserts are used

- By default, online import performs automatic commit to free both the active log space and the lock list. Automatic commits are not performed only if a **COMMITCOUNT** value of zero is specified.

Whenever the import utility performs a COMMIT, two messages are written to the message file: one indicates the number of records to be committed, and the other is written after a successful COMMIT. When restarting the import operation after a failure, specify the number of records to skip, as determined from the last successful COMMIT.

The import utility accepts input data with minor incompatibility problems (for example, character data can be imported using padding or truncation, and numeric data can be imported with a different numeric data type), but data with major incompatibility problems is not accepted.

You cannot **REPLACE** or **REPLACE\_CREATE** an object table if it has any dependents other than itself, or an object view if its base table has any dependents (including itself). To replace such a table or a view, do the following:

1. Drop all foreign keys in which the table is a parent.
2. Run the import utility.
3. Alter the table to re-create the foreign keys.

If an error occurs while recreating the foreign keys, modify the data to maintain referential integrity.

Referential constraints and foreign key definitions are not preserved when recreating tables from PC/IXF files. (Primary key definitions *are* preserved if the data was previously exported using **SELECT \*.**)

Importing to a remote database requires enough disk space on the server for a copy of the input data file, the output message file, and potential growth in the size of the database.

If an import operation is run against a remote database, and the output message file is very long (more than 60 KB), the message file returned to the user on the client might be missing messages from the middle of the import operation. The first 30 KB of message information and the last 30 KB of message information are always retained.

Importing PC/IXF files to a remote database is much faster if the PC/IXF file is on a hard drive rather than on diskettes.

You cannot use the **IMPORT CREATE** option with a PC/IXF file format on a table that has an index defined with an expression-based key.

The database table or hierarchy must exist before data in the **ASC** or **DEL** file formats can be imported; however, if the table does not already exist, **IMPORT CREATE** or **IMPORT REPLACE\_CREATE** creates the table when it imports data from a PC/IXF file. For typed tables, **IMPORT CREATE** can create the type hierarchy and the table hierarchy as well.

PC/IXF import should be used to move data (including hierarchical data) between databases. If character data containing row separators is exported to a delimited ASCII (DEL) file and processed by a text transfer program, fields containing the

row separators will shrink or expand. The file copying step is not necessary if the source and the target databases are both accessible from the same client.

The data in ASC and DEL files is assumed to be in the code page of the client application performing the import. PC/IXF files, which allow for different code pages, are recommended when importing data in different code pages. If the PC/IXF file and the import utility are in the same code page, processing occurs as for a regular application. If the two differ, and the **FORCEIN** option is specified, the import utility assumes that data in the PC/IXF file has the same code page as the application performing the import. This occurs even if there is a conversion table for the two code pages. If the two differ, the **FORCEIN** option is not specified, and there is a conversion table, all data in the PC/IXF file will be converted from the file code page to the application code page. If the two differ, the **FORCEIN** option is not specified, and there is no conversion table, the import operation will fail. This applies only to PC/IXF files on Db2 clients on the AIX operating system.

For table objects on an 8 KB page that are close to the limit of 1012 columns, import of PC/IXF data files might cause Db2 to return an error, because the maximum size of an SQL statement was exceeded. This situation can occur only if the columns are of type CHAR, VARCHAR, or CLOB. The restriction does not apply to import of **DEL** or **ASC** files. If PC/IXF files are being used to create a new table, an alternative is use **db2look** to dump the DDL statement that created the table, and then to issue that statement through the CLP.

Db2 Connect can be used to import data to DRDA servers such as Db2 for z/OS, Db2 for VM and VSE, and Db2 for OS/400. Only PC/IXF import (**INSERT** option) is supported. The **RESTARTCOUNT** parameter, but not the **COMMITCOUNT** parameter, is also supported.

When using the **CREATE** option with typed tables, create every sub-table defined in the PC/IXF file; sub-table definitions cannot be altered. When using options other than **CREATE** with typed tables, the traversal order list enables one to specify the traverse order; therefore, the traversal order list must match the one used during the export operation. For the PC/IXF file format, one need only specify the target sub-table name, and use the traverse order stored in the file.

The import utility can be used to recover a table previously exported to a PC/IXF file. The table returns to the state it was in when exported.

Data cannot be imported to a system table, a created temporary table, a declared temporary table, or a summary table.

Views cannot be created through the import utility.

Importing a multiple-part PC/IXF file whose individual parts are copied from a Windows system to an AIX system is supported. Only the name of the first file must be specified in the **IMPORT** command. For example, **IMPORT FROM data.ixf OF IXF INSERT INTO TABLE1**. The file data.002, etc should be available in the same directory as data.ixf.

On the Windows operating system:

- Importing logically split PC/IXF files is not supported.
- Importing bad format PC/IXF files is not supported.

Security labels in their internal format might contain newline characters. If you import the file using the DEL file format, those newline characters can be mistaken for delimiters. If you have this problem use the older default priority for delimiters by specifying the **delprioritychar** file type modifier in the **IMPORT** command.

If the database table contains implicitly hidden columns, you must specify whether data for the hidden columns is included in the import operation.

The IMPORT utility does not match the number of columns in a table and the number of fields in a data file. The utility checks for a sufficient amount of data in the data file and if a row in the data file does not contain sufficient columns of data, the row may either be rejected with a warning message if the corresponding table columns without data are defined as NOT NULL, or be inserted successfully without a warning message if the corresponding table columns are defined as NULL. On the other hand, if a row contains a higher number of columns than required, the sufficient number of columns are processed while the remaining columns of data are omitted and no warning message is given.

## Federated considerations

When using the **IMPORT** command and the **INSERT**, **UPDATE**, or **INSERT\_UPDATE** command parameters, you must ensure that you have CONTROL privilege on the participating nickname. You must ensure that the nickname you want to use when doing an import operation already exists. There are also several restrictions you should be aware of as shown in the **IMPORT** command parameters section.

Some data sources, such as ODBC, do not support importing into nicknames.

## Column-organized tables

- The **IMPORT** command inherits all INSERT, UPDATE, or DELETE statement restrictions that pertain to column-organized tables.
- The **CREATE INTO** parameter of the **IMPORT** command cannot create a column-organized table.
- Import operations against column-organized tables use the CS isolation level (which is needed for insert operations), not the default RS isolation level, which is set when import packages are bound to the database.
- You cannot use an IXF file that you created by exporting data from a column-organized table with the **CREATE** parameter or the **REPLACE\_CREATE** parameter of the **IMPORT** command.

## File type modifiers for the import utility

Table 11. Valid file type modifiers for the import utility: All file formats

Modifier	Description
compound=x	<p>x is a number between 1 and 100 inclusive. Uses nonatomic compound SQL to insert the data, and x statements will be attempted each time.</p> <p>If this modifier is specified, and the transaction log is not sufficiently large, the import operation will fail. The transaction log must be large enough to accommodate either the number of rows specified by <b>COMMITCOUNT</b>, or the number of rows in the data file if <b>COMMITCOUNT</b> is not specified. It is therefore recommended that the <b>COMMITCOUNT</b> option be specified to avoid transaction log overflow.</p> <p>This modifier is incompatible with:</p> <ul style="list-style-type: none"> <li>• <b>INSERT_UPDATE</b> mode</li> <li>• Hierarchical tables</li> <li>• Random distribution tables that use the random by generation method</li> <li>• The following modifiers: <b>usedefaults</b>, <b>identitymissing</b>, <b>identityignore</b>, <b>generatedmissing</b>, and <b>generatedignore</b></li> </ul>
generatedignore	<p>This modifier informs the import utility that data for all generated columns is present in the data file but should be ignored. This results in all values for the generated columns being generated by the utility. This modifier cannot be used with the <b>generatedmissing</b> modifier.</p> <p>Random distribution tables that use the random by generation method have an internally generated column called the <b>RANDOM DISTRIBUTION KEY</b>. This modifier does not apply to that column, only to other generated columns in the table. Values for the <b>RANDOM DISTRIBUTION KEY</b> will be regenerated unless explicitly referenced in the column list.</p>
generatedmissing	<p>If this modifier is specified, the utility assumes that the input data file contains no data for the generated columns (not even NULLs), and will therefore generate a value for each row. This modifier cannot be used with the <b>generatedignore</b> modifier.</p> <p>Random distribution tables that use the random by generation method have an internally generated column called the <b>RANDOM DISTRIBUTION KEY</b>. This modifier does not apply to that column, only to other generated columns in the table. Values for the <b>RANDOM DISTRIBUTION KEY</b> will be regenerated unless explicitly referenced in the column list.</p>
identityignore	<p>This modifier informs the import utility that data for the identity column is present in the data file but should be ignored. This results in all identity values being generated by the utility. The behavior will be the same for both <b>GENERATED ALWAYS</b> and <b>GENERATED BY DEFAULT</b> identity columns. This means that for <b>GENERATED ALWAYS</b> columns, no rows will be rejected. This modifier cannot be used with the <b>identitymissing</b> modifier.</p>
identitymissing	<p>If this modifier is specified, the utility assumes that the input data file contains no data for the identity column (not even NULLs), and will therefore generate a value for each row. The behavior will be the same for both <b>GENERATED ALWAYS</b> and <b>GENERATED BY DEFAULT</b> identity columns. This modifier cannot be used with the <b>identityignore</b> modifier.</p>

Table 11. Valid file type modifiers for the import utility: All file formats (continued)

Modifier	Description
<b>implicitlyhiddeninclude</b>	If this modifier is specified, the utility assumes that the input data file contains data for the implicitly hidden columns and this data will also be imported. This modifier cannot be used with the <b>implicitlyhiddenmissing</b> modifier. See the Note: section for information about the precedence when multiple modifiers are specified.  This modifier does not apply to the hidden <b>RANDOM DISTRIBUTION KEY</b> column of a random distribution tables that uses the random by generation method. The value for that column will be read from the input data file only if the column was explicitly referenced in the column list.
<b>implicitlyhiddenmissing</b>	If this modifier is specified, the utility assumes that the input data file does not contain data for the implicitly hidden columns and the utility will generate values for those hidden columns. This modifier cannot be used with the <b>implicitlyhiddeninclude</b> modifier. See the Note: section for information about the precedence when multiple modifiers are specified.  This modifier does not apply to the hidden <b>RANDOM DISTRIBUTION KEY</b> column of a random distribution tables that uses the random by generation method. The value for that column will be read from the input data file only if the column was explicitly referenced in the column list.
<b>lobsinfile</b>	<i>lob-path</i> specifies the path to the files containing LOB data.  Each path contains at least one file that contains at least one LOB pointed to by a Lob Location Specifier (LLS) in the data file. The LLS is a string representation of the location of a LOB in a file stored in the LOB file path. The format of an LLS is <i>filename.ext.nnn.mmm/</i> , where <i>filename.ext</i> is the name of the file that contains the LOB, <i>nnn</i> is the offset in bytes of the LOB within the file, and <i>mmm</i> is the length of the LOB in bytes. For example, if the string db2exp.001.123.456/ is stored in the data file, the LOB is located at offset 123 in the file db2exp.001, and is 456 bytes long.  The <b>LOBS FROM</b> clause specifies where the LOB files are located when the “ <i>lobsinfile</i> ” modifier is used. The <b>LOBS FROM</b> clause will implicitly activate the LOBSINFILE behavior. The <b>LOBS FROM</b> clause conveys to the <b>IMPORT</b> utility the list of paths to search for the LOB files while importing the data.  To indicate a null LOB, enter the size as -1. If the size is specified as 0, it is treated as a 0 length LOB. For null LOBS with length of -1, the offset and the file name are ignored. For example, the LLS of a null LOB might be db2exp.001.7.-1/.
<b>no_type_id</b>	Valid only when importing into a single sub-table. Typical usage is to export data from a regular table, and then to invoke an import operation (using this modifier) to convert the data into a single sub-table.
<b>nodefaults</b>	If a source column for a target table column is not explicitly specified, and the table column is not nullable, default values are not loaded. Without this option, if a source column for one of the target table columns is not explicitly specified, one of the following occurs: <ul style="list-style-type: none"><li>• If a default value can be specified for a column, the default value is loaded</li><li>• If the column is nullable, and a default value cannot be specified for that column, a NULL is loaded</li><li>• If the column is not nullable, and a default value cannot be specified, an error is returned, and the utility stops processing.</li></ul>
<b>norowwarnings</b>	Suppresses all warnings about rejected rows.

*Table 11. Valid file type modifiers for the import utility: All file formats (continued)*

Modifier	Description
<b>periodignore</b>	This modifier informs the import utility that data for the period columns is present in the data file but should be ignored. When this modifier is specified, all period column values are generated by the utility. This modifier cannot be used with the <b>periodmissing</b> modifier.
<b>periodmissing</b>	If this modifier is specified, the utility assumes that the input data file contains no data for the period columns. When this modifier is specified, all period column values are generated by the utility. This modifier cannot be used with the <b>periodignore</b> modifier.
<b>rowchangetimestampignore</b>	This modifier informs the import utility that data for the row change timestamp column is present in the data file but should be ignored. This results in all ROW CHANGE TIMESTAMP being generated by the utility. The behavior will be the same for both GENERATED ALWAYS and GENERATED BY DEFAULT columns. This means that for GENERATED ALWAYS columns, no rows will be rejected. This modifier cannot be used with the <b>rowchangetimestampmissing</b> modifier.
<b>rowchangetimestampmissing</b>	If this modifier is specified, the utility assumes that the input data file contains no data for the row change timestamp column (not even NULLs), and will therefore generate a value for each row. The behavior will be the same for both GENERATED ALWAYS and GENERATED BY DEFAULT columns. This modifier cannot be used with the <b>rowchangetimestampignore</b> modifier.
<b>seclabelchar</b>	<p>Indicates that security labels in the input source file are in the string format for security label values rather than in the default encoded numeric format. <b>IMPORT</b> converts each security label into the internal format as it is loaded. If a string is not in the proper format the row is not loaded and a warning (SQLSTATE 01H53) is returned. If the string does not represent a valid security label that is part of the security policy protecting the table then the row is not loaded and a warning (SQLSTATE 01H53, SQLCODE SQL3243W)) is returned.</p> <p>This modifier cannot be specified if the <b>seclabelname</b> modifier is specified, otherwise the import fails and an error (SQLCODE SQL3525N) is returned.</p>
<b>seclabelname</b>	<p>Indicates that security labels in the input source file are indicated by their name rather than the default encoded numeric format. <b>IMPORT</b> will convert the name to the appropriate security label if it exists. If no security label exists with the indicated name for the security policy protecting the table the row is not loaded and a warning (SQLSTATE 01H53, SQLCODE SQL3244W) is returned.</p> <p>This modifier cannot be specified if the <b>seclabelchar</b> modifier is specified, otherwise the import fails and an error (SQLCODE SQL3525N) is returned.</p> <p><b>Note:</b> If the file type is ASC, any spaces following the name of the security label will be interpreted as being part of the name. To avoid this use the <b>scriptblanks</b> file type modifier to make sure the spaces are removed.</p>
<b>transactionidignore</b>	This modifier informs the import utility that data for the TRANSACTION START ID column is present in the data file but should be ignored. When this modifier is specified, the value for the TRANSACTION START ID column is generated by the utility. This modifier cannot be used with the <b>transactionidmissing</b> modifier.
<b>transactionidmissing</b>	If this modifier is specified, the utility assumes that the input data file contains no data for the TRANSACTION START ID columns. When this modifier is specified, the value for the TRANSACTION START ID column is generated by the utility. This modifier cannot be used with the <b>transactionidignore</b> modifier.

*Table 11. Valid file type modifiers for the import utility: All file formats (continued)*

Modifier	Description
usedefaults	<p>If a source column for a target table column has been specified, but it contains no data for one or more row instances, default values are loaded. Examples of missing data are:</p> <ul style="list-style-type: none"> <li>For DEL files: two adjacent column delimiters (" , ") or two adjacent column delimiters separated by an arbitrary number of spaces ( , , ) are specified for a column value.</li> <li>For DEL/ASC files: A row that does not have enough columns, or is not long enough for the original specification.</li> </ul> <p><b>Note:</b> For ASC files, NULL column values are not considered explicitly missing, and a default will not be substituted for NULL column values. NULL column values are represented by all space characters for numeric, date, time, and /timestamp columns, or by using the NULL INDICATOR for a column of any type to indicate the column is NULL.</p> <p>Without this option, if a source column contains no data for a row instance, one of the following occurs:</p> <ul style="list-style-type: none"> <li>For DEL/ASC files: If the column is nullable, a NULL is loaded. If the column is not nullable, the utility rejects the row.</li> </ul> <p>You cannot use the <code>usedefaults</code> file type modifier in INSERT_UPDATE mode if the input data is missing the value for a column that is part of a primary key when trying to update an existing row. The existing row is not updated and SQL3116W is returned.</p>

*Table 12. Valid file type modifiers for the import utility: ASCII file formats (ASC/DEL)*

Modifier	Description
codepage=x	<p>x is an ASCII character string. The value is interpreted as the code page of the data in the input data set. Converts character data from this code page to the application code page during the import operation.</p> <p>The following rules apply:</p> <ul style="list-style-type: none"> <li>For pure DBCS (graphic) mixed DBCS, and EUC, delimiters are restricted to the range of x00 to x3F, inclusive.</li> <li>nullindchar must specify symbols included in the standard ASCII set between code points x20 and x7F, inclusive. This refers to ASCII symbols and code points.</li> </ul> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>If data expansion occurs when the code page is converted from the application code page to the database code page, the data might be truncated and loss of data can occur.</li> </ol>

Table 12. Valid file type modifiers for the import utility: ASCII file formats (ASC/DEL) (continued)

Modifier	Description
dateformat="x"	<p>x is the format of the date in the source file.<sup>2</sup> Valid date elements are:</p> <ul style="list-style-type: none"> <li><b>YYYY</b> Year (four digits ranging from 0000 - 9999)</li> <li><b>M</b> Month (one or two digits ranging from 1 - 12)</li> <li><b>MM</b> Month (two digits ranging from 01 - 12; mutually exclusive with M)</li> <li><b>D</b> Day (one or two digits ranging from 1 - 31)</li> <li><b>DD</b> Day (two digits ranging from 01 - 31; mutually exclusive with D)</li> <li><b>DDD</b> Day of the year (three digits ranging from 001 - 366; mutually exclusive with other day or month elements)</li> </ul> <p>A default value of 1 is assigned for each element that is not specified. Some examples of date formats are:</p> <ul style="list-style-type: none"> <li>"D-M-YYYY"</li> <li>"MM.DD.YYYY"</li> <li>"YYYYDDD"</li> </ul>
implieddecimal	The location of an implied decimal point is determined by the column definition; it is no longer assumed to be at the end of the value. For example, the value 12345 is loaded into a DECIMAL(8,2) column as 123.45, <i>not</i> 12345.00.
timeformat="x"	<p>x is the format of the time in the source file.<sup>2</sup> Valid time elements are:</p> <ul style="list-style-type: none"> <li><b>H</b> Hour (one or two digits ranging from 0 - 12 for a 12 hour system, and 0 - 24 for a 24 hour system)</li> <li><b>HH</b> Hour (two digits ranging from 00 - 12 for a 12 hour system, and 00 - 24 for a 24 hour system; mutually exclusive with H)</li> <li><b>M</b> Minute (one or two digits ranging from 0 - 59)</li> <li><b>MM</b> Minute (two digits ranging from 00 - 59; mutually exclusive with M)</li> <li><b>S</b> Second (one or two digits ranging from 0 - 59)</li> <li><b>SS</b> Second (two digits ranging from 00 - 59; mutually exclusive with S)</li> <li><b>SSSSS</b> Second of the day after midnight (5 digits ranging from 00000 - 86400; mutually exclusive with other time elements)</li> <li><b>TT</b> Meridian indicator (AM or PM)</li> </ul> <p>A default value of 0 is assigned for each element that is not specified. Some examples of time formats are:</p> <ul style="list-style-type: none"> <li>"HH:MM:SS"</li> <li>"HH.MM TT"</li> <li>"SSSSS"</li> </ul>

Table 12. Valid file type modifiers for the import utility: ASCII file formats (ASC/DEL) (continued)

Modifier	Description
timestampformat="x"	<p>x is the format of the time stamp in the source file.<sup>2</sup> Valid time stamp elements are:</p> <ul style="list-style-type: none"> <li><b>YYYY</b> Year (four digits ranging from 0000 - 9999)</li> <li><b>M</b> Month (one or two digits ranging from 1 - 12)</li> <li><b>MM</b> Month (two digits ranging from 01 - 12; mutually exclusive with M and MMM)</li> <li><b>MMM</b> Month (three-letter case-insensitive abbreviation for the month name; mutually exclusive with M and MM)</li> <li><b>D</b> Day (one or two digits ranging from 1 - 31)</li> <li><b>DD</b> Day (two digits ranging from 01 - 31; mutually exclusive with D)</li> <li><b>DDD</b> Day of the year (three digits ranging from 001 - 366; mutually exclusive with other day or month elements)</li> <li><b>H</b> Hour (one or two digits ranging from 0 - 12 for a 12 hour system, and 0 - 24 for a 24 hour system)</li> <li><b>HH</b> Hour (two digits ranging from 00 - 12 for a 12 hour system, and 00 - 24 for a 24 hour system; mutually exclusive with H)</li> <li><b>M</b> Minute (one or two digits ranging from 0 - 59)</li> <li><b>MM</b> Minute (two digits ranging from 00 - 59; mutually exclusive with M, minute)</li> <li><b>S</b> Second (one or two digits ranging from 0 - 59)</li> <li><b>SS</b> Second (two digits ranging from 00 - 59; mutually exclusive with S)</li> <li><b>SSSSS</b> Second of the day after midnight (5 digits ranging from 00000 - 86400; mutually exclusive with other time elements)</li> <li><b>U (1 to 12 times)</b> Fractional seconds(number of occurrences of U represent the number of digits with each digit ranging from 0 to 9)</li> <li><b>TT</b> Meridian indicator (AM or PM)</li> </ul> <p>A default value of 1 is assigned for unspecified YYYY, M, MM, D, DD, or DDD elements. A default value of 'Jan' is assigned to an unspecified MMM element. A default value of 0 is assigned for all other unspecified elements. Following is an example of a time stamp format:</p> <pre>"YYYY/MM/DD HH:MM:SS.UUUUUU"</pre> <p>The valid values for the MMM element include: 'jan', 'feb', 'mar', 'apr', 'may', 'jun', 'jul', 'aug', 'sep', 'oct', 'nov' and 'dec'. These values are case insensitive.</p> <p>The following example illustrates how to import data containing user defined date and time formats into a table called schedule:</p> <pre>db2 import from delfile2 of del modified by timestampformat="yyyy.mm.dd hh:mm tt" insert into schedule</pre>

*Table 12. Valid file type modifiers for the import utility: ASCII file formats (ASC/DEL) (continued)*

Modifier	Description
usegraphiccodepage	<p>If usegraphiccodepage is given, the assumption is made that data being imported into graphic or double-byte character large object (DBCLOB) data fields is in the graphic code page. The rest of the data is assumed to be in the character code page. The graphic code page is associated with the character code page. IMPORT determines the character code page through either the codepage modifier, if it is specified, or through the code page of the application if the codepage modifier is not specified.</p> <p>This modifier should be used in conjunction with the delimited data file generated by drop table recovery only if the table being recovered has graphic data.</p> <p><b>Restrictions</b></p> <p>The usegraphiccodepage modifier MUST NOT be specified with DEL files created by the <b>EXPORT</b> utility, as these files contain data encoded in only one code page. The usegraphiccodepage modifier is also ignored by the double-byte character large objects (DBCLOBs) in files.</p>
xmlchar	<p>Specifies that XML documents are encoded in the character code page.</p> <p>This option is useful for processing XML documents that are encoded in the specified character code page but do not contain an encoding declaration.</p> <p>For each document, if a declaration tag exists and contains an encoding attribute, the encoding must match the character code page, otherwise the row containing the document will be rejected. Note that the character code page is the value specified by the codepage file type modifier, or the application code page if it is not specified. By default, either the documents are encoded in Unicode, or they contain a declaration tag with an encoding attribute.</p>
xmlgraphic	<p>Specifies that XML documents are encoded in the specified graphic code page.</p> <p>This option is useful for processing XML documents that are encoded in a specific graphic code page but do not contain an encoding declaration.</p> <p>For each document, if a declaration tag exists and contains an encoding attribute, the encoding must match the graphic code page, otherwise the row containing the document will be rejected. Note that the graphic code page is the graphic component of the value specified by the codepage file type modifier, or the graphic component of the application code page if it is not specified. By default, documents are either encoded in Unicode, or they contain a declaration tag with an encoding attribute.</p> <p><b>Note:</b> If the xmlgraphic modifier is specified with the <b>IMPORT</b> command, the XML document to be imported must be encoded in the UTF-16 code page. Otherwise, the XML document may be rejected with a parsing error, or it may be imported into the table with data corruption.</p>

*Table 13. Valid file type modifiers for the import utility: ASC (non-delimited ASCII) file format*

Modifier	Description
nochecklengths	If nochecklengths is specified, an attempt is made to import each row, even if the source data has a column definition that exceeds the size of the target table column. Such rows can be successfully imported if code page conversion causes the source data to shrink; for example, 4-byte EUC data in the source could shrink to 2-byte DBCS data in the target, and require half the space. This option is particularly useful if it is known that the source data will fit in all cases despite mismatched column definitions.

*Table 13. Valid file type modifiers for the import utility: ASC (non-delimited ASCII) file format (continued)*

Modifier	Description
nullindchar=x	<p><i>x</i> is a single character. Changes the character denoting a null value to <i>x</i>. The default value of <i>x</i> is <i>N</i>.<sup>3</sup></p> <p>This modifier is case sensitive for EBCDIC data files, except when the character is an English letter. For example, if the null indicator character is specified to be the letter <i>N</i>, then <i>n</i> is also recognized as a null indicator.</p>
reclen=x	<i>x</i> is an integer with a maximum value of 32 767. <i>x</i> characters are read for each row, and a new-line character is not used to indicate the end of the row.
stripblanks	<p>Truncates any trailing blank spaces when loading data into a variable-length field. If this option is not specified, blank spaces are kept.</p> <p>In the following example, stripblanks causes the import utility to truncate trailing blank spaces:</p> <pre>db2 import from myfile.asc of asc       modified by stripblanks       method l (1 10, 12 15) messages msgs.txt       insert into staff</pre> <p>This option cannot be specified together with striptnulls. These are mutually exclusive options. This option replaces the obsolete t option, which is supported for earlier compatibility only.</p>
striptnulls	<p>Truncates any trailing NULLs (0x00 characters) when loading data into a variable-length field. If this option is not specified, NULLs are kept.</p> <p>This option cannot be specified together with stripblanks. These are mutually exclusive options. This option replaces the obsolete padwithzero option, which is supported for earlier compatibility only.</p>

*Table 14. Valid file type modifiers for the import utility: DEL (delimited ASCII) file format*

Modifier	Description
chardelx	<p><i>x</i> is a single character string delimiter. The default value is a double quotation mark (""). The specified character is used in place of double quotation marks to enclose a character string.<sup>34</sup> If you want to explicitly specify the double quotation mark as the character string delimiter, it should be specified as follows:</p> <pre>modified by chardel""</pre> <p>The single quotation mark (') can also be specified as a character string delimiter. In the following example, chardel'' causes the import utility to interpret any single quotation mark (') it encounters as a character string delimiter:</p> <pre>db2 "import from myfile.del of del       modified by chardel''       method p (1, 4) insert into staff (id, years)"</pre>
coldelx	<p><i>x</i> is a single character column delimiter. The default value is a comma (,). The specified character is used in place of a comma to signal the end of a column.<sup>34</sup></p> <p>In the following example, coldel; causes the import utility to interpret any semicolon (;) it encounters as a column delimiter:</p> <pre>db2 import from myfile.del of del       modified by coldel;;       messages msgs.txt insert into staff</pre>
decplusblank	Plus sign character. Causes positive decimal values to be prefixed with a blank space instead of a plus sign (+). The default action is to prefix positive decimal values with a plus sign.

Table 14. Valid file type modifiers for the import utility: DEL (delimited ASCII) file format (continued)

Modifier	Description
decptx	<p><i>x</i> is a single character substitute for the period as a decimal point character. The default value is a period (.). The specified character is used in place of a period as a decimal point character.<sup>34</sup></p> <p>In the following example, decpt; causes the import utility to interpret any semicolon (;) it encounters as a decimal point:</p> <pre>db2 "import from myfile.del of del       modified by chardel"       decpt; messages msgs.txt insert into staff"</pre>
delprioritychar	<p>The current default priority for delimiters is: record delimiter, character delimiter, column delimiter. This modifier protects existing applications that depend on the older priority by reverting the delimiter priorities to: character delimiter, record delimiter, column delimiter. Syntax:</p> <pre>db2 import ... modified by delprioritychar ...</pre> <p>For example, given the following DEL data file:</p> <pre>"Smith, Joshua",4000,34.98&lt;row delimiter&gt; "Vincent,&lt;row delimiter&gt;, is a manager", ... ... 4005,44.37&lt;row delimiter&gt;</pre> <p>With the delprioritychar modifier specified, there will be only two rows in this data file. The second &lt;row delimiter&gt; will be interpreted as part of the first data column of the second row, while the first and the third &lt;row delimiter&gt; are interpreted as actual record delimiters. If this modifier is <i>not</i> specified, there will be three rows in this data file, each delimited by a &lt;row delimiter&gt;.</p>
keepblanks	Preserves the leading and trailing blanks in each field of type CHAR, VARCHAR, LONG VARCHAR, or CLOB. Without this option, all leading and trailing blanks that are not inside character delimiters are removed, and a NULL is inserted into the table for all blank fields.
nochardel	<p>The import utility will assume all bytes found between the column delimiters to be part of the column's data. Character delimiters will be parsed as part of column data. This option should not be specified if the data was exported using Db2 (unless nochardel was specified at export time). It is provided to support vendor data files that do not have character delimiters. Improper usage might result in data loss or corruption.</p> <p>This option cannot be specified with chardelx, delprioritychar or nodoubledel. These are mutually exclusive options.</p>
nodoubledel	Suppresses recognition of double character delimiters.

Table 15. Valid file type modifiers for the import utility: IXF file format

Modifier	Description
forcein	<p>Directs the utility to accept data despite code page mismatches, and to suppress translation between code pages.</p> <p>Fixed length target fields are checked to verify that they are large enough for the data. If nochecklengths is specified, no checking is done, and an attempt is made to import each row.</p>
indexixf	Directs the utility to drop all indexes currently defined on the existing table, and to create new ones from the index definitions in the PC/IXF file. This option can only be used when the contents of a table are being replaced. It cannot be used with a view, or when a <i>insert-column</i> is specified.

Table 15. Valid file type modifiers for the import utility: IXF file format (continued)

Modifier	Description
indexschema=schema	Uses the specified <i>schema</i> for the index name during index creation. If <i>schema</i> is not specified (but the keyword <code>indexschema</code> is specified), uses the connection user ID. If the keyword is not specified, uses the schema in the IXF file.
nochecklengths	If <code>nochecklengths</code> is specified, an attempt is made to import each row, even if the source data has a column definition that exceeds the size of the target table column. Such rows can be successfully imported if code page conversion causes the source data to shrink; for example, 4-byte EUC data in the source could shrink to 2-byte DBCS data in the target, and require half the space. This option is particularly useful if it is known that the source data will fit in all cases despite mismatched column definitions.
forcecreate	Specifies that the table should be created with possible missing or limited information after returning SQL3311N during an import operation.

Table 16. IMPORT behavior when using codepage and usegraphiccodepage

codepage=N	usegraphiccodepage	IMPORT behavior
Absent	Absent	All data in the file is assumed to be in the application code page.
Present	Absent	All data in the file is assumed to be in code page N. <b>Warning:</b> Graphic data will be corrupted when imported into the database if N is a single-byte code page.
Absent	Present	Character data in the file is assumed to be in the application code page. Graphic data is assumed to be in the code page of the application graphic data.  If the application code page is single-byte, then all data is assumed to be in the application code page.  <b>Warning:</b> If the application code page is single-byte, graphic data will be corrupted when imported into the database, even if the database contains graphic columns.
Present	Present	Character data is assumed to be in code page N. Graphic data is assumed to be in the graphic code page of N.  If N is a single-byte or double-byte code page, then all data is assumed to be in code page N.  <b>Warning:</b> Graphic data will be corrupted when imported into the database if N is a single-byte code page.

**Note:**

1. The import utility does not issue a warning if an attempt is made to use unsupported file types with the **MODIFIED BY** option. If this is attempted, the import operation fails, and an error code is returned.
2. Double quotation marks around the date format string are mandatory. Field separators cannot contain any of the following: a-z, A-Z, and 0-9. The field separator should not be the same as the character delimiter or field delimiter in the DEL file format. A field separator is optional if the start and end

positions of an element are unambiguous. Ambiguity can exist if (depending on the modifier) elements such as D, H, M, or S are used, because of the variable length of the entries.

For time stamp formats, care must be taken to avoid ambiguity between the month and the minute descriptors, since they both use the letter M. A month field must be adjacent to other date fields. A minute field must be adjacent to other time fields. Following are some ambiguous time stamp formats:

```
"M" (could be a month, or a minute)
"M:M" (Which is which?)
"M:YYYY:M" (Both are interpreted as month.)
"S:M:YYYY" (adjacent to both a time value and a date value)
```

In ambiguous cases, the utility will report an error message, and the operation will fail.

Following are some unambiguous time stamp formats:

```
"M:YYYY" (Month)
"S:M" (Minute)
"M:YYYY:S:M" (Month....Minute)
"M:H:YYYY:M:D" (Minute....Month)
```

Some characters, such as double quotation marks and back slashes, must be preceded by an escape character (for example, \).

3. Character values provided for the chardel, coldel, or decpt file type modifiers must be specified in the code page of the source data.

The character code point (instead of the character symbol), can be specified using the syntax xJJ or 0xJJ, where JJ is the hexadecimal representation of the code point. For example, to specify the # character as a column delimiter, use one of the following statements:

```
... modified by coldel# ...
... modified by coldel0x23 ...
... modified by coldelX23 ...
```

4. *Delimiter considerations for moving data* lists restrictions that apply to the characters that can be used as delimiter overrides.
5. The following file type modifiers are not allowed when importing into a nickname:
  - indexif
  - indexschema
  - dldelfiletype
  - nodefaults
  - usedefaults
  - no\_type\_id filetype
  - generatedignore
  - generatedmissing
  - identityignore
  - identitymissing
  - lobsinfile
6. The **CREATE** mode is not supported for XML columns.
7. All XML data must reside in XML files that are separate from the main data file. An XML Data Specifier (XDS) (or a NULL value) must exist for each XML column in the main data file.
8. XML documents are assumed to be in Unicode format or to contain a declaration tag that includes an encoding attribute, unless the XMLCHAR or XMLGRAPHIC file type modifier is specified.

9. Rows containing documents that are not well-formed will be rejected.
10. If the **XMLVALIDATE** option is specified, documents that successfully validate against their matching schema will be annotated with the schema information as they are inserted. Rows containing documents that fail to validate against their matching schema will be rejected. To successfully perform the validation, the privileges held by the user invoking the import must include at least one of the following:
  - DBADM authority
  - USAGE privilege on the XML schema to be used in the validation
11. When multiple modifiers suffixed with **ignore**, **include**, **missing**, and **override** are specified, they are applied in the order that they are listed. In the following statement, data for implicitly hidden columns that are not identity columns is included in the input data. While data for all identity columns, regardless of their implicitly hidden status, is not.
 

```
db2 import from delfile1 of del modified by
 implicitlyhiddeninclude identitymissing insert into table1
```

However, changing the order of the file type modifiers in the following statement means that data for all implicitly hidden columns (including hidden identity columns) is included in the input data. While data for identity columns that are not implicitly hidden is not.

```
db2 import from delfile1 of del modified by
 identitymissing implicitlyhiddeninclude insert into table1
```

If the DB2\_DMU\_DEFAULT registry variable is set to **IMPLICITLYHIDDENINCLUDE**, then:

```
db2set DB2_DMU_DEFAULT=IMPLICITLYHIDDENINCLUDE
db2 import from delfile1 of del modified by identitymissing insert into table1
```

is equivalent to:

```
db2 import from delfile1 of del modified by
 implicitlyhiddeninclude identitymissing insert into table1
```

## INGEST

Ingests data from an input file or pipe into a Db2 table. The **INGEST** command provides the ability to move data into Db2 tables with no impact to running applications.

### Authorization

The privileges held by the authorization ID used to connect to the database must include:

- At least one of the following authorities:
  - DATAACCESS authority
  - CONTROL privilege on the target table
  - SELECT and INSERT privilege on the target table if the **INGEST** command specifies the INSERT statement (including as part of a MERGE statement)
  - SELECT and UPDATE privilege on the target table if the **INGEST** command specifies the UPDATE statement (including as part of a MERGE statement)
  - SELECT and DELETE privilege on the target table if the **INGEST** command specifies the DELETE statement (including as part of a MERGE statement)
  - INSERT, SELECT, and DELETE privilege on the target table if the **INGEST** command specifies the REPLACE clause

- SELECT privilege on the following catalog views:
  - SYSCAT.COLUMNNS
  - SYSCAT.DATATYPES
  - SYSCAT.INDEXES
  - SYSCAT.INDEXCOLUSE
  - SYSCAT.SECURITYPOLICIES (if the target table has a security label column)
  - SYSCAT.TABDEP
  - SYSCAT.TABLES
  - SYSCAT.VIEWS

**Note:** Users have these privileges by default unless the database was created with the RESTRICTIVE clause.

- EXECUTE privilege on the following procedures:
  - SYSPROC.DB\_PARTITION (V9.7 or earlier) or SYSPROC.DB\_MEMBERS (V9.8 or later)
  - SYSPROC.MON\_GET\_CONNECTION (V9.7 and later)
- If the target table has any triggers, the authorization ID must have sufficient privileges to execute the operations that the triggers specify.
- To insert into or update a table that has protected columns, the authorization ID must have LBAC credentials that allow write access to all protected columns in the table. Otherwise, the command fails and an error is returned.
- If an UPDATE or MERGE statement requires reading a protected column, the authorization ID must have LBAC credentials that allow read access to the column. Otherwise, the command fails and an error is returned.
- To insert into or update a table that has protected rows, the authorization ID must hold an LBAC credential that meets these criteria:
  - The LBAC credential is part of the security policy protecting the table.
  - If the security policy was defined as RESTRICT NOT AUTHORIZED WRITE SECURITY LABEL, then the LBAC credential must be granted to the authorization ID for write access

The security label on the row to be inserted, the authorization ID's LBAC credentials, the security policy definition, and the LBAC rules determine whether insert or update can be performed on the table with protected rows.

- If the **INGEST** command specifies the RESTART NEW (the default) or RESTART CONTINUE option, then SELECT, INSERT, UPDATE, and DELETE privilege on the restart table
- If the **INGEST** command specifies the RESTART TERMINATE option, then SELECT and DELETE privilege on the restart table.
- If the **INGEST** command specifies the EXCEPTION TABLE option, then INSERT privilege on the exception table

In addition, the SQL statement on the **INGEST** command is subject to the same fine grained access controls (FGAC) that it would be if the user running the ingest utility accessed the table outside of the ingest utility.

The user running the CLP must have the following file permissions:

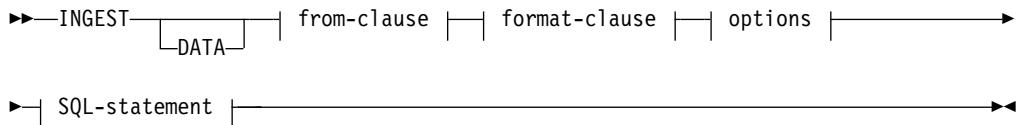
- read access to the control file
- if the **INGEST** command specifies the MESSAGES option, then:
  - write access to the directory containing the messages file

- write access to the file if the messages file already exists
- If the **INGEST** command specifies the **DUMPFILE** option, then:
  - write access to the directory containing the dump file
  - write access to the dump file if the dump file already exists

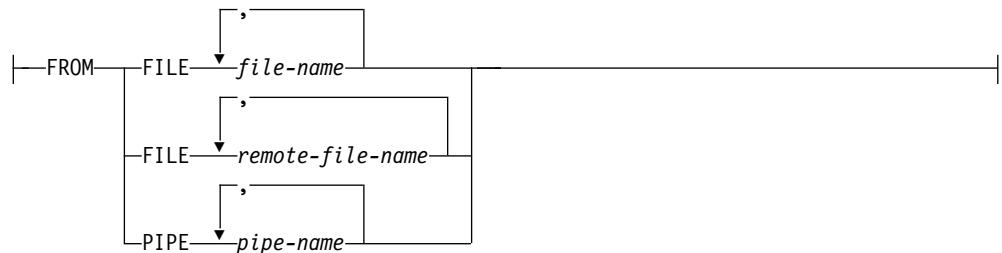
## Required connection

Database

## Command syntax



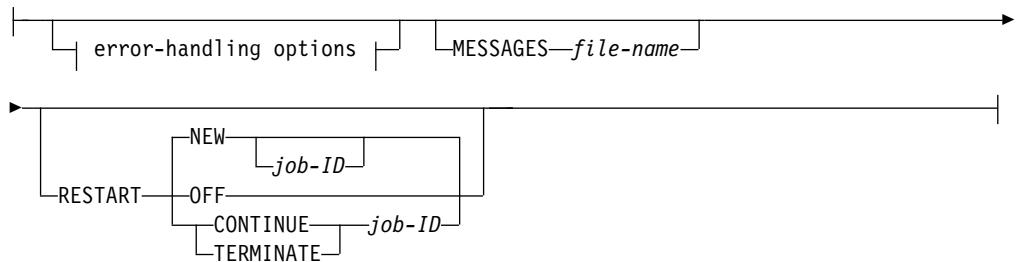
### from-clause:



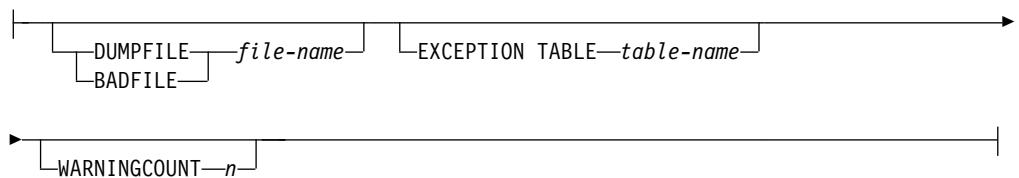
### format-clause:

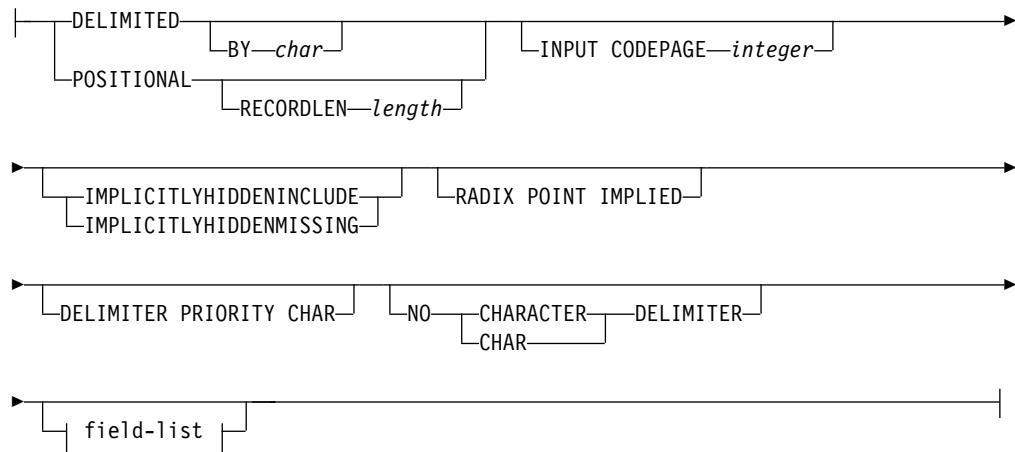
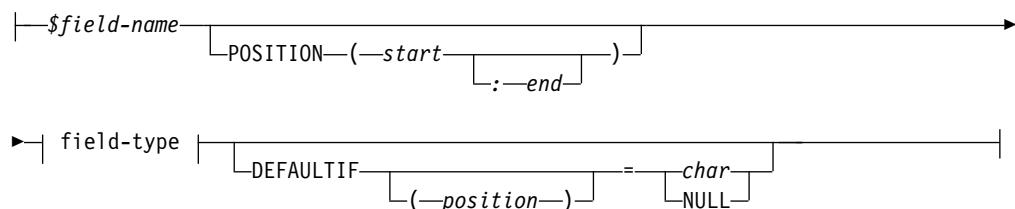


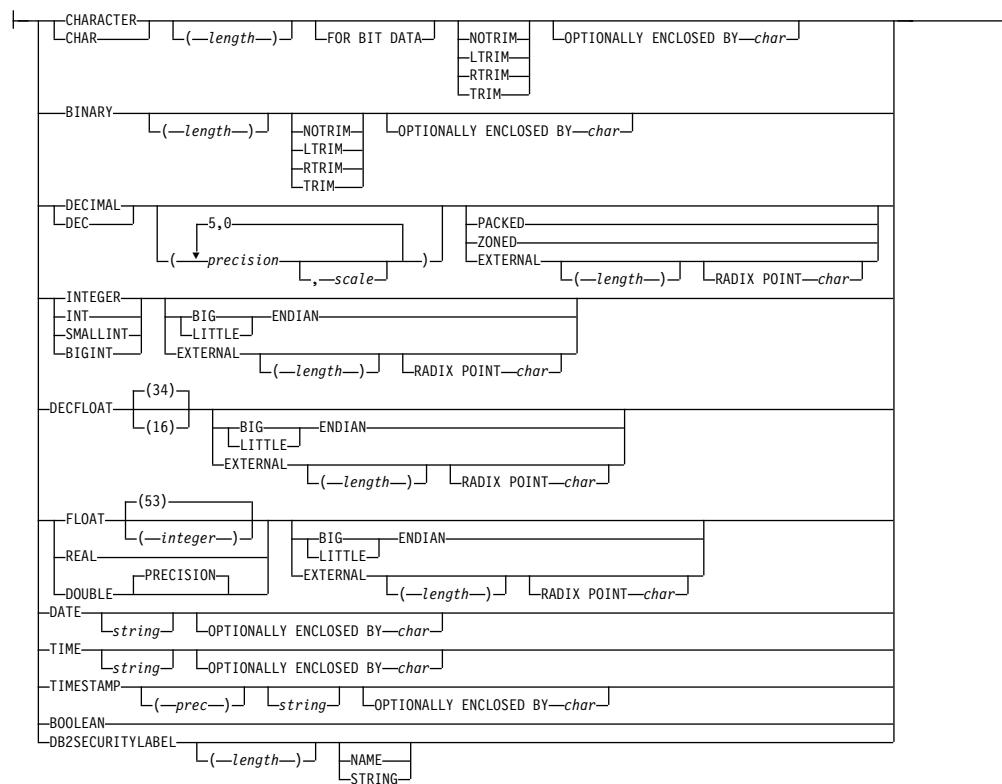
### options:



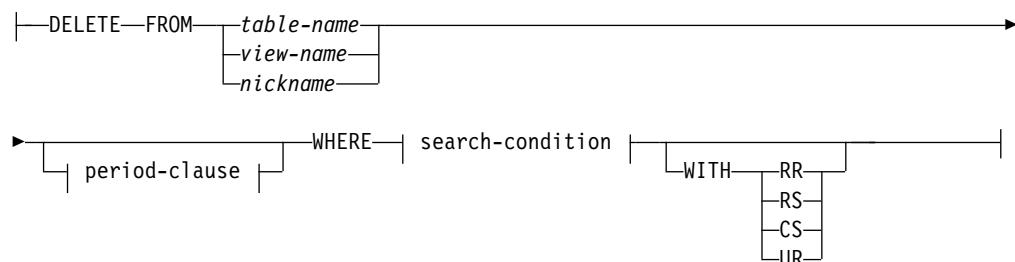
### error-handling options:



**SQL-statement:****format-definition:****field-list:****field-definition:****field-type:**



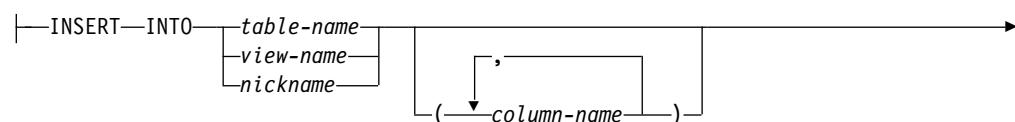
### **DELETE-statement:**

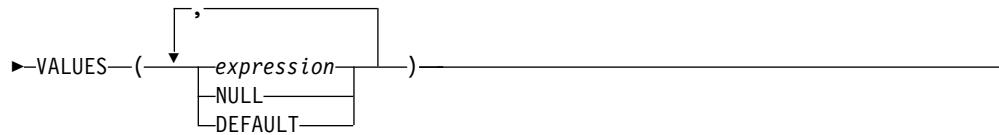


### **period-clause:**

```
FOR PORTION OF BUSINESS_TIME FROM -value1- TO -value2-
```

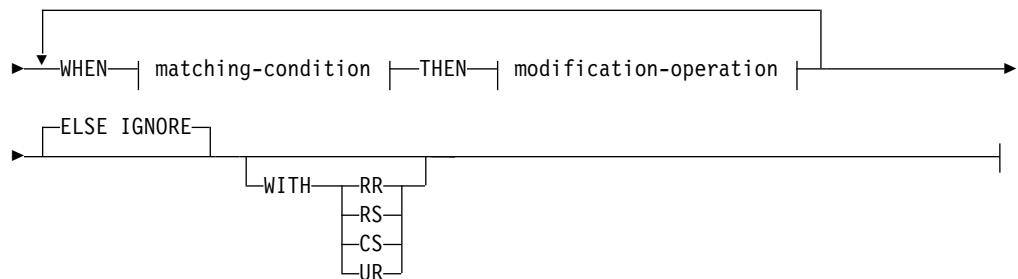
### **INSERT-statement:**





#### MERGE-statement:

$\vdash \text{MERGE INTO } [table-name] \text{ ON } search-condition \rightarrow$   
 $\quad \quad \quad [view-name]$



#### matching-condition:

$\vdash [NOT] \text{ MATCHED} \text{ AND } search-condition \rightarrow$

#### modification-operation:

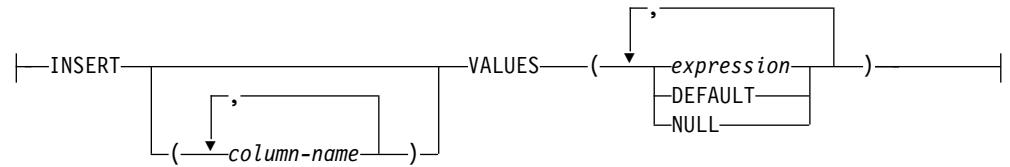
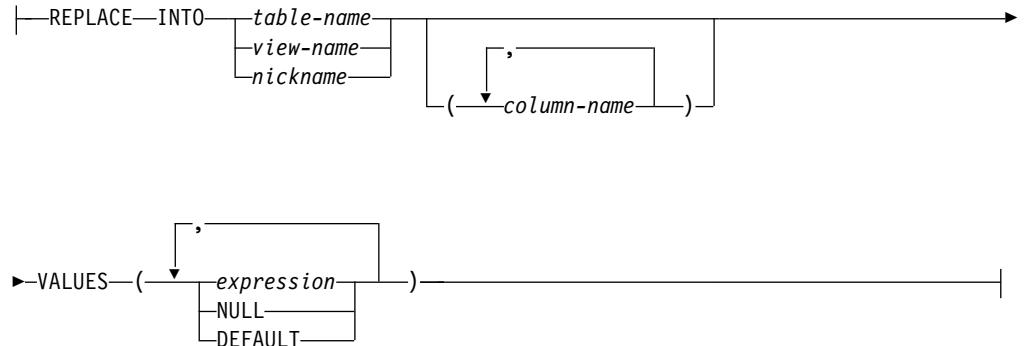
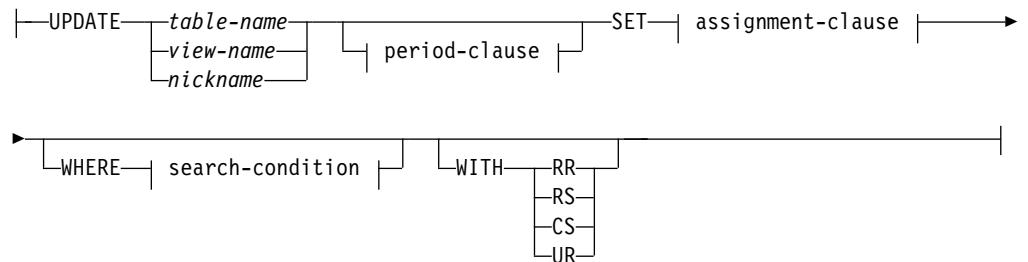
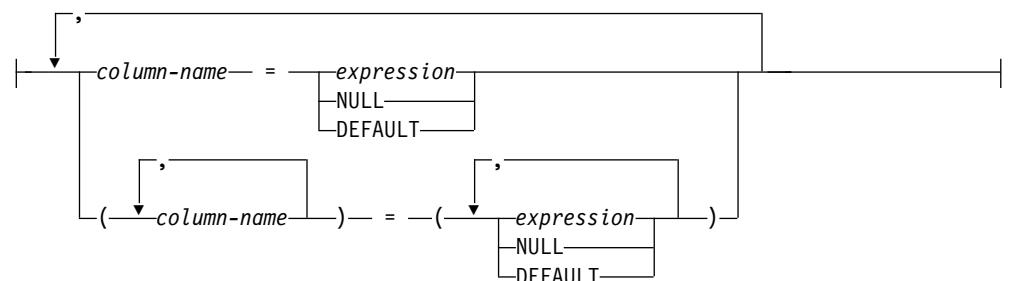
$\vdash$   
 $\quad \quad \quad \left| \begin{array}{l} \text{UPDATE } [period-clause] \text{ SET } assignment-clause \\ \text{DELETE } [period-clause] \\ \text{insert-operation} \end{array} \right| \rightarrow$

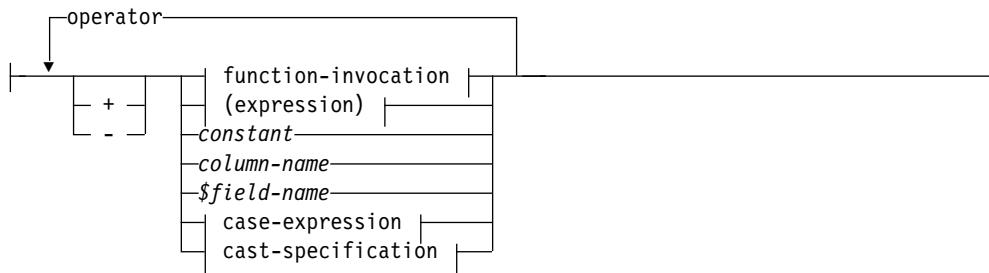
#### period-clause:

$\vdash \text{FOR PORTION OF BUSINESS\_TIME FROM } value1 \text{ TO } value2 \rightarrow$

#### assignment-clause:

$\vdash$   
 $\quad \quad \quad \left| \begin{array}{l} column-name = expression \\ \quad \quad \quad \left| \begin{array}{l} \text{DEFAULT} \\ \text{NULL} \end{array} \right| \\ \quad \quad \quad (column-name) = (expression) \\ \quad \quad \quad \left| \begin{array}{l} \text{DEFAULT} \\ \text{NULL} \end{array} \right| \end{array} \right| \rightarrow$

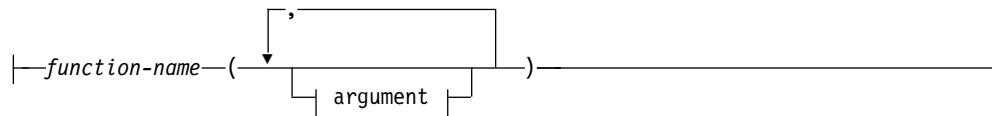
**insert-operation:****REPLACE-statement:****UPDATE-statement:****assignment-clause:****expression:**



#### **operator:**



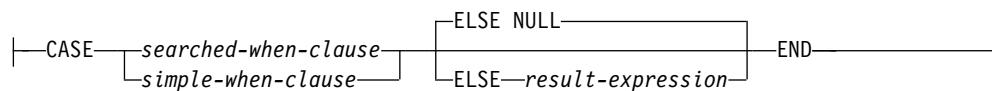
#### **function-invocation:**



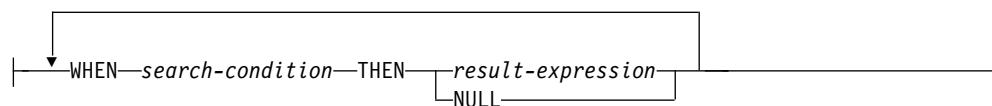
#### **argument:**



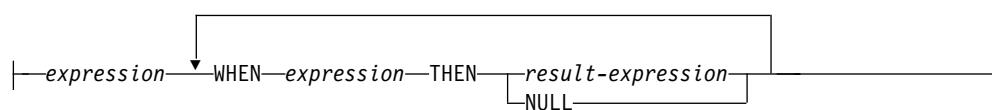
#### **case-expression:**

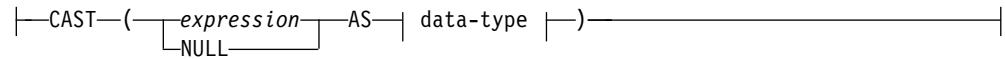
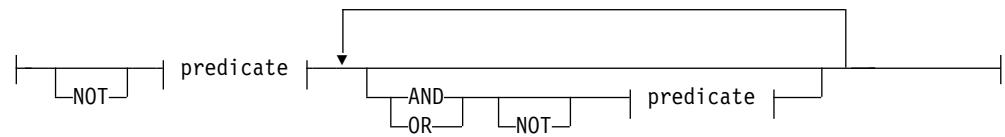
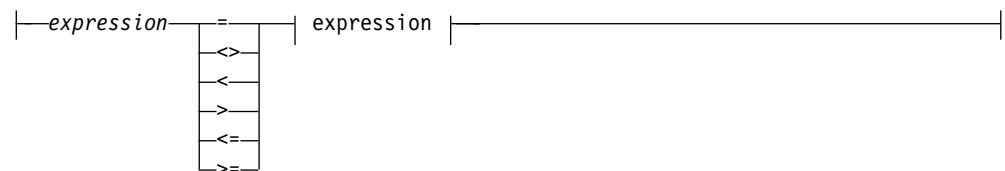
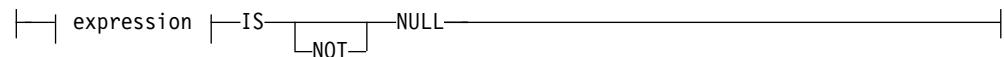


#### **searched-when-clause:**



#### **simple-when-clause:**



**cast-specification:****search-condition:****predicate:****basic-predicate:****NULL-predicate:****Command parameters****FROM**

Specifies the source of the input data. The ingest utility always reads the input data from the client.

**FILE *file-name***

Specifies that data is to be read from the specified files. For the syntax of file names, see “File and pipe names” on page 276.

**FILE *remote-file-name***

Specifies that data is to be read from remote storage, such as IBM SoftLayer Object Storage or Amazon Simple Storage Service (S3), and is accessed by using a storage access alias. Local staging space is required to temporarily store the file that is transferred from the remote storage server; refer to Remote storage requirements. The syntax of remote file names is:

`DB2REMOTE://<alias>//<storage-path>/<file-name>`

**PIPE *pipe-name***

Specifies that data is to be read from the specified pipes. For the syntax of pipe names, see “File and pipe names” on page 276.

## **FORMAT** *format-definition*

The data is in the format given by the specified format definition. The syntax of a format definition is given in the "format-definition" section described previously.

## **DUMPFILE or BADFILE** *file-name*

Specifies that rows rejected by the formatters are to be written to the specified file. The formatters reject rows due to the following types of errors:

- numbers that are invalid or out of range (based on the field type)
- dates, times, and timestamps that do not fit the specified format
- Any other errors detected by the formatter

If a relative path is specified, it is relative to the current directory and the default drive. On Linux and UNIX platforms, if the file does not exist, the ingest utility creates the file with the permission flags specified by the user's umask setting. The ingest utility uses the umask setting that was in effect at the time the Db2 CLP backend process (db2bp) started, which is usually at the first connection. If the file already exists, the ingest utility appends the records to the end of the file.

The ingest utility writes each record in the same format as it appeared in the input. This means that after correcting the errors, you can re-run the **INGEST** command using the dump file as input. However, the ingest utility might not write records in the same order that they appeared across multiple input files or within each input file. If you want the dump file to contain records in the same order that they appeared within each input file, set the *num\_formatters* configuration parameter to 1. In this case:

- If the operation is **INSERT** or **REPLACE**, records from different input files might still appear out of order but all the records from a given input file appears in the same order that they were within that file.
- If the operation is **UPDATE**, **DELETE**, or **MERGE**, all records are in the same order that they were across all input files and within each input file

If an error occurs opening or writing to the file, the ingest utility issues an error message, including the input source and line number, and ends the command. In this case, the record is not saved anywhere. (If the input is from a file, the user can get the original input record from the file.)

The dump file is guaranteed to be complete only if the **INGEST** command completes normally in a single run. If the **INGEST** command fails and the restarted command succeeds, the combination of dump files from the two commands might be missing records or might contain duplicate records.

If this parameter is not specified, the ingest utility issues an error message for each rejected row, but does not save the row anywhere.

**Note:** If you specify this parameter and any rejected input records contain sensitive data, these records appear in the dump file. You must protect the file from unauthorized access as needed.

## **EXCEPTION TABLE** *table-name*

Specifies that rows inserted by the ingest utility and rejected by Db2 with certain SQLSTATEs are to be written to the specified table. Db2 could reject rows due to the following types of errors. Note that each of these errors indicates bad data in the input file:

- For character data, right truncation occurred; for example, an update or insert value is a string that is too long for the column, or a datetime value cannot be assigned to a host variable, because it is too small.
- For binary data, right truncation occurred; for example, an update or insert value is a string that is too long for the column, or a datetime value cannot be assigned to a host variable, because it is too small.
- A null value, or the absence of an indicator parameter was detected; for example, the null value cannot be assigned to a host variable, because no indicator variable is specified.
- A numeric value is out of range.
- An invalid datetime format was detected; that is, an invalid string representation or value was specified.
- The character value for a CAST specification or cast scalar function is invalid.
- A character is not in the coded character set.
- The data partitioning key value is not valid.
- A resulting row did not satisfy row permissions.
- An insert or update value is null, but the column cannot contain null values.
- The insert or update value of the FOREIGN KEY is not equal to any value of the parent key of the parent table.
- A violation of the constraint imposed by a unique index or a unique constraint occurred.
- The resulting row of the INSERT or UPDATE does not conform to the check constraint definition.
- The value cannot be converted to a valid security label for the security policy protecting the table.
- This authorization ID is not allowed to perform the operation on the protected table.
- The component element is not defined in security label component.
- The specified security label name cannot be found for the specified security policy.
- The data type, length, or value of the argument to routine is incorrect.

The specified table must be defined as described in the “Exception tables” topic in the related links section. The restrictions listed in that section and in message SQL3604N also apply, with the following exception:

- If the target table contains a DB2SECURITYLABEL column, the exception table column corresponding to the DB2SECURITYLABEL column must be of type VARCHAR with a length of at least 128. (Type LONG VARCHAR is also permissible but has been deprecated.)

The ingest utility uses the exception table only when the operation is INSERT or REPLACE. If the operation is UPDATE, MERGE, or DELETE, and the EXCEPTION TABLE parameter is specified, the utility issues an error.

If an error occurs inserting into the table, the ingest utility issues an error message, including the input source and line number, and continues. In this case, the record is not saved anywhere. (If the input is from a file, the user can get the original input record from the file.)

If the table name is not fully qualified, the ingest utility uses the value of CURRENT SCHEMA for the schema name. If the EXCEPTION TABLE

parameter is not specified, the ingest utility issues an error message for each rejected row but does not save the row anywhere.

#### **WARNINGCOUNT *n***

Specifies that the **INGEST** command is to stop after *n* warning and error messages have been issued. This parameter covers only certain types of errors. For more information, see Categories of errors. The number is the total for all input sources. If this limit is reached in the middle of a transaction, the transaction is rolled back. However, rows that were committed to the target table before this limit was reached remain in the table. If the number is 0, the **INGEST** command continues regardless of the number of warnings and errors. The range is 0 - 2,147,483,647 (max 32-bit signed integer). The default is 0.

#### **MESSAGES *file-name***

Specifies the file to receive informational, warning, and error messages.

If a relative path is specified, it is relative to the current directory and the default drive. On Linux and UNIX platforms, if the file does not exist, the ingest utility creates the file with the permission flags specified by the user's umask setting. The ingest utility uses the umask setting that was in effect at the time the Db2 CLP backend process (db2bp) started, which is usually at the first connection. If the file already exists, the ingest utility appends to the end of the file. If this parameter is not specified, the ingest utility writes messages to standard output.

Even when this parameter is specified, the ingest utility writes messages to standard output in the following cases:

- syntax errors
- an input file is not found or not readable
- target or exception table is not found
- the dump file or messages file cannot be opened
- other errors detected at start-up

Also, the summary messages issued at the end (showing number of rows read, inserted, and so on, and the total number of warnings and errors) are always written to standard output.

If an error occurs opening or writing to the messages file, the ingest utility issues an error message and ends the command.

For examples of messages from the **INGEST** command, see "Messages from the **INGEST** command" on page 275.

#### **RESTART NEW *job-ID***

Specifies that if the **INGEST** command fails before completing, it can be restarted from the point of the last commit by specifying the **RESTART CONTINUE** option on a later **INGEST** command. The *job-ID* is a string of up to 128 bytes that uniquely identifies the **INGEST** command. This job-ID must be unique across all **INGEST** commands in the current database that specified the **RESTART** option and are not yet complete. (These could be commands that are still running or that failed before completing.) Once the **INGEST** command completes, you can reuse the job-ID on the **RESTART** parameter of a later **INGEST** command. If the job-ID is omitted, the ingest utility generates one. This option is the default.

Before using this option, you must have created the restart log table. For more information, see "Restarting a failed INGEST command" in the following related links section.

**RESTART OFF**

Specifies that no restart information is to be saved. If the **INGEST** command fails before completing, it cannot be restarted using the **RESTART CONTINUE** option. If you want to rerun the command to completion, you need to restore the target table to its state before running the **INGEST** command, and rerun the **INGEST** command with the same input data.

**RESTART CONTINUE *job-ID***

Specifies that the ingest utility is to restart a previous **INGEST** command that specified the **RESTART NEW** option and failed before completing. The *job-ID* specified on this option must match the job-ID specified on the previous **INGEST** command. This restarted command is also restartable. Once the restarted command completes, you can reuse the job-ID on the **RESTART NEW** parameter of a later **INGEST** command. For more information, see "Restarting a failed INGEST command" in the following related links section.

**RESTART TERMINATE *job-ID***

Specifies that the ingest utility is to clean up the restart information for a previous **INGEST** command that specified the **RESTART NEW** option and failed before completing. The string specified on this option must match the string specified on the previous **INGEST** command.

This option is intended for when a previous restartable **INGEST** command failed, and you plan to never resume the job. Once you specify this option, the **INGEST** command that failed earlier can no longer be restarted. You can, however, reuse the string on the **RESTART NEW** parameter of a later **INGEST** command.

**Note:** Unlike with the **TERMINATE** parameter of the **LOAD** command, data that the original **INGEST** command committed before its failure is still in the target table. For more information, see "Terminating a failed INGEST command" in the following related links section.

**DELIMITED BY *char***

Specifies that each input record is a sequence of text fields delimited by the specified character. The delimiter can be any single-byte character except the following values:

- the null character (X'00')
- blank (X'20')
- carriage return or line feed (X'0D' or X'0A')
- dot (X'2E'), regardless of what is specified on the RADIX POINT clause
- the decimal point (specified by the RADIX POINT clause; the default is the dot .)
- the string delimiter (specified by the OPTIONALLY ENCLOSED BY clause; the default is the double quote ")

If the input data code page is a DBCS or EUC code page, the character must be in the range X'01' to X'3F', inclusive. Note that this excludes the vertical bar (| or X'7C'). If the input data code page is not a single-byte code page, the character must be in the range X'01' to X'7F', inclusive. If the input code page is a single-byte code page, the character can be in the range X'01' to X'FF'.

The default is a comma ,.

**string**

The metavariable **string** specifies any character string constant, including:

- A sequence of characters that starts and ends with a string delimiter which is an apostrophe (').
- A hexadecimal constant: X followed by a sequence of hex characters that starts and ends with an apostrophe.
- A Unicode string constant: U& followed by a sequence of characters that starts and ends with an apostrophe and that is optionally followed by the UESCAPE clause.
- A graphic string constant: G or N followed by a sequence of double-byte characters that starts and ends with an apostrophe.
- A hexadecimal graphic string constant: GX followed by a sequence of hex characters that starts and ends with an apostrophe.
- A UCS-2 graphic string constant: UX followed by a sequence of hex characters that starts and ends with an apostrophe.
- A binary constant: BX followed by a sequence of hex characters that starts and ends with an apostrophe.

If the string contains the enclosing character, it must be doubled inside the string. For example, if the string is "don't know" and the enclosing character is a single quote, specify 'don''t know'. Examples of this are 'This is a string', X'303132', and U&'Unicode chars'.

#### **char**

The metavariable **char** specifies a character string constant that is 1 byte in length. Examples of this are 'A' and X'30'.

#### **POSITIONAL**

Specifies that each input record is a sequence of text and/or binary fields identified by their position in the input record. The position of each field is given by the POSITION clause in the field definition.

#### **RECORDLEN *length***

Specifies that the input is fixed-length records and each record has the specified length in bytes. Any carriage return or line feed characters (X'0D' or X'0A') in the record are assumed to be part of the data. Note that the record length that some editors display does not include these characters, so you might need to add 1 or 2 to the record length that the editor displays. If the input contains binary data, this parameter is required.

The range is 1 - 32,767. If RECORDLEN specifies a length less than the sum of the field lengths specified on each field definition, the ingest utility issues an error message and exits. If RECORDLEN specifies a length greater than the maximum field end position, the ingest utility ignores the bytes past the end of the field with the maximum end position. If the last record is too short, the ingest utility issues an error message and rejects the record.

If this parameter is omitted, the ingest utility recognizes both of the following as the record (row) delimiter, regardless of platform:

- line feed (X'0A')
- one or more carriage returns followed by a line feed (X'0D0A')

#### **INPUT CODEPAGE *integer***

Specifies the code page of the input data. The ingest utility supports the

code pages listed in the “Supported territory codes and code pages” topic in the *Related links* section, except the following values :

- 1200 (UTF-16)
- any code pages listed as "host" code pages

The default is the Db2 application code page.

If the input data is not in the code page specified by this parameter, the ingest utility does not issue an error. However, if the ingest utility or Db2 needs to convert the input data into another code page, the utility might convert some characters to the substitute character (Unicode U+001A) or other characters that you did not intend. For more information, see the topic on “Code page considerations for the ingest utility”.

#### **IMPLICITLYHIDDENINCLUDE**

Specifies that implicitly hidden columns are included in the default column list. If the *DB2\_DMU\_DEFAULT* registry variable on the client-side is also specified, then this keyword takes precedence. This keyword is only allowed for **INSERT** statements where there is not a column list following the table name. If the SQL statement is not an **INSERT** or there is a column list after the table name, then an error is returned (SQLCODE -2918). This option does not apply to the hidden **RANDOM\_DISTRIBUTION\_KEY** column of a random distribution table using the random by generation method.

#### **IMPLICITLYHIDDENMISSING**

Specifies that implicitly hidden columns are omitted from the default column list. If the *DB2\_DMU\_DEFAULT* registry variable on the client-side is also specified, then this keyword takes precedence. This keyword is only allowed for **INSERT** statements where there is not a column list following the table name. If the SQL statement is not an **INSERT** or there is a column list after the table name, then an error is returned (SQLCODE -2918). This option does not apply to the hidden **RANDOM\_DISTRIBUTION\_KEY** column of a random distribution table using the random by generation method

#### **RADIX POINT IMPLIED**

The location of an implied decimal point is determined by the column definition; it is no longer assumed to be at the end of the value. For example, the value 12345 is ingested into a DECIMAL(8,2) column as 123.45, not 12345.00. The PACKED decimal option and the RADIX POINT option are not compatible (SQLCODE -3525).

This parameter is equivalent to the **implieddecimal** modifier on the LOAD and IMPORT commands.

#### **DELIMITER PRIORITY CHAR**

The current default priority for delimiters is record delimiter, character delimiter, column delimiter. This modifier protects existing applications that depend on the older priority by reverting the delimiter priorities to character delimiter, record delimiter, column delimiter.

For example, assume the following delimited data file:

```
"Smith, Joshua",4000,34.98<row delimiter>
"Vincent,<row delimiter>, is a manager", ...
... 4005,44.37<row delimiter>
```

With DELIMITER PRIORITY CHAR specified, this data file has only two rows. The second <row delimiter> is interpreted as part of the first data column of the second row. The first and the third <row delimiter> are

interpreted as actual record delimiters. If DELIMITER PRIORITY CHAR specified is not specified, this data file has three rows; each delimited by a <row delimiter>.

This parameter is equivalent to the **de1prioritychar** modifier on the LOAD and IMPORT commands.

POSITIONAL input is not compatible (SQLCODE -3525).

#### NO CHAR DELIMITER

When you use the INGEST utility, all bytes that are found between the column delimiters are considered to be part of the column's data. Character delimiters are parsed as part of column data. Do not specify this option if the data was exported by using a Db2 database system (unless the **nochardel** modifier was specified during export). The **nochardel** modifier is provided to support vendor data files that do not have character delimiters. Improper usage might result in data loss or corruption. The DELIMITER PRIORITY CHAR and OPTIONALLY ENCLOSED BY parameters are not compatible (SQLCODE -3525).

This parameter is equivalent to the **nochardel** modifier on the LOAD and IMPORT commands.

#### field-list

Specifies the list of field definitions. If the list is omitted, it defaults as described in Default field definition list.

#### \$field-name

Field names can be from 2 to 129 bytes in length (including the dollar sign) and follow the same rules as SQL identifiers. You can also specify delimited field names by specifying a dollar sign followed by a delimited name, for example, \$"My Field Name".

If the SQL statement specifies a table name column name that starts with a dollar sign, specify the table name or column name as a delimited identifier. For example, the ingest utility interprets the following identifiers as indicated:

*Table 17. The meaning of field name identifiers*

Identifier	Meaning
\$name	field "\$NAME"
\$NAME	field "\$NAME"
\$\$"My Name"	field "\$My Name"
"\$name"	column "\$name" (in lowercase)
"\$NAME"	column "\$NAME" (in upper case)
"\$My Name"	column "\$My Name"

If you specify the **INGEST** command on the system command line in UNIX, in order to avoid the field names being seen as environment variables, you need to put the command in single quotation marks. For more information, see "Using INGEST on the system command line (UNIX)" on page 273.

#### POSITION (start:end)

This clause is valid only when the format is POSITIONAL. It specifies the starting position and optionally the ending position of the field within the record. The units are bytes. The first byte in the record is at position 1. If the ending position is specified, it must be greater than or equal to the starting position.

Positions specified on different fields can overlap. For example, if the full name of an American state is in positions 1 - 10, you could define the following two fields:

- \$state\_full\_name POSITION(1:10)
- \$state\_abbreviation POSITION(1:2)

If there is data outside the specified field positions, the ingest utility ignores it. For example, if the field definition list specifies two fields at POSITION(1:10) and POSITION(21:30), the ingest utility ignores data in positions 11:20 and any data past position 30 to the end of the record.

If the POSITION clause is omitted, the starting position is assumed to be the next byte following the previous field, or position 1 if this is the first field. If the ending position is omitted, the utility uses a default or issues an error, as described in “Rules and defaults for field lengths” on page 278.

When the field definition does not specify a length, the ingest utility uses a length of end\_position - start\_position + 1. This length is subject to the following restrictions:

- Fields of type SMALLINT, INTEGER, BIGINT, DECIMAL, REAL, FLOAT, and DECFLOAT with the EXTERNAL modifier have a maximum length of 50.
- If a format string is specified for fields of type DATE, TIME, and TIMESTAMP(p), the field length must be greater than or equal to length of the shortest value that matches the format string
- If a format string is not specified:
  - For DATE, the field length must be between 8 and 10, inclusive.
  - For TIME, the field length must be between 4 and 8, inclusive.
  - For TIMESTAMP, the field length must be between 19 and 32, inclusive.

#### **field-type**

Specifies the data type of the field.

#### **CHARACTER (*length*) / BINARY (*length*)**

Character data or binary data.

The code page is specified by the INPUT CODEPAGE parameter. The default is the application code page.

For information about the default length, see “Rules and defaults for field lengths” on page 278.

#### **NOTRIM, LTRIM, RTRIM, TRIM**

Specifies that leading blanks (LTRIM), trailing blanks (RTRIM), or both leading and trailing blanks (TRIM) in the field and not enclosed by the string delimiter are not part of the string. In the case of binary strings, LTRIM, RTRIM, and TRIM specify hexadecimal zeros are not part of the string. When the format is DELIMITED, the default is TRIM. When the format is POSITIONAL, the default is NOTRIM. If this parameter is specified on any character field, it must have the same value on all other character fields.

#### **OPTIONALLY ENCLOSED BY *char***

This clause is valid only when the format is DELIMITED.

The string can be enclosed by the specified character. The restrictions are the same as for the field delimiter. In addition, the

character cannot be the same as the field delimiter or the decimal point. If this parameter is specified on any character, binary, date, time, or timestamp field, it must have the same value on all other character, binary, date, time, and timestamp fields.

The utility uses the following algorithm to determine whether the value starts with the delimiter:

- If the TRIM or LTRIM option is specified (or defaults), the utility tests the first character in the field after trimming leading blanks (in the case of character strings) or hexadecimal zeros (in the case of binary strings).
- If the RTRIM or NOTRIM option is specified, the utility tests the first character in the field. (In other words, when RTRIM or NOTRIM is specified, the utility does not skip over leading blanks to locate the string delimiter.)

Except for record delimiters, the utility considers all characters between the enclosing characters to be part of the string. If the string contains the enclosing character, it must be doubled inside the string. For example, if the string is don't know and the enclosing character is a single quote, specify 'don''t know'. If the string does not end with the enclosing character, the utility considers the opening delimiter to be part of the string.

The utility issues warning SQL3114W under the following conditions:

- TRIM or RTRIM is specified (or defaults) and there are extra non-blank characters between the closing delimiter and the next field delimiter (or end of record).
- NOTRIM or LTRIM is specified and there are extra characters (including blanks) between the closing delimiter and the next field delimiter (or end of record).

When this parameter is not specified, the default is OPTIONAL  
ENCLOSED BY '\"'. In that case, if the value does not start with a double quote, the utility considers any character (other than the field delimiter) around the string to be part of the string.

## FOR BIT DATA

**Note:** This option is applicable only for CHARACTER data type. Specifies that the field contains bit data and that the ingest utility is not to convert it from the input data code page to the ingest utility application code page. If this field is used to assign to a column that specifies FOR BIT DATA, it is strongly recommended that the field definition also specify FOR BIT DATA. Otherwise, the value assigned to the column is unpredictable, because of how the ingest utility sometimes optimizes code conversion.

## INTEGER/SMALLINT/BIGINT EXTERNAL (*length*)

A character string of up to *length* bytes representing a number. The string can be an integer, decimal, or floating point constant. If the string specifies a decimal or floating point value, the ingest utility converts it to the specified integer type by truncating the fractional part. If the string is not a valid number, or the number is out of range, the ingest utility issues an error message and rejects the record. For more information, see "Handling of invalid numeric data" on page 284.

Use EXTERNAL with numeric field types to indicate that the field value is specified as ASCII characters rather than in binary. If EXTERNAL is specified on any integer field, it must be specified on all other integer, decfloat, and float fields.

For information about default length, see “Rules and defaults for field lengths” on page 278.

#### **DECIMAL (*precision*, *scale*) EXTERNAL (*length*)**

A character string of up to *length* bytes representing a decimal number. The string can be an integer, decimal, or floating point constant. The ingest utility converts it to a decimal value with the specified precision and scale. If the string specifies a decimal value with a scale larger than the scale specified on the field type, the ingest utility truncates the fractional part of the value with no warning or error. If the string specifies a decimal value with a scale smaller than the scale specified on the field type, the ingest utility pads the fractional part of the value with zeros. If the string is not a valid number, or the number is out of range (other than the scale), the ingest utility issues an error message and rejects the record. For more information, see “Handling of invalid numeric data” on page 284.

The precision can range from 1 to 31. The scale can range from 0 to the precision. The default is (5,0). For more information about default length, see “Rules and defaults for field lengths” on page 278.

If EXTERNAL is specified on any decimal field, it must be specified on all other decimal fields.

#### **DECFLOAT (16|34) EXTERNAL (*length*)**

A character string of up to *length* bytes representing a decimal floating point number. The string can be an integer, decimal, or floating point constant, or a decimal floating point special value. The ingest utility converts it to a decimal floating point value of the specified precision. If the string is not a valid number or decimal floating point special value, or the number is out of range, the ingest utility issues an error message and rejects the record. For more information, see “Handling of invalid numeric data” on page 284. The precision can be either 16 or 34 (the default).

For more information about the default length, see “Rules and defaults for field lengths” on page 278.

If EXTERNAL is specified on any decfloat field, it must be specified on all other integer, decfloat, and float fields.

#### **FLOAT(*integer*) EXTERNAL(*length*)**

A character string of up to *length* bytes representing a floating point number. The string can be an integer, decimal, or floating point constant. If the string is not a valid number, or the number is out of range, the ingest utility issues an error message and rejects the record. For more information, see “Handling of invalid numeric data” on page 284.

The value of the integer must be in the range 1 through 53. Values 1 through 24 indicate single precision, and values 25 through 53 indicate double precision. The default is 53. You can also specify:

**REAL** For single-precision floating-point.

**DOUBLE, DOUBLE PRECISION, or FLOAT**

For double-precision floating-point.

If EXTERNAL is specified on any float field, it must be specified on all other integer, decfloat, and float fields.

For information about the default length, see “Rules and defaults for field lengths” on page 278.

#### RADIX POINT *char*

The character to use as the decimal point. The restrictions are the same as those for the field delimiter. In addition, the character cannot be the same as the field delimiter or the string delimiter. If this parameter is specified on any integer, decimal, decfloat, or float field, it must have the same value on all other integer, decimal, decfloat, and float fields. The default is a dot  
..

#### INTEGER, SMALLINT, or BIGINT

An integer of the specified type in binary. These types can be specified only when the format is POSITIONAL and the RECORDLEN parameter specified. The following can also be specified:

##### BIG | LITTLE ENDIAN

Specifies whether the integer is in big endian format (most significant byte at low address) or little endian format (least significant byte at low address). This option applies to integer, float, and decfloat types, but not decimal types. The default is the default format on the current hardware platform where the ingest utility is running.

##### DECIMAL (*precision, scale*) PACKED | ZONED

A decimal number of the specified precision and scale in packed or zoned format. These types can be specified only when the format is POSITIONAL and the RECORDLEN parameter is specified. The precision can range from 1 to 31. The scale can range from 0 to the precision. The default is (5,0). The PACKED/ZONED setting must be the same on all other decimal fields. The default is PACKED.

##### DECFLOAT(16 | 34)

A decimal floating point number of the specified precision in binary. The precision can be either 16 or 34 (the default). This type can be specified only when the format is POSITIONAL and the RECORDLEN parameter is specified.

##### FLOAT(*integer*)

A single- or double-precision floating point number of the specified size in binary (IEEE floating point format). The value of the integer must be in the range 1 through 53. Values 1 through 24 indicate single precision and values 25 through 53 indicate double precision. The default is 53. These types can be specified only when the format is POSITIONAL and the RECORDLEN parameter is specified. You can also specify:

**REAL** For single-precision floating-point.

##### DOUBLE, DOUBLE PRECISION, or FLOAT

For double-precision floating-point.

##### DATE, TIME, TIMESTAMP

A date, time, or timestamp specified as a string. If the database has the **date\_compat** database configuration parameter set to ON, DATE is equivalent to TIMESTAMP(0).

For information about the default length, see “Rules and defaults for field lengths” on page 278.

##### *precision*

Specifies the precision of a timestamp. The range is 0 - 12. The

default is 6. If the input data specifies a timestamp with a precision larger than the precision specified on the field type, the ingest utility truncates the fractional part of the timestamp with no warning or error (provided that the timestamp has the format specified on the format string). If the input data specifies a timestamp with a precision smaller than the precision specified on the field type, the ingest utility pads the fractional part of the timestamp with zeros.

**string** Specifies the format of the date, time, or timestamp value. The elements of the format string are those currently supported by the **IMPORT** and **LOAD** commands. For more information, see the descriptions of the `dateformat`, `timeformat`, and `timestampformat` file type modifiers in the “**IMPORT command**” topic.

If the format is POSITIONAL and the string is longer than the length specified by the POSITION parameter, the ingest utility issues an error. For example, if the string is 'yyyy-mm-dd' (10 bytes), but the position is 1:6, the ingest utility issues an error.

The date, time, or timestamp value in the input data must match the format, except that you can omit sub-fields on the right. For example, if the timestamp format is "yyyy/mm/dd hh:mm:ss.uuu", the following timestamps are valid:

```
2010/06/03 12:34
2010/06/03 12:34:56
2010/06/03 12:34:56.1
2010/06/03 12:34:56.12
2010/06/03 12:34:56.123
```

However, "2010/06/03 12:34:56.1234" is not valid. When you omit sub-fields, they default as described in the descriptions of the `dateformat`, `timeformat`, and `timestampformat` file type modifiers in the “**IMPORT command**” topic.

There is one exception to the previous description of omitting sub-fields: When the format is POSITIONAL and the field is the last field in the record and the record ends before the field's end position, the utility issues a warning and uses NULL for the value.

If the date, time, or timestamp value is not in the specified format (other than sub-fields missing from the right), the ingest utility issues an error message and rejects the row.

The following rules also apply

- If this parameter is specified on any DATE field, it must also be specified and have the same value on all other DATE fields. If the database has the `date_compat` database configuration parameter on (in which case, field type DATE is equivalent to `TIMESTAMP(0)`), it must also be specified and have the same value on all other TIMESTAMP fields.
- If it is specified on any TIME field, it must also be specified and have the same value on all other TIME fields.
- If it is specified on any TIMESTAMP field, it must also be specified and have the same value on all other TIMESTAMP fields. If the database has the `date_compat` database configuration parameter on (in which case, field type DATE is equivalent to `TIMESTAMP(0)`), it must also be specified and have the same value on all other DATE fields.

If the format string is not specified, the ingest utility recognizes various formats, as shown in Table 18.

*Table 18. Default values for DATE, TIME, and TIMESTAMP*

Field type	Default format
DATE	<ul style="list-style-type: none"> <li>If the <b>date_compat</b> database configuration parameter is set to OFF, then:           <ul style="list-style-type: none"> <li>'yyyyymmdd' (delimited format only)</li> <li>'yyyy-mm-dd'</li> <li>'mm/dd/yyyy'</li> <li>'dd.mm.yyyy'</li> </ul> </li> <li><b>Note:</b> In all but the first format, the month and day can also be specified as a single digit, for example, 'yyyy-m-d'.</li> <li>If the <b>date_compat</b> database configuration parameter is set to ON, then the same defaults as <b>TIMESTAMP(0)</b>.</li> </ul>
TIME	<ul style="list-style-type: none"> <li>'hh.mm.ss'</li> <li>'hh:mm tt'</li> <li>'hh:mm:ss'</li> </ul>
TIMESTAMP	<ul style="list-style-type: none"> <li>'yyyy-mm-dd-hh.mm.ss.aaaaaaaaaaaaaa' or 'yyyy-mm-dd hh:mm:ss.aaaaaaaaaaaaaa'</li> <li>'yyyy-mm-dd-hh.mm.ss.aaaaaaaaaaaaaa'</li> <li>'yyyy-mm-dd hh:mm:ss.aaaaaaaaaaaaaa'</li> <li>'yyyy-mm-dd'</li> <li>'mm/dd/yyyy'</li> <li>'dd.mm.yyyy'</li> <li>'yyymmdd' (delimited format only)</li> </ul> <p><b>Note:</b> In all but the first format, the month and day can also be specified as a single digit, for example, 'yyyy-m-d-hh.mm.ss.aaaaaaaaaaaaaa'.</p>

#### OPTIONALLY ENCLOSED BY *char*

This clause is valid only when the format is DELIMITED.

The string can be enclosed by the specified character. The restrictions are the same as for the field delimiter. In addition, the character cannot be the same as the field delimiter or the decimal point. If this parameter is specified on any character, binary, date, time, or timestamp field, it must have the same value on all other character, binary, date, time, and timestamp fields.

The utility uses the following algorithm to determine whether the value starts with the delimiter:

- If the TRIM or LTRIM option is specified (or defaults), the utility tests the first character in the field after trimming leading blanks (in the case of character strings) or hexadecimal zeros (in the case of binary strings).
- If the RTRIM or NOTRIM option is specified, the utility tests the first character in the field. (In other words, when RTRIM or

NOTRIM is specified, the utility does not skip over leading blanks to locate the string delimiter.)

Except for record delimiters, the utility considers all characters between the enclosing characters to be part of the string. If the string contains the enclosing character, it must be doubled inside the string. For example, if the string is don't know and the enclosing character is a single quote, specify 'don''t know'. If the string does not end with the enclosing character, the utility considers the opening delimiter to be part of the string.

The utility issues warning SQL3114W under the following conditions:

- TRIM or RTRIM is specified (or defaults) and there are extra non-blank characters between the closing delimiter and the next field delimiter (or end of record).
- NOTRIM or LTRIM is specified and there are extra characters (including blanks) between the closing delimiter and the next field delimiter (or end of record).

When this parameter is not specified, the default is OPTIONALY ENCLOSED BY ''''. In that case, if the value does not start with a double quote, the utility considers any character (other than the field delimiter) around the string to be part of the string.

#### **BOOLEAN**

A Boolean value.

For Boolean columns, the supported values during data ingest are value 1 or value 0 only.

#### **DB2SECURITYLABEL (*length*)**

Specifies a Db2 security label. If neither NAME nor STRING is specified and the format is POSITIONAL, the default format is encoded numeric format; otherwise an error is returned.

For information about the default length, see "Rules and defaults for field lengths" on page 278.

#### **NAME**

The Db2 security label is specified by its name. If the format is DELIMITED, either NAME or STRING must be specified. If this parameter is specified on any DB2SECURITYLABEL field, it must have the same value on all other DB2SECURITYLABEL fields. If no security label exists with the indicated name for the security policy protecting the table, the row is not loaded and a warning is returned.

#### **STRING**

The Db2 security label is specified in string format. If the format is DELIMITED, either NAME or STRING must be specified. If this parameter is specified on any DB2SECURITYLABEL field, it must have the same value on all other DB2SECURITYLABEL fields. If a string is not in the proper format, the row is not loaded and a warning is returned. If the string does not represent a valid security label that is part of the security policy protecting the table, the row is not loaded and a warning is returned.

The default is encoded numeric format and is allowed only when the format is POSITIONAL.

#### **DEFAULTIF = NULL**

Specifies that if the field is empty, then the utility considers the field value to be the default value of the table column to which the field is assigned. There must be at least one space between the DEFAULTIF keyword and the equal sign. A field is considered empty if any of the following conditions are true:

- When the input format is DELIMITED, and any of the following conditions are true:
  - There are two adjacent delimiters.
  - There are two delimiters with only blanks between them and the NOTRIM option is not specified.
  - The record ends at the end of a previous field.
- When the input format is POSITIONAL and the record ends at the end of a previous field.

This parameter is equivalent to the **usedefaults** modifier on the LOAD and IMPORT commands.

#### **DEFAULTIF (*position*) = *char***

Specifies a input value for a column in the input file to convert to the database table column's default value. The position is optional and can be specified only if the format is POSITIONAL. If the position is specified, the utility reads the character from the input record before applying any specified or default trim option. The position does not have to be in the field. If the position is omitted, the utility first applies any specified or default trim option and then reads the first character of the field. In either case, if the character read from the input record matches the one specified, the utility considers the field value to be the default value of the table column to which the field is assigned.

The DEFAULTIF parameter has the following restrictions:

- When the position is omitted, there must be at least one space between DEFAULTIF and the equal sign. Otherwise a syntax error occurs.
- The DEFAULTIF character can be any single-byte character except the following values:
  - the null character (X'00')
  - carriage return or line feed (X'0D' or X'0A')

If the input data code page is a DBCS or EUC code page, the character must be in the range X'01' to X'3F', inclusive. If the input data code page is not a single-byte code page, the character must be in the range X'01' to X'7F', inclusive. If the input code page is a single-byte code page, the character can be in the range X'01' to X'FF'.

- The field must be assigned to only one column and cannot be part of an expression that is assigned to that column. For example, consider the following **INGEST** command:

```
INGEST FROM FILE ...
 UPDATE my_table
 SET (c1, c2, c3, c4, c5) =
 ($field1, $field2, $field2, $field3, $field4+$field5)
 WHERE $field3 = 1;
```

Only \$field1 can specify DEFAULTIF. \$field2 cannot because it is assigned to multiple columns. \$field3 cannot because it is also used in a predicate. \$field4 and \$field5 cannot because they are used in an expression.

- The default value of the table column must be a constant or NULL. It cannot be a special register.

**Note:** If a column is nullable (that is, NOT NULL is not specified on the column definition) and the WITH DEFAULT clause is not specified on the column definition, the column still has a default value of NULL.

- If the table column type differs from the field type, the ingest utility converts the default value to the field type, applying the same rules used to convert input data to the field type. For example, if the table column is defined as FLOAT WITH DEFAULT 3.7 and the field is defined as INTEGER DEFAULTIF=..., the ingest utility uses a default value of 3. Similarly, if the length of the table column's default value is greater than the field length, the utility truncates the default value to the field length.

If these restrictions are violated, the ingest utility issues an error and the **INGEST** command ends.

## Examples

### Basic ingest examples

The following example inserts data from a delimited text file:

```
INGEST FROM FILE my_file.txt
 FORMAT DELIMITED
 INSERT INTO my_table;
```

The following example inserts data from a delimited text file with fields separated by a comma (the default). The fields in the file correspond to the table columns.

```
INGEST FROM FILE my_file.txt
 FORMAT DELIMITED
 (
 $field1 INTEGER EXTERNAL,
 $field2 DATE 'mm/dd/yyyy',
 $field3 CHAR(32)
)
 INSERT INTO my_table
 VALUES($field1, $field2, $field3);
```

### Delimiter override example

The following example inserts data like the previous example, but the fields are separated by a vertical bar.

```
INGEST FROM FILE my_file.txt
 FORMAT DELIMITED by '|'
 (
 $field1 INTEGER EXTERNAL,
 $field2 DATE 'mm/dd/yyyy',
 $field3 CHAR(32)
)
 INSERT INTO my_table
 VALUES($field1, $field2, $field3);
```

### Omitting the field definition and VALUES list example

In the following example, the table is defined as follows:

```

CREATE TABLE my_table (
 c1 VARCHAR(32),
 c2 INTEGER GENERATED BY DEFAULT AS IDENTITY,
 c3 INTEGER GENERATED ALWAYS AS (c2 + 1),
);

```

The user issues the following **INGEST** command:

```

INGEST FROM FILE my_file.txt
 FORMAT DELIMITED
 INSERT INTO mytable;

```

- The default field definition list will be:

```

(
 $C1 CHARACTER(32),
 $C2 INTEGER EXTERNAL,
 $C3 INTEGER EXTERNAL
)

```

- The default VALUES list on the INSERT statement is:

```
VALUES($C1, $C2, DEFAULT)
```

Note that the third value is DEFAULT because the column that corresponds to field \$C3 is defined as GENERATED ALWAYS. The fourth value is omitted because it has no field.

## **Extra fields used to compute column values example**

The following example is the same as the delimiter override example, but only the first two fields correspond to the first two table columns (PROD\_ID and DESCRIPTION), whereas the value for the third table column (TOTAL\_PRICE) is computed from the remaining three fields

```

INGEST FROM FILE my_file.txt
 FORMAT DELIMITED BY '|'
(
 $prod_ID CHAR(8),
 $description CHAR(32),
 $price DECIMAL(5,2) EXTERNAL,
 $sales_tax DECIMAL(4,2) EXTERNAL,
 $shipping DECIMAL(3,2) EXTERNAL
)
INSERT INTO my_table(prod_ID, description, total_price)
 VALUES($prod_id, $description, $price + $sales_tax + $shipping);

```

## **Filler fields example**

The following example inserts data from a delimited text file with fields separated by a comma (the default). The fields in the file correspond to the table columns except that there are extra fields between the fields for columns 2 and 3 and columns 3 and 4.

```

INGEST FROM FILE my_file.txt
 FORMAT DELIMITED
(
 $field1 INTEGER,
 $field2 CHAR(8),
 $filler1 CHAR,
 $field3 CHAR(32),
 $filler2 CHAR,
 $field4 DATE
)
INSERT INTO my_table VALUES($field1, $field2, $field3, $field4);

```

## Format modifiers example

The following example inserts data from a delimited text file in code page 850. Date fields are in American format and char fields are enclosed in equal signs.

```
INGEST FROM FILE my_file.txt
FORMAT DELIMITED
INPUT CODEPAGE 850
(
$field1 INTEGER EXTERNAL,
$field2 DATE 'mm/dd/yyyy',
$field3 CHAR(32) OPTIONALY ENCLOSED BY '='
)
INSERT INTO my_table
VALUES($field1, $field2, $field3);
```

## Positional example

The following example inserts data from a file with fields in the specified positions. The fields in the file correspond to the table columns.

```
INGEST FROM FILE my_file.txt
FORMAT POSITIONAL
(
$field1 POSITION(1:8) INTEGER EXTERNAL,
$field2 POSITION(10:19) DATE 'yyyy-mm-dd',
$field3 POSITION(25:34) CHAR(10)
)
INSERT INTO my_table
VALUES($field1, $field2, $field3);
```

## DEFAULTIF examples

This example is similar to the previous example, except if the second field starts with a blank, the ingest utility inserts the default value:

```
INGEST FROM FILE my_file.txt
FORMAT POSITIONAL
(
$field1 POSITION(1:8) INTEGER EXTERNAL,
$field2 POSITION(10:19) DATE 'yyyy-mm-dd' DEFAULTIF = ' ',
$field3 POSITION(25:34) CHAR(10)
)
INSERT INTO my_table
VALUES($field1, $field2, $field3);
```

This example is the same as the previous example, except that the default indicator is in the column after the data columns:

```
INGEST FROM FILE my_file.txt
FORMAT POSITIONAL
(
$field1 POSITION(1:8) INTEGER EXTERNAL,
$field2 POSITION(10:19) DATE 'yyyy-mm-dd' DEFAULTIF(35) = ' ',
$field3 POSITION(25:34) CHAR(10)
)
INSERT INTO my_table
VALUES($field1, $field2, $field3);
```

## Multiple input sources example

This example inserts data from three delimited text files:

```
INGEST FROM FILE my_file.txt, my_file2.txt, my_file3.txt
FORMAT DELIMITED
(
```

```

$field1 INTEGER EXTERNAL,
$field2 DATE 'mm/dd/yyyy',
$field3 CHAR(32)
)
INSERT INTO my_table
VALUES($field1, $field2, $field3);

```

## Pipe example

This example inserts data from a pipe:

```

INGEST FROM PIPE my_pipe
FORMAT DELIMITED
(
$field1 INTEGER EXTERNAL,
$field2 DATE 'mm/dd/yyyy',
$field3 CHAR(32)
)
INSERT INTO my_table
VALUES($field1, $field2, $field3);

```

## Options example

This example inserts data from a delimited text file with fields separated by a comma (the default). The fields in the file correspond to the table columns. The command specifies that write rows rejected by Db2 (for example, due to constraint violations) are to be written to table EXCP\_TABLE, rows rejected due to other errors are to be discarded, and messages are to be written to file messages.txt.

```

INGEST FROM FILE my_file.txt
FORMAT DELIMITED
(
$field1 INTEGER EXTERNAL,
$field2 DATE 'mm/dd/yyyy',
$field3 CHAR(32)
)
EXCEPTION TABLE excp_table
MESSAGES messages.txt
INSERT INTO my_table
VALUES($field1, $field2, $field3);

```

## Restart example

This example issues an **INGEST** command (which is restartable, by default) with a specified ingest job id:

```

INGEST FROM FILE my_file.txt
FORMAT DELIMITED
(
$field1 INTEGER EXTERNAL,
$field2 DATE 'mm/dd/yyyy',
$field3 CHAR(32)
)
RESTART NEW 'ingestcommand001'
INSERT INTO my_table
VALUES($field1, $field2, $field3);

```

If the command terminates before completing, you can restart it with the following command:

```

INGEST FROM FILE my_file.txt
FORMAT DELIMITED
(
$field1 INTEGER EXTERNAL,
$field2 DATE 'mm/dd/yyyy',
$field3 CHAR(32)

```

```

)
RESTART CONTINUE 'ingestcommand001'
INSERT INTO my_table
VALUES($field1, $field2, $field3);

```

## Restart terminate example

This example issues the same **INGEST** command as the previous "Restart example":

```

INGEST FROM FILE my_file.txt
FORMAT DELIMITED
(
$field1 INTEGER EXTERNAL,
$field2 DATE 'mm/dd/yyyy',
$field3 CHAR(32)
)
RESTART NEW 'ingestcommand001'
INSERT INTO my_table
VALUES($field1, $field2, $field3);

```

If the command terminates before completing and you do not plan to restart it, you can clean up the restart records with the following command.

```

INGEST FROM FILE my_file.txt
FORMAT DELIMITED
(
$field1 INTEGER EXTERNAL,
$field2 DATE 'mm/dd/yyyy',
$field3 CHAR(32)
)
RESTART TERMINATE 'ingestcommand001'
INSERT INTO my_table
VALUES($field1, $field2, $field3);

```

After issuing this command, you can no longer restart the **INGEST** command with the job id: "ingestcommand001", but you can reuse that string on the RESTART NEW parameter of a new **INGEST** command.

## Reordering columns example

This example inserts data from a delimited text file with fields separated by a comma. The table has three columns and the fields in the input data are in the reverse order of the table columns.

```

INGEST FROM FILE my_file.txt
FORMAT DELIMITED
(
$field1 INTEGER EXTERNAL,
$field2 DATE 'mm/dd/yyyy',
$field3 CHAR(32)
)
INSERT INTO my_table
VALUES($field3, $field2, $field1);

```

## Basic UPDATE, MERGE, and DELETE examples

The following examples update the table rows whose primary key matches the corresponding fields in the input file.

```

INGEST FROM FILE my_file.txt
FORMAT DELIMITED
(
$key1 INTEGER EXTERNAL,
$key2 INTEGER EXTERNAL,
$data1 CHAR(8),

```

```

$data2 CHAR(32),
$data3 DECIMAL(5,2) EXTERNAL
)
UPDATE my_table
SET (data1, data2, data3) = ($data1, $data2, $data3)
WHERE (key1 = $key1) AND (key2 = $key2);

```

or

```

INGEST FROM FILE my_file.txt
FORMAT DELIMITED
(
$key1 INTEGER EXTERNAL,
$key2 INTEGER EXTERNAL,
$data1 CHAR(8),
$data2 CHAR(32),
$data3 DECIMAL(5,2) EXTERNAL
)
UPDATE my_table
SET data1 = $data1, data2 = $data2, data3 = $data3
WHERE (key1 = $key1) AND (key2 = $key2);

```

This example merges data from the input file into the target table. For input rows whose primary key fields match a table row, it updates that table row with the input row. For other input rows, it adds the row to the table.

```

INGEST FROM FILE my_file.txt
FORMAT DELIMITED
(
$key1 INTEGER EXTERNAL,
$key2 INTEGER EXTERNAL,
$data1 CHAR(8),
$data2 CHAR(32),
$data3 DECIMAL(5,2) EXTERNAL
)
MERGE INTO my_table
ON (key1 = $key1) AND (key2 = $key2)
WHEN MATCHED THEN
 UPDATE SET (data1, data2, data3) = ($data1, $data2, $data3)
WHEN NOT MATCHED THEN
 INSERT VALUES($key1, $key2, $data1, $data2, $data3);

```

This example deletes table rows whose primary key matches the corresponding primary key fields in the input file.

```

INGEST FROM FILE my_file.txt
FORMAT DELIMITED
(
$key1 INTEGER EXTERNAL,
$key2 INTEGER EXTERNAL
)
DELETE FROM my_table
WHERE (key1 = $key1) AND (key2 = $key2);

```

## Complex SQL examples

Consider the following example in which there is a table with columns KEY, DATA, and ACTION. The following command updates the DATA column of table rows where the primary key column (KEY) matches the corresponding field in the input file and the ACTION column is 'U':

```

INGEST FROM FILE my_file.txt
FORMAT DELIMITED
(
$key_fld INTEGER EXTERNAL,
$data_fld INTEGER EXTERNAL

```

```

)
UPDATE my_table
SET data = $data_fld
WHERE (key = $key_fld) AND (action = 'U');

```

The following example is the same as the previous example except that if the keys match and the ACTION column is 'D', then it deletes the row from the table:

```

INGEST FROM FILE my_file.txt
FORMAT DELIMITED
(
 $key_fld INTEGER EXTERNAL,
 $data_fld INTEGER EXTERNAL
)
MERGE INTO my_table
ON (key1 = $key_fld)
WHEN MATCHED AND (action = 'U') THEN
 UPDATE SET data = $data_fld
WHEN MATCHED AND (action = 'D') THEN
 DELETE;

```

## Usage notes

### Using INGEST on the system command line (UNIX)

If you specify the **INGEST** command on the system command line in a UNIX command shell, you must specify field names in single quotation marks or put an escape character (backslash) before the \$ that starts the field name. Otherwise, the command shell interprets the field names as environment variables and replace them with the value of the corresponding environment variable.

For example, suppose environment variable *\$field1* has value abc and environment variable *\$field2* has no value, and you enter the following command in the UNIX command shell:

```
db2 INGEST ... FORMAT DELIMITED ($field1 INTEGER, $field2 CHAR) ...
```

The Db2 CLP sees the following command, which is not valid:

```
INGEST ... FORMAT DELIMITED (abc INTEGER, CHAR) ...
```

You can avoid this by using single quotation marks, as follows:

```
db2 'INGEST ... FORMAT DELIMITED ($field1 INTEGER, $field2 CHAR) ...'
```

If the **INGEST** command contains single quotation marks, you can enclose the entire command in double quotation marks " and use escape characters \ before the \$ that starts field names. For example:

```
db2 "INGEST ... FORMAT DELIMITED BY X'7C' (\$field1 ...) ..."
```

The simplest way to avoid all the previously mentioned problems is to put the command in a file and specify the -f option on the db2 command.

## Commit frequency

Updates from the **INGEST** command are committed at the end of an ingest operation. The **INGEST** command issues commits based on the **commit\_period** and **commit\_count** configuration parameters. As a result of this, the following do not affect the **INGEST** command:

- the CLP -c or +c options, which normally affect whether the CLP automatically commits

- the NOT LOGGED INITIALLY option on the CREATE TABLE statement

## Categories of error

For purposes of determining how the ingest utility handles errors, we can group errors into the following categories:

### 1. Start-up errors

These errors include:

- syntax errors
- an input file is not found or not readable
- the target or exception table is not found
- the dump file or messages file cannot be opened
- not enough memory
- other errors detected at startup

When the utility detects any of these errors, it issues an error message and exits without ingesting any data.

### 2. Data errors

These errors include:

- Errors in the input data that the formatter detects, for example:
  - numbers that are invalid or out of range (based on the field type)
  - some dates, times, timestamps that do not fit the specified format
  - other errors detected by the formatters
- Errors from SQL statements. These are listed in the description of the EXCEPTION TABLE parameter on the **INGEST** command. The most common are
  - data too long, out of range, or incorrect format (not caught by formatter)
  - constraint violations on the target table, including not null, unique, referential, or check
  - range violations on the target table

When the utility detects any of these errors, it issues a warning or error message and continues on. In the case of formatter errors, the utility also writes the record to the dump file (if specified). In the case of SQL errors, the utility also inserts the row into the exception table (if specified). To have the utility end after a certain number of these errors, use the WARNINGCOUNT parameter.

### 3. Recoverable errors

These are errors that might go away if the utility reconnects (if needed), waits some small amount of time, and tries again. When the utility detects any of these errors and the **retry\_count** or **reconnect\_count** configuration parameter is greater than 0, the utility attempts to recover from the error. If **retry\_count** and **reconnect\_count** are 0, or the utility cannot recover, the utility considers these errors to be *terminating errors*.

### 4. Terminating errors

These are all other errors not listed in the previous three types. When the utility detects any of these errors, it issues an error message and exits. Any data that was committed remains in the target table. You can restart the command from the last commit point.

## Messages from the INGEST command

If the utility read at least one record from the input source, the utility issues a summary of the number of rows read, inserted, and rejected (similar to the import and load utilities) and a successful completion message. For example:

```
INGEST FROM FILE my_table.del FORMAT DELIMITED
 ($field1 INTEGER EXTERNAL, $field2 CHAR(32))
 INSERT INTO my_table VALUES($field1, $field2)
Number of rows read = 6
Number of rows inserted = 6
Number of rows rejected = 0
SQL2980I The ingest utility completed successfully at timestamp "11/02/2011 12:34:56.123456".
```

The meaning of the “Number of rows...” messages is as follows:

### Number of rows read

The number of records the utility read from the input source.

### Number of rows inserted (updated, deleted, merged)

The number of rows affected by the execution of the SQL statement against the target table and committed to the database. The message says “inserted”, “updated”, “deleted”, or “merged”, depending on the SQL statement.

### Number of rows rejected

The number of rows rejected (by the utility or Db2).

If there is only one warning or error and the error is such that no input records could be processed, the command issues only that error message and does not display the summary of rows read, rejected, and so on. For example:

```
INGEST FROM FILE bad_file.del FORMAT DELIMITED
 ($field1 INTEGER EXTERNAL, $field2 CHAR)
 INSERT INTO my_table VALUES($field1, $field2)

SQL2036N The path for the file or device "bad_file.del" is not valid.
```

After the **INGEST** command begins reading records, if there are one or more warning or error conditions detected, the command issues messages, along with the summary of rows read, skipped, and so on, and a summary of the number of warnings and errors. Consider the following example which tries to insert two duplicate keys:

```
INGEST FROM FILE my_table1.del, my_table2.del FORMAT DELIMITED
 ($field1 integer external, $field2 char(32))
 INSERT INTO my_table VALUES($field1, $field2)

SQL2905I The following error occurred issuing the SQL "INSERT"
statement on table "ALVEYWD.MY_TABLE" using data from line "6" of
input file "my_table1.del".

SQL0803N One or more values in the INSERT statement, UPDATE statement,
or foreign key update caused by a DELETE statement are not valid
because the primary key, unique constraint or unique index identified
by "1" constrains table "ALVEYWD.MY_TABLE" from having duplicate values
for the index key. SQLSTATE=23505
```

```
SQL2905I The following error occurred issuing the SQL "INSERT" statement
on table "ALVEYWD.MY_TABLE" using data from line "9" of input file "my_table2.del".
```

```
SQL0803N One or more values in the INSERT statement, UPDATE statement,
or foreign key update caused by a DELETE statement are not valid because
the primary key, unique constraint or unique index identified by "1"
constrains table "ALVEYWD.MY_TABLE" from having duplicate values
for the index key. SQLSTATE=23505
```

```
Number of rows read = 6
Number of rows inserted = 4
```

```

Number of rows rejected = 2
Number of rows committed = 4

SQL2902I The ingest utility completed at timestamp "11/02/2011 12:34:56.123456".
Number of errors: 2. Number of warnings: 0.

```

If the MESSAGES parameter is specified, most messages are written to that file, except as specified in the description of that parameter.

## File and pipe names

The metavariables *file-name* and *pipe-name* specify a file or pipe name that follows the operating system syntax. File or pipe names specified on the **INGEST** command that contain any characters other than the following must be enclosed in single quotation marks:

- alphanumeric
- underscore (\_)
- dash (-)
- forward-slash (/) or back-slash (\)
- dot (.)

The quotation marks need to be around the entire name. For example, if a filename contains the equal sign (=), specify:

```
'dir1/dir2/my=file'
```

instead of

```
dir1/dir2/'my=file'
```

## Default field definition list

When all of the following are true, you can omit the field definition list:

- The format is delimited.
- The SQL statement is INSERT.
- The VALUES clause is omitted from the INSERT statement.

The field definition list defaults as follows:

- If a column list follows the table name on the INSERT statement, there is one field for each column in the list.
- If the INSERT statement omits the column list and there are no implicitly hidden columns, then there is one field for each column in the table.
- If the INSERT statement omits the column list and there are implicitly hidden columns, then you must explicitly specify whether or not the implicitly hidden columns are included. Use the DB2\_DMU\_DEFAULT registry variable, or the IMPLICITLYHIDDENINCLUDE or IMPLICITLYHIDDENMISSING keywords to specify if implicitly hidden columns are included.
- Each field has the same name as the corresponding table column, prefixed with a dollar sign \$.
- Each field has the same data type and length (or precision and scale) as the corresponding table column. Numeric fields (integer, decimal, and so on) default to EXTERNAL format. DB2SECURITYLABEL fields default to STRING format.

Table 19 on page 277 shows how the field, column, and values lists default for every possible combination of omitting or including those lists.

*Table 19. Possible combinations when field definition list is specified or omitted*

Field definition list specified?	Column list specified?	VALUES clause specified?	Defaults
no	no	no	<p>Field list and column list default to all columns. Values list defaults to field list.</p> <p><b>Note:</b> If the table contains implicitly hidden columns, then you must explicitly specify whether or not the implicitly hidden columns are included using the DB2_DMU_DEFAULT registry variable, or the IMPLICITLYHIDDENINCLUDE or IMPLICITLYHIDDENMISSING keywords.</p>
no	no	yes	Not allowed
no	yes	no	Field list and values list default to the specified column list
no	yes	yes	Not allowed
yes	no	no	<p>Column list defaults to all columns.</p> <p>Values list defaults to user-specified field list.</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. The number of fields must be same as number of columns. Otherwise an error occurs.</li> <li>2. If the table contains implicitly hidden columns, then you must explicitly specify whether or not the implicitly hidden columns are included using the DB2_DMU_DEFAULT registry variable, or the IMPLICITLYHIDDENINCLUDE or IMPLICITLYHIDDENMISSING keywords.</li> </ol>
yes	no	yes	<p>Column list defaults to all columns.</p> <p><b>Note:</b> If the table contains implicitly hidden columns, then you must explicitly specify whether or not the implicitly hidden columns are included using the DB2_DMU_DEFAULT registry variable, or the IMPLICITLYHIDDENINCLUDE or IMPLICITLYHIDDENMISSING keywords.</p>

Table 19. Possible combinations when field definition list is specified or omitted (continued)

Field definition list specified?	Column list specified?	VALUES clause specified?	Defaults
yes	yes	no	Values list defaults to user-specified field list. <b>Note:</b> Number of fields must be same as number of columns. Otherwise an error occurs.
yes	yes	yes	No defaults

## Rules and defaults for field lengths

Field lengths specified on field types are in bytes and must be 1 - 32 767, inclusive.

The following tables show the length of a field under all combinations of input data format, field type, and whether the length and ending position is specified. The cell value *the specified length* means that the field length is explicitly specified; for example, the length that can follow "INTEGER EXTERNAL". It is not the precision that is on some numeric types. The cell value *n/a* means not applicable or not allowed.

Table 20. Field lengths for DELIMITED format

Field type	Field type omits length (or datetime format) <sup>1</sup>	Field type specifies length (or datetime format) <sup>1</sup>
CHARACTER	255 <sup>2</sup>	the specified length
BINARY	255 <sup>2</sup>	the specified length
SMALLINT , INTEGER, BIGINT EXTERNAL	255 <sup>2</sup>	the specified length
DECIMAL(p,s) EXTERNAL (default for (p,s) is (5,0))	255 <sup>2</sup>	the specified length
DECFLOAT(16 or 34) EXTERNAL	255 <sup>2</sup>	the specified length
REAL EXTERNAL	255 <sup>2</sup>	the specified length
FLOAT or DOUBLE EXTERNAL	255 <sup>2</sup>	the specified length
DATE	<ul style="list-style-type: none"> <li>• <b>date_compat</b> off: length of maximum length default format for a date (10)</li> <li>• <b>date_compat</b> on: length of maximum length default format for a timestamp (32)</li> </ul>	<ul style="list-style-type: none"> <li>• <b>date_compat</b> off: length of maximum length default format for a date (10)</li> <li>• <b>date_compat</b> on: length of maximum length default format for a timestamp (32)</li> </ul>
TIME	length of maximum length default format (8)	length of max length default format (8)
TIMESTAMP(p) (default for p is 6)	length of maximum length default format (32)	length of max length default format (32)
DB2SECURITYLABEL with NAME modifier	255 <sup>2</sup>	the specified length

Table 20. Field lengths for DELIMITED format (continued)

Field type	Field type omits length (or datetime format) <sup>1</sup>	Field type specifies length (or datetime format) <sup>1</sup>
DB2SECURITYLABEL with STRING modifier	255 <sup>2</sup>	the specified length

<sup>1</sup> In delimited format, the field length means the length to which the utility truncates the field data if it exceeds that length. The truncation occurs after applying the trim option. If the truncation results in loss of non-blank characters, the utility issues a warning.

<sup>2</sup> In delimited format, character, and numeric fields that are specified in ASCII and omit the length have a default length of 255 bytes. If you need a longer length, specify an explicit length on the field type.

Table 21. Field lengths for POSITIONAL format

Field type	Field type omits length (or date/time format), POSITION omits end position	Field type specifies length (or date/time format), POSITION omits end position	Field type omits length (or date/time format), POSITION specifies end position	Field type specifies length (or date/time format), and POSITION specifies end position
CHARACTER	n/a <sup>3</sup>	the specified length	(end - start + 1)	the lesser of the specified length and (end - start + 1) <sup>7</sup>
CHARACTER	n/a <sup>3</sup>	the specified length	(end - start + 1)	the lesser of the specified length and (end - start + 1) <sup>7</sup>
SMALLINT (binary)	2	n/a <sup>4</sup>	If (end - start + 1) is 2, 4, or 8, use that. Otherwise, use length of binary type. If conflict, issue warning. <sup>5</sup>	n/a <sup>4</sup>
INTEGER (binary)	4	n/a <sup>4</sup>	If (end - start + 1) is 2, 4, or 8, use that. Otherwise, use length of binary type. If conflict, issue warning. <sup>5</sup>	n/a <sup>4</sup>
BIGINT (binary)	8	n/a <sup>4</sup>	If (end - start + 1) is 2, 4, or 8, use that. Otherwise, use length of binary type. If conflict, issue warning. <sup>5</sup>	n/a <sup>4</sup>
SMALLINT, INTEGER, BIGINT EXTERNAL	n/a <sup>3</sup>	the specified length, which must be <= 50	(end - start + 1), which must be <= 50	the lesser of the specified length and (end - start + 1) <sup>7</sup>
DECIMAL(p,s) PACKED (default for (p,s) is (5,0))	(p+2)/2	n/a <sup>4</sup>	Use (p+2)/2. If conflict with end position, issue warning. <sup>5</sup>	n/a <sup>4</sup>
DECIMAL(p,s) ZONED (default for (p,s) is (5,0))	p	n/a <sup>4</sup>	Use precision. If conflict with end position, issue warning. <sup>5</sup>	n/a <sup>4</sup>

Table 21. Field lengths for POSITIONAL format (continued)

Field type	Field type omits length (or date/time format), POSITION omits end position	Field type specifies length (or date/time format), POSITION omits end position	Field type omits length (or date/time format), POSITION specifies end position	Field type specifies length (or date/time format), and POSITION specifies end position
DECIMAL(p,s) EXTERNAL (default for (p,s) is (5,0))	n/a <sup>3</sup>	the specified length	(end - start + 1)	the lesser of the specified length and (end - start + 1) <sup>7</sup>
DECFLOAT(16) (binary)	8	n/a <sup>4</sup>	Use 8. If conflict with end position, issue warning. <sup>5</sup>	n/a <sup>4</sup>
DECFLOAT(34) (binary)	16	n/a <sup>4</sup>	Use 16. If conflict with end position, issue warning. <sup>5</sup>	n/a <sup>4</sup>
DECFLOAT(16 or 34) EXTERNAL	n/a <sup>3</sup>	the specified length	(end - start + 1)	the lesser of the specified length and (end - start + 1) <sup>7</sup>
REAL (binary)	4	n/a <sup>4</sup>	Use 4. If conflict with end position, issue warning. <sup>5</sup>	n/a <sup>4</sup>
REAL EXTERNAL	n/a <sup>3</sup>	the specified length	(end - start + 1)	the lesser of the specified length and (end - start + 1) <sup>7</sup>
FLOAT or DOUBLE (binary)	8	n/a <sup>4</sup>	Use 8. If conflict with end position, issue warning. <sup>5</sup>	n/a <sup>4</sup>
FLOAT or DOUBLE EXTERNAL	n/a <sup>3</sup>	the specified length	(end - start + 1))	the lesser of the specified length and (end - start + 1) <sup>7</sup>
DATE	<ul style="list-style-type: none"> <li>• <b>date_compat</b> off: length of maximum length default format for a date (10)</li> <li>• <b>date_compat</b> on: length of maximum length default format for a TIMESTAMP(0) (19)</li> </ul>	length of format string, which must be $\geq 1$	<ul style="list-style-type: none"> <li>• <b>date_compat</b> off: (end - start + 1) , which must be <math>\geq 8</math> and <math>\leq 10</math></li> <li>• <b>date_compat</b> on: (end - start + 1) , which must be <math>\geq 19</math> and <math>\leq 32</math></li> </ul>	If (end - start + 1) is greater than or equal to length of the format string, use that. Otherwise, (end - start + 1) must be greater than or equal to the length of the shortest value that matches the format string. <sup>6</sup>
TIME	length of max length default format (8)	length of format string, which must be $\geq 1$	(end - start + 1) , which must be $\geq 4$ and $\leq 8$	If (end - start + 1) is greater than or equal to length of the format string, use that. Otherwise, (end - start + 1) must be greater than or equal to the length of the shortest value that matches the format string. <sup>6</sup>

Table 21. Field lengths for POSITIONAL format (continued)

Field type	Field type omits length (or date/time format), POSITION omits end position	Field type specifies length (or date/time format), POSITION omits end position	Field type omits length (or date/time format), POSITION specifies end position	Field type specifies length (or date/time format), and POSITION specifies end position
TIMESTAMP(p) (default for p is 6)	length of default format (If p = 0, then 19. Otherwise, 20 + p.)	length of format string, which must be $\geq 1$	$(end - start + 1)$ , which must be $\geq 19$ and $\leq 32$	If $(end - start + 1)$ is greater than or equal to length of the format string, use that. Otherwise, $(end - start + 1)$ must be greater than or equal to the length of the shortest value that matches the format string. <sup>6</sup>
DB2SECURITYLABEL (binary)	n/a <sup>3</sup>	the specified length	$(end - start + 1)$	the lesser of the specified length and $(end - start + 1)$ <sup>7</sup>
DB2SECURITYLABEL with NAME modifier	n/a <sup>3</sup>	the specified length	$(end - start + 1)$	the lesser of the specified length and $(end - start + 1)$ <sup>7</sup>
DB2SECURITYLABEL with STRING modifier	n/a <sup>3</sup>	the specified length	$(end - start + 1)$	the lesser of the specified length and $(end - start + 1)$ <sup>7</sup>

<sup>3</sup> These cases (positional format, length and end position omitted) are not allowed because the utility cannot determine the intended length of the field and there is no suitable default.

<sup>4</sup> These cases (positional format, numeric binary field, length specified, end position omitted) are not allowed because with binary numeric types, the length is implied by the binary type and the syntax does not allow specifying an explicit field length in bytes.

<sup>5</sup> The various utilities handle conflicts between the numeric binary type specified and the length specified on the POSITION parameter as shown in Table 22.

<sup>6</sup> The various utilities handle conflicts between the date/time format string length and the length specified on the POSITION parameter as shown in Table 23 on page 282.

<sup>7</sup> In these cases (length and end position are specified but conflict), the ingest utility issues a warning and uses the lesser of the specified length and the value of  $(end - start + 1)$ .

Table 22. Conflicts between numeric binary type and specified length

Field type	Load <sup>1</sup>	Ingest
SMALLINT, INTEGER, BIGINT	If $(end - start + 1)$ is 2, 4, or 8, use that length with no warning or error. Otherwise issue warning, and use NULL or reject the row.	If $(end - start + 1)$ is 2, 4, or 8, use that length and issue a warning. Otherwise, use the length of the binary type and issue a warning.
DECIMAL	Issue error SQL3123W and reject the row.	Use the length of the binary type and issue a warning.
REAL,FLOAT, DECFLOAT	Use the length of the binary type. Do not issue a warning or error.	Use the length of the binary type and issue a warning.

*Table 22. Conflicts between numeric binary type and specified length (continued)*

Field type	Load <sup>1</sup>	Ingest
<sup>1</sup> Import does not support binary numeric types (MODIFIED BY binarynumerics).		

*Table 23. Conflicts between date/time format string length and specified length*

Conflict	Import/Load	Ingest
(end - start + 1) is greater than or equal to the length of the format string.	Use end - start + 1. No warning or error.	Use end - start + 1. No warning or error.
(end - start + 1) is less than the length of the format string.	Issue error.	Issue error.

## How the ingest utility determines field lengths

The algorithm for determining field length is as follows:

1. Determine the length of the field as it appears in the input data:
  - If the format is DELIMITED:
    - Apply the specified or default trim option. (For CHAR fields, the default is TRIM. For all other non-binary field types, the ingest utility always trims leading and trailing blanks.)
    - If OPTIONALLY ENCLOSED BY is not specified, the data length is the number of bytes left in the field.
    - If OPTIONALLY ENCLOSED BY is specified, the data length is the number of bytes between the string delimiters (after converting doubled delimiters inside the string to single delimiters).
  - If the format is POSITIONAL:
    - Apply the specified or default trim option. (For CHAR fields, the default is NOTRIM. For all other non-binary field types, the ingest utility always trims leading and trailing blanks.)
2. If the length determined in step 1 is greater than the field length as described in “Rules and defaults for field lengths” on page 278:
  - For fields other than DATE, TIME, or TIMESTAMP, truncate the data to the field length. If non-blank characters were truncated, issue a warning.
  - For DATE, TIME, and TIMESTAMP fields, issue an error.
3. If the SQL statement sets a column to the field value and the value is too long or out of range, Db2 issues an error message and rejects the row.

**Note:** This can happen only on an INSERT, UPDATE, or MERGE statement.

The following tables show some examples. In these tables, the tilde (~) means a blank; the trim rules for BINARY are similar to those of CHAR.

*Table 24. FORMAT DELIMITED BY ‘|’*

Field definition	Input field	Final field value
CHAR TRIM	~ABC~	ABC
CHAR NOTRIM	~ABC~	~ABC~
CHAR OPTIONALLY ENCLOSED BY ""	~"ABC"~	ABC

*Table 24. FORMAT DELIMITED BY '' (continued)*

Field definition	Input field	Final field value
CHAR OPTIONALLY ENCLOSED BY ""	~"~ABC~"~	~ABC~
CHAR NOTRIM OPTIONALLY ENCLOSED BY ""	"~ABC~"	~ABC~
CHAR NOTRIM OPTIONALLY ENCLOSED BY ""	~"ABC"~	~"ABC"~
CHAR(1) TRIM	~ABC~	A (and warning because non-blanks were trimmed)
CHAR(1) NOTRIM	~ABC~	~ (and warning because non-blanks were trimmed)
CHAR(1) OPTIONALLY ENCLOSED BY ""	~ABC~	A (and warning because non-blanks were trimmed)
CHAR(6) TRIM	~ABC~	ABC
CHAR(6) NOTRIM	~ABC~	~ABC~
CHAR(6) OPTIONALLY ENCLOSED BY ""	~"ABC"~	ABC
CHAR(6) OPTIONALLY ENCLOSED BY ""	~"~ABC~"~	~ABC~
INTEGER EXTERNAL	~12345~	12345
INTEGER EXTERNAL(3)	~12345~	123 (and warning because non-blanks were trimmed)
INTEGER EXTERNAL(9)	~12345~	12345

*Table 25. FORMAT POSITIONAL*

Field definition	Input field	Final field value
POSITION(1:5) CHAR TRIM	~ABC~	ABC
POSITION(1:5) CHAR NOTRIM	~ABC~	~ABC~
POSITION(1:5) CHAR(3) TRIM	ABC	A (and warning because end position conflicts with length)
POSITION(1:5) CHAR(5) NOTRIM	~ABC~	~ABC~
POSITION(1:5) CHAR(5) TRIM	~ABC~	ABC
POSITION(1:5) CHAR(7) NOTRIM	~ABC~	~ABC~ (and warning because end position conflicts with length)
POSITION(1:7) INTEGER EXTERNAL	~12345~	12345
POSITION(1:7) INTEGER EXTERNAL(3)	123	123 (and warning because end pos conflicts with length)

*Table 25. FORMAT POSITIONAL (continued)*

Field definition	Input field	Final field value
POSITION(1:7) INTEGER EXTERNAL(9)	~12345~	12345 (and warning because end position conflicts with length)

## Handling of invalid numeric data

In general, when numeric data is specified as a character string and the data cannot be converted to a number or is out of range for the field type, the ingest utility rejects the record and issues an error. This is different than the import and load utilities, which handle these errors as follows:

- For all numeric types, if the data cannot be converted to the column's type (for example, "ABC" in an integer field):
  - If the column is nullable, the import and load utilities replace the value with NULL and issue a warning.
  - If the column is not nullable, the import and load utilities reject the record and issue an error.
- For all numeric types except DECIMAL, if the data is out of range:
  - If the column is nullable, the import and load utilities replace the value with NULL and issue a warning.
  - If the column is not nullable, the import and load utilities reject the record and issue an error.
- For DECIMAL fields, if the data is out of range, the import and load utilities reject the record and issue an error.

## Notes regarding the FORMAT clause

- The priority for delimiters is the same as for the load utility: record, character, field. The import and load utilities also support the delprioritychar file type modifier, which changes the priority to character, record, field, but the ingest utility does not.
- When modifiers are specified on a field, they must be specified on all fields that have a similar type. For example, if a decimal field specifies RADIX POINT, the same RADIX POINT character must be specified on all other fields of type INTEGER, DECIMAL, DECLFLOAT, and FLOAT.
- For character fields, the various TRIM options specify whether the ingest utility strips leading and/or trailing blanks. For all other non-binary field types (for example, INTEGER EXTERNAL), the ingest utility always trims leading and trailing blanks.
- When the format is DELIMITED or the format is POSITIONAL and the RECORDLEN parameter is omitted:
  - If a record contains fewer fields than defined in the format, the ingest utility considers the missing fields to be NULL.
  - If a record contains extra fields, the ingest utility ignores them.
- When the format is POSITIONAL:
  - If the RECORDLEN parameter is specified and the last record is too short, the ingest utility issues an error and rejects the record.
  - If there is data outside the specified field positions, the ingest utility ignores it. For example, if the field specifies two fields at POSITION(1:10) and

POSITION(21:30), the ingest utility ignores data in positions 11:20 and any data past position 30 to the end of the record.

## SQL statements on the INGEST command

- Restrictions that apply to the use of the **INGEST** command with column-organized tables are the same restrictions that apply to the use of **INSERT**, **UPDATE**, or **DELETE** statements with column-organized tables.
  - You cannot specify RR or RS for the *WITH isolation-level* clause, which you can specify for the **UPDATE** and **DELETE** statements that are part of the **INGEST** command.
- The ingest utility supports the following values in the **PERIOD** clause:
  - constants
  - special registers

**Note:** Only the following special registers affect the execution of the SQL statement on the **INGEST** command:

- CURRENT SCHEMA
- CURRENT TEMPORAL SYSTEM\_TIME
- CURRENT TEMPORAL BUSINESS\_TIME
- scalar functions whose arguments are supported operands (although nested function invocations and user-defined functions cannot be used)
- CAST specifications where the cast operand is a supported operand expression using arithmetic operators and operands
- expressions using arithmetic operators and operands

You can also specify a field name, which the utility converts to a parameter marker.

- There are several other considerations for ingesting into a temporal table:
  - When special register CURRENT TEMPORAL SYSTEM\_TIME is set, you cannot ingest into a system-period temporal table or a bi-temporal table.
  - When special register CURRENT TEMPORAL BUSINESS\_TIME is set, you can still ingest into a business-time temporal table or a bi-temporal table (subject to the other restrictions on system-time temporal tables).
  - You cannot use the **REPLACE** or **DELETE** operation on a system-period temporal table or bi-temporal table.
  - The ingest utility cannot insert values for the SYSTEM\_TIME period in a system-period temporal table.
- Any strings in the SQL statements are assumed to be in the application code page.
- Any column names that start with a dollar sign (\$) must be specified as SQL delimited identifiers (enclosed in double quotation marks), in order to distinguish them from field names.
- In most cases, after converting field names to parameter markers and binding in values for the fields, the ingest utility passes these statements *as is* to Db2. They are therefore subject to the same restrictions. For example:
  - Fields are bound as their field type. Therefore they can be used only where a value of the specified type is allowed. For example, fields of type DB2SECURITYLABEL can be used only where a security label is allowed.
  - If the **INSERT** statement omits the column list but specifies the **VALUES** list, the **VALUES** list must contain an item for each column. If the table contains implicitly hidden columns, then you must explicitly specify whether or not

the implicitly hidden columns are included. Use the DB2\_DMU\_DEFAULT registry variable, or the IMPLICITLYHIDDENINCLUDE or IMPLICITLYHIDDENMISSING keywords to specify if implicitly hidden columns are included.

- The ingest utility issues an error and ends the **INGEST** command if any of the following conditions is true:
  - If the SQL statement specified on the command does not reference any fields
  - The SQL statement is DELETE or UPDATE and it has no WHERE clause or the WHERE clause does not reference any fields.
  - The SQL statement is MERGE and the ON clause does not reference any fields.
- The default isolation level is cursor stability (CS). This can be overridden by specifying the WITH clause on the SQL statement (except INSERT), or by setting the CLI IsolationLevel keyword in the file specified by the **DB2CLINI PATH** environment variable (the default is sql1ib/cfg/db2cli.ini). Setting the IsolationLevel keyword, however, affects all CLI applications.

### The MERGE statement

The **INGEST** command issues the MERGE statement once for each input data record, treating the record as a one-row table (equivalent to the **USING table-reference** parameter on the SQL MERGE statement). This can occasionally produce different results than the equivalent SQL MERGE statement. Consider the following example:

- Table SOURCE\_TABLE contains two rows:

```
(1, 'source data 1')
(2, 'source data 2')
```
- Input file source\_table.del contains the same two records as in SOURCE\_TABLE.
- Table TARGET\_TABLE contains one row:

```
(NULL, 'target data 1')
```

The SQL MERGE statement is:

```
MERGE INTO target_table
 USING (SELECT * FROM source_table) source_table
 ON target_table.c1 <> source_table.c1
 WHEN NOT MATCHED THEN
 INSERT VALUES(source_table.c1, source_table.c2);
```

The **INGEST** command (using the equivalent MERGE statement) is:

```
INGEST FROM FILE source_table.del
 FORMAT DELIMITED
 (
 $c1 INTEGER EXTERNAL,
 $c2 CHAR(32)
)
 MERGE INTO target_table
 ON c1 <> $c1
 WHEN NOT MATCHED THEN
 INSERT VALUES($c1, $c2);
```

Following the SQL MERGE statement, TARGET\_TABLE contains the following rows:

```
(NULL, 'target data 1')
(1, 'source data 1')
(2, 'source data 2')
```

Following the **INGEST** command, TARGET\_TABLE contains the following rows:

```
(NULL, 'target data 1')
(1, 'source data 1')
```

The reason the **INGEST** command results in fewer rows is that after the **INGEST** command processes the first input data record, the target table contains the two rows shown previously. From that point onwards, the ON clause has a matching row, which means the INSERT statement on the WHEN NOT MATCHED clause is not processed again.

Note that this example is not a common use of the MERGE statement.

When the MERGE statement has the more common format of updating or inserting rows based on matching keys, the SQL MERGE statement and the **INGEST** command produce the same results.

### The REPLACE statement

REPLACE is basically the same as INSERT except that the ingest utility issues the DELETE statement to delete all the table rows before beginning the inserts. If the table is large, the DELETE could take some time and use significant log space.

### Data type conversion

For each field the utility ingests, there are two places that data conversion can occur:

- When the input data is in character format (including numbers specified in ASCII), the utility converts the data from character to the field type.
- If a field's type differs from its corresponding column type, Db2 converts the field value from the field type to the column type.

In both cases, the ingest utility and Db2 use the rules described in the topic "Assignments and comparisons". This can occasionally produce different results than converting directly from character to the column type.

Consider the following example:

- The input file specifies string '9.99E6143', which is a valid DECFLOAT(34) number but outside the range of DECFLOAT(16).
- The field type is DECFLOAT(34).
- The column type is DECFLOAT(16).

In this example, the ingest utility converts the field value from character to DECFLOAT(34). Then Db2 converts from DECFLOAT(34) to DECFLOAT(16). That results in a warning and a value of DECFLOAT infinity in the DECFLOAT(16) column.

### Casting a field to an SQL data type

Before issuing the SQL statement that you specify on the **INGEST** command, the ingest utility converts field names to parameter markers and then issues the SQL statement dynamically. In order to determine the data types of the parameter markers, Db2 uses the rules described in the topic "Determining data types of untyped expressions". Just as with dynamic SQL, if the data type of a field is not obvious from the context where it is used, you might get an error, in which case you need to do perform one of the following actions:

- Set the **DB2\_DEFERRED\_PREPARE\_SEMANTICS** registry variable to YES.
- Use a CAST specification to cast the field name to an SQL data type.

For example, consider the following **INGEST** command:

```

INGEST FROM FILE my_file.txt
 FORMAT DELIMITED($date_fld DATE)
 INSERT INTO my_table(int_col) VALUES(day($date_fld));

```

If you have the **DB2\_DEFERRED\_PREPARE\_SEMANTICS** registry variable set to NO (the default), when the ingest utility tries to issue the statement, it might return an error because Db2 cannot determine which version of the DAY function to use. (This is true even though you defined the field as a DATE and the ingest utility binds it as a DATE.)

You can fix the problem by casting field names to their corresponding field types, for example:

```
INSERT INTO my_table(int_col) VALUES(day(CAST($date_fld AS DATE)));
```

In some cases, you can also fix the problem by setting registry variable DB2\_DEFERRED\_PREPARE\_SEMANTICS=YES. However, this does not always work.

As an additional example, consider the following **INGEST** command:

```

INGEST FROM FILE my_file.txt
 FORMAT DELIMITED ($field1 DECIMAL(5,2))
 INSERT INTO my_table(dec_col) VALUES($field1 + 1);

```

Because \$field1 is added to an integer, Db2 assigns type INTEGER to the field. In order to have Db2 assign type DECIMAL(5,2), you need to change the SQL statement to:

```
INSERT INTO my_table(dec_col) VALUES(CAST($field1 AS DECIMAL(5,2)) + 1);
```

or

```
INSERT INTO my_table(dec_col) VALUES($field1 + 001.00);
```

## INGEST GET STATS

Displays statistics about one or more **INGEST** commands that are being run by the authorization ID that is connected to the database. The ingest utility maintains statistics for a maximum of 128 ingest jobs running at a time.

### Scope

A separate CLP session is required to successfully invoke this command. It must be run on the same machine that the **INGEST** command is running on.

### Authorization

None

### Required connection

Database.

### Syntax

```

>>> INGEST GET [STATISTICS | STATS] FOR [job-ID | ALL] [EVERY number SECONDS | SHOW TOTALS]

```

## Command parameters

### ALL | *job-ID*

Specifies which **INGEST** command to show statistics for.

The job ID is either the full job ID enclosed in single quotation marks or the temporary job ID displayed by the **INGEST LIST** command.

### EVERY *number* SECONDS

Specifies that a new row is to be appended to the displayed table every *number* seconds.

This parameter is valid only when an **INGEST job-ID** is specified (not when ALL is specified). When this parameter is specified, the only way to end the command is by pressing Ctrl+C or end the CLP session. The range for number of seconds is 1 to 86 400.

### SHOW TOTALS

Specifies that statistics about each phase of ingest processing (transporter, formatter, and flusher) is to be displayed. When this parameter is omitted, the command displays only summary statistics.

## Examples

### Example of a basic INGEST GET STATS command output

=> INGEST GET STATS FOR 4

```
Ingest job ID = DB21000:20101116.123456.234567:34567:4567
Database = MYDB
Target table = MY_SCHEMA.MY_TABLE1

Overall Overall Current Current Total records
ingest rate write rate ingest rate write rate
(records/second) (writes/second) (records/second) (writes/second)

```

Overall ingest rate (records/second)	Overall write rate (writes/second)	Current ingest rate (records/second)	Current write rate (writes/second)	Total records
54321	5432	76543	87654	98765

### Example of an INGEST GET STATS command that provides statistics every 3 seconds

=> INGEST GET STATS FOR 4 EVERY 3 SECONDS

```
Ingest job ID = DB21000:20101116.123456.234567:34567:4567
Database = MYDB
Target table = MY_SCHEMA.MY_TABLE1

Overall Overall Current Current Total records
ingest rate write rate ingest rate write rate
(records/second) (writes/second) (records/second) (writes/second)

```

Overall ingest rate (records/second)	Overall write rate (writes/second)	Current ingest rate (records/second)	Current write rate (writes/second)	Total records
3333	65432	76543	87654	108765
3334	75432	86543	97654	118765
3335	85432	96543	107654	128765 ...

(new row appended every 3 seconds)

### Example of an INGEST GET STATS command that shows the totals for each phase

=> INGEST GET STATS FOR 4 SHOW TOTALS

```
=====
Ingest job ID = DB21000:20101116.123456.234567:34567:4567
Database = MYDB
Target table = MY_SCHEMA.MY_TABLE1
=====
```

Totals for all transporters

	Since last query	Since command start
Number of bytes read	90,000	180,000
Number of records read	3000	6000
Bytes per second	10,000	10,000
Records per second	1000	1000

Totals for all formatters

	Since last query	Since command start
Number of records formatted	9000	18,000
Records per second	3000	3000
Number of records rejected	6	12

Totals for all flushers

	Since last query	Since command start
Number of records flushed	12,000	24,000
Records per second	4000	4000
Number of records rejected	8	16
Number of reconnects	4	8
Number of retries	16	32

## Usage notes

For many statistics, the **INGEST GET STATS** command displays the statistics since the last **INGEST GET STATS** command (issued through the current window) and since the **INGEST** command started. As shown in the previous examples, these appear in different columns in the output.

**Note:** The format of the **INGEST GET STATS** command output should not be considered a programming interface. IBM reserves the right to change the format in future fix packs or releases.

## INGEST LIST

Lists basic information about **INGEST** commands that are being run by the authorization ID that is connected to the database. The ingest utility maintains statistics for a maximum of 128 ingest jobs running at a time.

### Scope

A separate CLP session is required to successfully invoke this command. It must be run on the same machine that the **INGEST** command is running on.

### Authorization

None

### Required connection

Database

## Command syntax

►—INGEST LIST—————►

## Command parameters

### Examples

=> INGEST LIST

```
Ingest job ID = DB21000:20101116.123456.234567:34567:45678
Ingest temp job ID = 1
Database Name = MYDB
Input type = FILE
Target table = MY_SCHEMA.MY_TABLE
Start Time = 04/10/2010 11:54:45.773215
Running Time = 01:02:03
Number of records processed = 30,000
```

### Usage notes

- The ingest temporary job ID is an integer you can use on the **INGEST GET STATS** command. It is provided to save you from typing the full job ID, but it is valid only while the **INGEST** command is running.
- The dates and times are displayed in the format of the current locale.
- The **SET UTIL\_IMPACT\_PRIORITY** command does not affect the **INGEST** command.
- The **util\_impact\_lim** database manager configuration parameter does not affect the **INGEST** command.

## INGEST SET

Sets a configuration parameter for subsequent **INGEST** commands in the current CLP session.

### Scope

The setting affects only later **INGEST** commands in the same CLP session that share the same CLP backend process. It does not affect **INGEST** commands in other CLP sessions or later CLP sessions that use a different CLP backend process.

### Authorization

None.

### Required connection

None.

### Syntax

►—INGEST SET—*config-param*—| value |—————►

**value:****Boolean-value:****memory-size-value:**

## Command parameters

**config-param**

Specifies one of the ingest configuration parameters

**value** Specifies a value for the ingest configuration parameter. Each configuration parameter accepts either an integer value, a Boolean value, or a memory size value

## Example

```
INGEST SET num_flushers_per_partition 5;
INGEST SET shm_max_size 2 GB;
```

## INITIALIZE TAPE

Initializes tapes for backup and restore operations to streaming tape devices. This command is only supported on Windows operating systems.

## Authorization

One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT

## Required connection

None

## Command syntax

## Command parameters

ON *device*

Specifies a valid tape device name. The default value is \\.\TAPE0.

### USING *blksize*

Specifies the block size for the device, in bytes. The device is initialized to use the block size specified, if the value is within the supported range of block sizes for the device.

The buffer size specified for the **BACKUP DATABASE** command and for **RESTORE DATABASE** must be divisible by the block size specified here.

If a value for this parameter is not specified, the device is initialized to use its default block size. If a value of zero is specified, the device is initialized to use a variable length block size; if the device does not support variable length block mode, an error is returned.

When backing up to tape, use of a variable block size is currently not supported. If you must use this option, ensure that you have well tested procedures in place that enable you to recover successfully, using backup images that were created with a variable block size.

When using a variable block size, you must specify a backup buffer size that is less than or equal to the maximum limit for the tape devices that you are using. For optimal performance, the buffer size must be equal to the maximum block size limit of the device being used.

## **INSPECT**

Inspects database for architectural integrity, checking the pages of the database for page consistency. The **INSPECT** command checks that the structures of table objects and structures of table spaces are valid. Cross object validation conducts an online index to data consistency check.

## Scope

In a single partition database environment, the scope is that single partition only. In a partitioned database environment, it is the collection of all logical partitions defined in db2nodes.cfg. For partitioned tables, the **CHECK DATABASE** and **CHECK TABLESPACE** options include individual data partitions and non-partitioned indexes. The **CHECK TABLE** option is also available for a partitioned table, however it will check all data partitions and indexes in a table, rather than checking a single data partition or index.

## **Authorization**

For **INSPECT CHECK**, one of the following authorities:

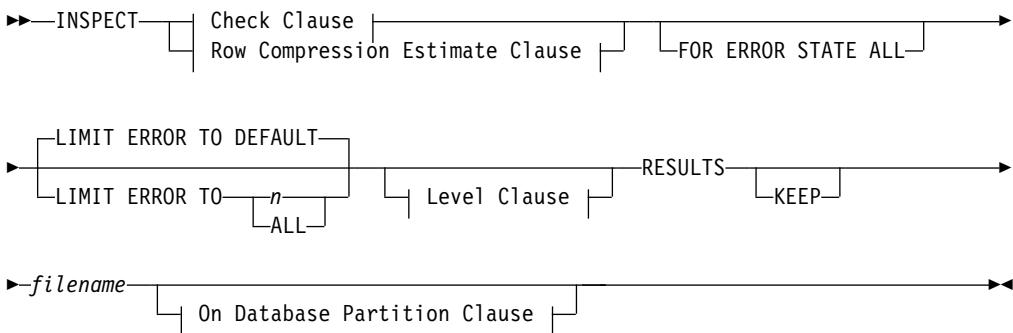
- SYSADM
  - DBADM
  - SYSCTRL
  - SYSMAINT

- CONTROL privilege if single table.

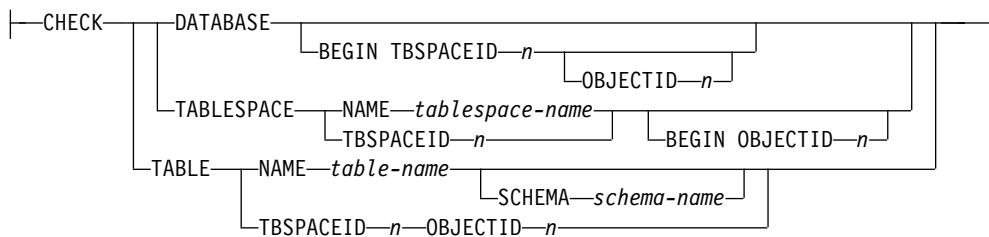
## Required Connection

Database

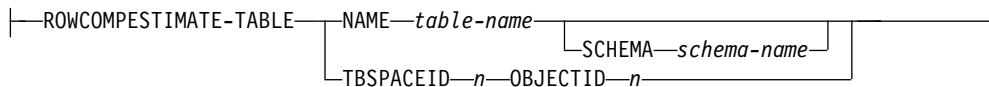
## Command Syntax



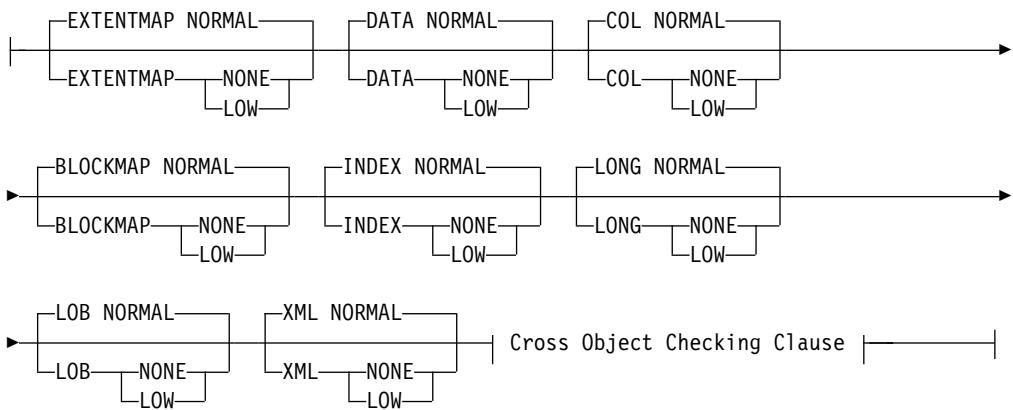
### Check Clause:



### Row Compression Estimate Clause:



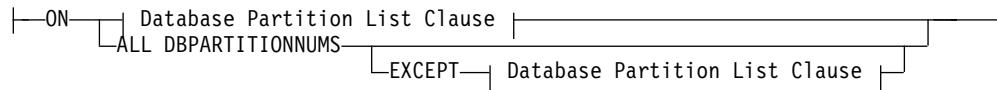
### Level Clause:



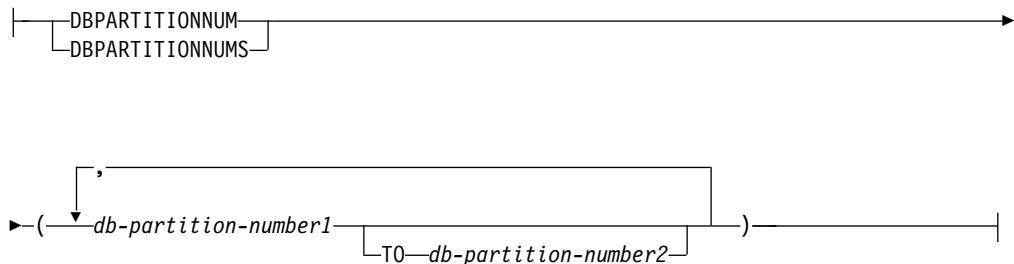
### Cross Object Checking Clause:



### On Database Partition Clause:



### Database Partition List Clause:



## Command Parameters

### CHECK

Specifies check processing.

### DATABASE

Specifies whole database.

### BEGIN TBSPACEID *n*

Specifies processing to begin from table space with given table space ID number.

### OBJECTID *n*

Specifies processing to begin from table with given table space ID number and object ID number.

### TABLESPACE

#### NAME *tablespace-name*

Specifies single table space with given table space name.

#### TBSPACEID *n*

Specifies single table space with given table space ID number.

#### BEGIN OBJECTID *n*

Specifies processing to begin from table with given object ID number.

### TABLE

#### NAME *table-name*

Specifies table with given table name.

#### SCHEMA *schema-name*

Specifies schema name for specified table name for single table operation.

**TBSpaceID *n* ObjectID *n***

Specifies table with given table space ID number and object ID number.

**ROWCOMPESTIMATE-TABLE**

Estimates the effectiveness of row compression for a table. You can also specify which database partitions this operation is to be done on.

This operation will keep the RESULTS output file regardless if the **KEEP** option is specified.

This tool is capable of taking a sample of the table data, and building a dictionary from it. This dictionary can then be used to test compression against the records contained in the sample. From this test compression, data is gathered from which the following estimates are made:

- Percentage of bytes saved from compression
- Percentage of pages saved from compression
- Compression dictionary size
- Expansion dictionary size

**INSPECT** will insert the dictionary built for gathering these compression estimates if the COMPRESS YES attribute is set for this table, and a dictionary does not already exist for this table. **INSPECT** will attempt to insert the dictionary concurrent to other applications accessing the table. Dictionary insert requires an Exclusive Table Alter lock and an Intent on Exclusive Table lock. **INSPECT** will only insert a dictionary into tables that support data row compression. For partitioned tables, a separate dictionary is built and inserted on each partition.

When sampling table row data and building a compression dictionary for a table, the **INSPECT** command supports only the table row data in the table object. If the table contains XML columns, data is not sampled and a compression dictionary is not built for the XML data in the XML storage object of the table. Use the table function instead.

The **ROWCOMPESTIMATE** option does not provide an index compression estimate. Use the table function instead.

This parameter does not support column-organized tables.

**RESULTS**

Specifies the result output file. The file will be written out to the diagnostic data directory path. If there is no error found by the check processing, this result output file will be erased at the end of the **INSPECT** operation. If there are errors found by the check processing, this result output file will not be erased at the end of the **INSPECT** operation.

**KEEP** Specifies to always keep the result output file.

*file-name*

Specifies the name for the result output file. The file has to be created in the diagnostic data directory path.

**ALL DBPARTITIONNUMS**

Specifies that operation is to be done on all database partitions specified in the db2nodes.cfg file. This is the default if a database partition clause is not specified.

**EXCEPT**

Specifies that operation is to be done on all database partitions specified in the db2nodes.cfg file, except those specified in the database partition list.

**ON DBPARTITIONNUM | ON DBPARTITIONNUMS**

Perform operation on a set of database partitions.

***db-partition-number1***

Specifies a database partition number in the database partition list.

***db-partition-number2***

Specifies the second database partition number, so that all database partitions from *db-partition-number1* up to and including *db-partition-number2* are included in the database partition list.

**FOR ERROR STATE ALL**

For table object with internal state already indicating error state, the check will just report this status and not scan through the object. Specifying this option will have the processing scan through the object even if internal state already lists error state.

When used with the **INDEXDATA** option, as long as the index or data object is in an error state, the online index to data consistency checking will not be performed.

**LIMIT ERROR TO *n***

Number of pages in error for an object to which reporting is limited. When this limit of the number of pages in error for an object is reached, the processing will discontinue the check on the rest of the object.

When used with the **INDEXDATA** option, *n* represents the number of errors to which reporting is limited during the online index to data consistency checking.

**LIMIT ERROR TO DEFAULT**

Default number of pages to limit error reporting for an object. This value is the extent size of the object. This parameter is the default.

When used with the **INDEXDATA** option, **DEFAULT** represents the default number of errors to which reporting is limited during the online index to data consistency checking.

**LIMIT ERROR TO ALL**

No limit on number of pages in error reported.

When used with the **INDEXDATA** option, **ALL** represents no limit on the number of errors reported during the online index to data consistency checking.

**EXTENTMAP**

Specifies the processing level for an extent map.

**NORMAL**

Specifies a normal processing level. This option is the default.

**NONE**

Specifies no processing.

**LOW** Specifies a low processing level.**DATA** Specifies the processing level for a data object.**NORMAL**

Specifies a normal processing level. This option is the default.

**NONE**

Specifies no processing.

**LOW** Specifies a low processing level.

<b>COL</b>	Specifies the processing level for a column-organized data object.
<b>NORMAL</b>	Specifies a normal processing level. This option is the default.
<b>NONE</b>	Specifies no processing.
<b>LOW</b>	Specifies a low processing level.
<b>BLOCKMAP</b>	Specifies the processing level for a block map object.
<b>NORMAL</b>	Specifies a normal processing level. This option is the default.
<b>NONE</b>	Specifies no processing.
<b>LOW</b>	Specifies a low processing level.
This parameter does not support column-organized tables.	
<b>INDEX</b>	Specifies the processing level for an index object.
<b>NORMAL</b>	Specifies a normal processing level. This option is the default.
<b>NONE</b>	Specifies no processing.
<b>LOW</b>	Specifies a low processing level.
<b>LONG</b>	Specifies the processing level for a long object.
<b>NORMAL</b>	Specifies a normal processing level. This option is the default.
<b>NONE</b>	Specifies no processing.
<b>LOW</b>	Specifies a low processing level.
<b>LOB</b>	Specifies the processing level for a LOB.
<b>NORMAL</b>	Specifies a normal processing level. This option is the default.
<b>NONE</b>	Specifies no processing.
<b>LOW</b>	Specifies a low processing level.
<b>XML</b>	Specifies the processing level for an XML column object.
<b>NORMAL</b>	Specifies a normal processing level. This option is the default. Pages of the XML object are checked for most inconsistencies. Actual XML data is not inspected.
<b>NONE</b>	Specifies no processing.
<b>LOW</b>	Specifies a low processing level. Pages of the XML object are checked for some inconsistencies. Actual XML data is not inspected.

## **INDEXDATA**

Specified in order to perform an index to data consistency check.  
**INDEXDATA** checking is not performed by default.

This parameter does not support column-organized tables.

## **Examples**

- To perform an index to data consistency check that allows read/write access to all objects, even the object inspected at the moment, issue the following command:

```
inspect check table name fea3 indexdata results keep fea3high.out
```

- To perform an index to data consistency check that allows read or write access to all objects, including the object that is being currently inspected, issue:

```
INSPECT CHECK TABLE NAME car SCHEMA vps INDEXDATA RESULTS KEEP table1.out
```

- To estimate how much storage space will be saved if the data in a table named EMPLOYEE is compressed, issue:

```
INSPECT ROWCOMPESTIMATE TABLE NAME car SCHEMA vps RESULTS table2.out
```

## **Usage Notes**

1. For **CHECK** operations on table objects, the level of processing can be specified for the objects. The default is **NORMAL** level, specifying **NONE** for an object excludes it. Specifying **LOW** will do subset of checks that are done for **NORMAL**.
2. The **CHECK DATABASE** option can be specified to start from a specific table space or from a specific table by specifying the ID value to identify the table space or the table.
3. The **CHECK TABLESPACE** option can be specified to start from a specific table by specifying the ID value to identify the table.
4. The processing of table spaces will affect only the objects that reside in the table space. The exception is when the **INDEXDATA** option is used. **INDEXDATA** will check index to data consistency as long as the index object resides in the table space. This means:
  - If the data object resides in a different table space than the specified table space to be inspected where the index object resides, it can still benefit from the **INDEXDATA** checking.
  - For a partitioned table, each index can reside in a different table space. Only those indexes that reside in the specified table space will benefit from the index to data checking. If you want to inspect all the indexes against one table, use the **CHECK TABLE** option or the **CHECK DATABASE** option.
5. The online inspect processing will access database objects using isolation level uncommitted read. **COMMIT** processing will be done during **INSPECT** processing. It is advisable to end the unit of work by issuing a **COMMIT** or **ROLLBACK** before invoking **INSPECT**.
6. The online inspect check processing will write out unformatted inspection data results to the results file specified. The file will be written out to the diagnostic data directory path. If there is no error found by the check processing, this result output file will be erased at the end of **INSPECT** operation. If there are errors found by the check processing, this result output file will not be erased at the end of **INSPECT** operation. After check processing completes, to see inspection details, the inspection result data will require to be formatted out with the utility **db2inspf**. The results file will have file extension of the database partition number.
7. In a partitioned database environment, each database partition will generate its own results output file with extension corresponding to its database

- partition number. The output location for the results output file will be the database manager diagnostic data directory path. If the name of a file that already exists is specified, the operation will not be processed, the file will have to be removed before that file name can be specified.
8. Normal online inspect processing will access database objects using isolation level uncommitted read. Inserting a compression dictionary into the table will attempt to acquire write locks. Please refer to the **ROWCOMPESTIMATE** option for details on dictionary insert locking. Commit processing will be done during the inspect processing. It is advisable to end the unit of work by issuing a COMMIT or ROLLBACK before starting the inspect operation.
  9. The **INDEXDATA** option only examines the logical inconsistency between index and data. Therefore, it is recommended that you first run **INDEX** and **DATA** checking separately, to rule out any physical corruption, before running **INDEXDATA** checking.
  10. The **INSPECT** command, specified with the **INDEXDATA** parameter, performs an index to data consistency check while allowing read/write access to all objects/tables, even the one being inspected at the moment. The **INSPECT INDEXDATA** option includes the following inspections:
    - the existence of the data row for a given index entry.
    - a key to data value verification.
- When the **INDEXDATA** option is specified:
- By default, only the values of explicitly specified level clause options will be used. For any level clause options which are not explicitly specified, the default levels will be overwritten from NORMAL to NONE. For instance, when **INDEXDATA** is the only level clause option specified, by default, only index to data checking will be performed.
11. The **BLOCKMAP** option returns information that includes whether a block has been reclaimed for use by the table space following a reorganization to reclaim multidimensional clustering (MDC) or insert time clustering (ITC) table blocks that were empty.
  12. If the **INSPECT** command completes with resource errors or limitations, E.g. system is out of memory, you should try to run it again after the resource errors are fixed or limitations lifted.

## LIST ACTIVE DATABASES

Displays a subset of the information listed by the **GET SNAPSHOT FOR ALL DATABASES** command. An active database is available for connection and use by any application.

For each active database, this command displays the following information:

- Database name
- Number of applications currently connected to the database
- Database path.

### Scope

This command is issued on the currently attached member and, by default, returns information only for that member. In the case of multiple members per host, the currently attached member is the first member that is listed in the db2nodes.cfg file on that host.

To issue the command for a specific member that is not the currently attached member, specify the **ATTACH\_MEMBER** parameter. To issue the command for all members and receive an aggregated result, specify the **GLOBAL** parameter.

To change the currently attached member, issue the **SET CLIENT** command with the **ATTACH\_MEMBER** parameter. You must issue the **DETACH** command followed by the **ATTACH** command from your application for this change to take effect.

## Authorization

One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT
- SYSMON

## Command syntax

```
►►—LIST ACTIVE DATABASES—
 |
 |—AT MEMBER—member-number
 |
 |—GLOBAL—
```

## Command parameters

### AT MEMBER *member-number*

Specifies the member for which the list of active databases is to be displayed.

### GLOBAL

Returns a list of active databases for all members in a partitioned database environment or a Db2 pureScale environment.

## Examples

The following example is sample output from the **LIST ACTIVE DATABASES** command:

Active Databases	
Database name	= TEST
Applications connected currently	= 0
Database path	= /home smith smith/NODE0000/SQL00002/
Database name	= SAMPLE
Applications connected currently	= 1
Database path	= /home smith smith/NODE0000/SQL00001/

## Compatibilities

For compatibility with previous versions:

- **DBPARTITIONNUM** or **NODE** can be substituted for **MEMBER**, except when the **DB2\_ENFORCE\_MEMBER\_SYNTAX** registry variable is set to **ON**.

## LIST APPLICATIONS

Displays to standard output the application program name, authorization ID (user name), application handle, application ID, and database name of all active database

applications. This command can also optionally display an application's sequence number, status, status change time, and database path.

## Scope

This command is issued on the currently attached member and, by default, returns information only for that member. In the case of multiple members per host, the currently attached member is the first member that is listed in the db2nodes.cfg file on that host.

To issue the command for a specific member that is not the currently attached member, specify the **ATTACH\_MEMBER** parameter. To issue the command for all members and receive an aggregated result, specify the **GLOBAL** parameter.

To change the currently attached member, issue the **SET CLIENT** command with the **ATTACH\_MEMBER** parameter . You must issue the **DETACH** command followed by the **ATTACH** command from your application for this change to take effect.

## Authorization

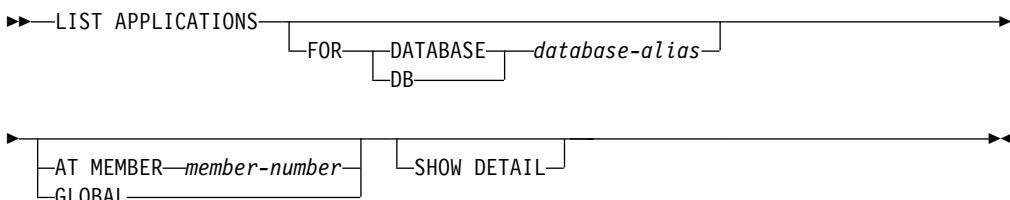
one of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT
- SYSMON

## Required connection

Instance. To list applications for a remote instance, it is necessary to first attach to that instance.

## Command syntax



## Command parameters

### FOR DATABASE *database-alias*

Information for each application that is connected to the specified database is to be displayed. Database name information is not displayed. If this option is not specified, the command displays the information for each application that is currently connected to any database at the member to which the user is currently attached.

The default application information consists of the following:

- Authorization ID
- Application name
- Application handle

- Application ID
- Database name
- Number of agents

**AT MEMBER *member-number***

Specifies the member for which the active applications are to be displayed.

**GLOBAL** Returns a list of active applications for all members in a partitioned database environment or a Db2 pureScale environment.

**SHOW DETAIL**

Some of the additional output information will include:

- CONNECT Auth ID
- Sequence number
- Coordinating member number
- Coordinator pid or thread
- Status
- Status change time
- Node
- Database path

If this option is specified, it is recommended that the output be redirected to a file, and that the report be viewed with the help of an editor. The output lines might wrap around when displayed on the screen. When a database is activated by a user other than the database administrator or an user without SYSADM authority the authorization ID will be shown as the non system user.

## Examples

To list detailed information about the applications connected to the SAMPLE database, issue:

```
list applications for database sample show detail
```

## Usage notes

The database administrator can use the output from this command as an aid to problem determination. In addition, this information is required if the database administrator wants to use the **GET SNAPSHOT** command or the **FORCE APPLICATION** command in an application.

To list applications at a remote instance (or a different local instance), it is necessary to first attach to that instance. If **FOR DATABASE** is specified when an attachment exists, and the database resides at an instance which differs from the current attachment, the command will fail.

**LIST APPLICATIONS** only shows user applications while **LIST APPLICATIONS SHOW DETAIL** shows all applications including the system applications. Event monitors are an example of system applications. System applications usually appear in snapshot output with application names beginning "db2" (for example, db2stmm, db2taskd).

## Compatibilities

For compatibility with previous versions:

- **DBPARTITIONNUM** or **NODE** can be substituted for **MEMBER**, except when the **DB2\_ENFORCE\_MEMBER\_SYNTAX** registry variable is set to ON.

## LIST COMMAND OPTIONS

Lists the current settings for the environment variables: **DB2BQTIME**, **DB2DQTRY**, **DB2RQTIME**, **DB2IQTIME**, **DB2OPTIONS**.

### Authorization

None

### Required connection

None

### Command syntax

**►►—LIST COMMAND OPTIONS—►►**

### Command parameters

None

### Examples

The following is sample output from **LIST COMMAND OPTIONS**:

Command Line Processor Option Settings		
Backend process wait time (seconds)	(DB2BQTIME) = 1	
No. of retries to connect to backend	(DB2BQTRY) = 60	
Request queue wait time (seconds)	(DB2RQTIME) = 5	
Input queue wait time (seconds)	(DB2IQTIME) = 5	
Command options	(DB2OPTIONS) =	
Option	Description	Current Setting
-a	Display SQLCA	OFF
-b	Auto-Bind	ON
-c	Auto-Commit	ON
-d	XML declarations	OFF
-e	Display SQLCODE/SQLSTATE	OFF
-f	Read from input file	OFF
-i	Display XML data with indentation	OFF
-j	Return code for system calls	OFF
-l	Log commands in history file	OFF
-m	Display the number of rows affected	OFF
-n	Remove new line character	OFF
-o	Display output	ON
-p	Display interactive input prompt	ON
-q	Preserve whitespaces & linefeeds	OFF
-r	Save output to report file	OFF
-s	Stop execution on command error	OFF
-t	Set statement termination character	OFF
-v	Echo current command	OFF
-w	Display FETCH/SELECT warning messages	ON
-x	Suppress printing of column headings	OFF
-y	Get SQL message text from server	ON
-z	Save all output to output file	OFF

## LIST DATABASE DIRECTORY

Lists the contents of the system database directory. If a path is specified, the contents of the local database directory are listed.

### Scope

If this command is issued without the **ON *path*** parameter, the system database directory is returned. This information is the same at all database partitions.

If the **ON *path*** parameter is specified, the local database directory on that path is returned. This information is not the same at all database partitions.

### Authorization

None

### Required connection

None. Directory operations affect the local directory only.

### Command syntax

```
►►—LIST—[DATABASE]—DIRECTORY—[ON—[path]]—[drive]—►►
```

### Command parameters

#### ON *path* | *drive*

Specifies the local database directory from which to list information. If not specified, the contents of the system database directory are listed. Note that the instance name is implied in the path. Please do not specify the instance name as part of the path.

### Examples

The following shows sample output for a system database directory:

System Database Directory

Number of entries in the directory = 2

Database 1 entry:

Database alias	= SAMPLE
Database name	= SAMPLE
Local database directory	= /home/smith
Database release level	= 8.00
Comment	=
Directory entry type	= Indirect
Catalog database partition number	= 0
Alternate server hostname	= montero
Alternate server port number	= 29384

Database 2 entry:

Database alias	= TC004000
Database name	= TC004000
Node name	= PRINODE
Database release level	= a.00
Comment	=

Directory entry type	= LDAP
Catalog database partition number	= -1
Gateway node name	= PRIGW
Alternate server node name	=
Alternate server gateway node name	= ALTGW

The following shows sample output for a local database directory:

```
Local Database Directory on /u/smith
```

```
Number of entries in the directory = 1
```

```
Database 1 entry:
```

Database alias	= SAMPLE
Database name	= SAMPLE
Database directory	= SQL00001
Database release level	= 8.00
Comment	=
Directory entry type	= Home
Catalog database partition number	= 0
Database partition number	= 0

These fields are identified as follows:

#### **Database alias**

The value of the *alias* parameter when the database was created or cataloged. If an alias was not entered when the database was cataloged, the database manager uses the value of the *database-name* parameter when the database was cataloged.

#### **Database name**

The value of the *database-name* parameter when the database was cataloged. This name is usually the name under which the database was created.

#### **Local database directory**

The path on which the database resides. This field is filled in only if the system database directory has been scanned.

#### **Database directory**

The name of the directory where the database resides. This field is filled in only if the local database directory has been scanned.

#### **Node name**

The name of the remote node. This name corresponds to the value entered for the *nodename* parameter when the database and the node were cataloged.

#### **Database release level**

The release level of the database manager that can operate on the database.

#### **Comment**

Any comments associated with the database that were entered when it was cataloged.

#### **Directory entry type**

The location of the database:

- A Remote entry describes a database that resides on another node.
- An Indirect entry describes a database that is local. Databases that reside on the same node as the system database directory are thought to indirectly reference the home entry (to a local database directory), and are considered indirect entries.

- A Home entry indicates that the database directory is on the same path as the local database directory.
- An LDAP entry indicates that the database location information is stored on an LDAP server.

All entries in the system database directory are either remote or indirect.

All entries in local database directories are identified in the system database directory as indirect entries.

#### **Authentication**

The authentication type cataloged at the client.

#### **Principal name**

Specifies a fully qualified Kerberos principal name.

#### **Catalog database partition number**

Specifies which node is the catalog database partition. This is the database partition on which the **CREATE DATABASE** command was issued.

#### **Database partition number**

Specifies the number that is assigned in db2nodes.cfg to the node where the command was issued.

#### **Alternate server hostname**

Specifies the host name or the IP address for the alternate server to be used when there is communication failure on the connection to the database. This field is displayed only for the system database directory.

#### **Alternate server port number**

Specifies the port number for the alternate server to be used when there is communication failure on the connection to the database. This field is displayed only for the system database directory.

#### **Alternate server node name**

If the directory entry type is LDAP, specifies the node name for the alternate server to be used when there is communication failure on the connection to the database.

#### **Alternate server gateway node name**

If the directory entry type is LDAP, specifies the gateway node name for the alternate gateway to be used when there is communication failure on the connection to the database.

### **Usage notes**

Regardless of the **DB2LDAPCACHE** miscellaneous variable setting, if using the **LIST DATABASE DIRECTORY** or the **LIST NODE DIRECTORY** commands, the list of local database and node entries are read from the LDAP server.

There can be a maximum of eight opened database directory scans per process. To overcome this restriction for a batch file that issues more than eight **LIST DATABASE DIRECTORY** commands within a single Db2 session, convert the batch file into a shell script. The "db2" prefix generates a new Db2 session for each command.

## **LIST DATABASE PARTITION GROUPS**

Lists all database partition groups associated with the current database.

## Scope

This command can be issued from any database partition that is listed in \$HOME/sql1ib/db2nodes.cfg. It returns the same information from any of these database partitions.

## Authorization

For the system catalogs SYSCAT.DBPARTITIONGROUPS and SYSCAT.DBPARTITIONGROUPDEF, one of the following authorities is required:

- SYSADM
- SYSCTRL
- SYSMAINT
- SYSMON
- DBADM
- CONTROL privilege
- SELECT privilege.

## Required connection

Database

## Command syntax

►►►LIST DATABASE PARTITION GROUPS [SHOW DETAIL]►►►

## Command parameters

### SHOW DETAIL

Specifies that the output should include the following information:

- Distribution map ID
- Database partition number
- In-use flag

## Examples

The following example is sample output from the **LIST DATABASE PARTITION GROUPS** command:

```
DATABASE PARTITION GROUP NAME
```

```

IBMCATGROUP
IBMDFAULTGROUP
```

2 record(s) selected.

The following example is sample output from the **LIST DATABASE PARTITION GROUPS SHOW DETAIL** command:

```
DATABASE PARTITION GROUP NAME PMAP_ID DATABASE PARTITION NUMBER IN_USE
```

```

IBMCATGROUP 0 0 Y
IBMDFAULTGROUP 1 0 Y
```

2 record(s) selected.

The fields are identified as follows:

#### **DATABASE PARTITION GROUP NAME**

The name of the database partition group. The name is repeated for each database partition in the database partition group.

#### **PMAP\_ID**

The ID of the distribution map. The ID is repeated for each database partition in the database partition group.

#### **DATABASE PARTITION NUMBER**

The number of the database partition.

#### **IN\_USE**

One of four values:

- Y** The database partition is being used by the database partition group.
- D** The database partition is going to be dropped from the database partition group as a result of a **REDISTRIBUTE DATABASE PARTITION GROUP** operation. When the operation completes, the database partition will not be included in reports from **LIST DATABASE PARTITION GROUPS**.
- A** The database partition has been added to the database partition group but is not yet added to the distribution map. The containers for the table spaces in the database partition group have been added on this database partition. The value is changed to Y when the **REDISTRIBUTE DATABASE PARTITION GROUP** operation completes successfully.
- T** The database partition has been added to the database partition group, but is not yet added to the distribution map. The containers for the table spaces in the database partition group have not been added on this database partition. Table space containers must be added on the new database partition for each table space in the database partition group. The value is changed to A when containers have successfully been added.

## **LIST DBPARTITIONNUMS**

Lists all database partitions or members associated with the current database.

### **Scope**

This command can be issued from any database partition or member that is listed in \$HOME/sql1lib/db2nodes.cfg. It returns the same information from any of these database partitions or members.

### **Authorization**

None

### **Required connection**

Database

## Command syntax

►►—LIST DBPARTITIONNUMS————►►

## Command parameters

None

## Examples

**Example 1 - Partitioned database instance :** Following is sample output from the **LIST DBPARTITIONNUMS** command:

```
DATABASE PARTITION NUMBER

0
2
5
7
9
```

5 record(s) selected.

**Example 2 - Db2 pureScale instance :** In a Db2 pureScale environment, **LIST DBPARTITIONNUMS** will always report a single partition.

```
DATABASE PARTITION NUMBER

0
```

1 record(s) selected.

## LIST DCS APPLICATIONS

Displays standard output information about applications that are connected to host databases via Db2 Connect Enterprise Edition.

### Authorization

One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT
- SYSMON

### Required connection

Instance. To list the DCS applications at a remote instance, it is necessary to first attach to that instance.

## Command syntax

►►—LIST DCS APPLICATIONS————►►

SHOW DETAIL  
EXTENDED

## Command parameters

### LIST DCS APPLICATIONS

The default application information includes:

- Host authorization ID (*username*)
- Application program name
- Application handle
- Outbound application ID (*luwid*).

### SHOW DETAIL

Specifies that output include the following additional information:

- Client application ID
- Client sequence number
- Client database alias
- Client node name (*nname*)
- Client release level
- Client code page
- Outbound sequence number
- Host database name
- Host release level.

### EXTENDED

Generates an extended report. This report includes all of the fields that are listed when the **SHOW DETAIL** option is specified, plus the following additional fields:

- DCS application status
- Status change time
- Client platform
- Client protocol
- Client code page
- Process ID of the client application
- Host coded character set ID (CCSID).

#### Note:

1. The application status field contains one of the following values:

##### **connect pending - outbound**

Denotes that the request to connect to a host database has been issued, and that Db2 Connect is waiting for the connection to be established.

##### **waiting for request**

Denotes that the connection to the host database has been established, and that Db2 Connect is waiting for an SQL statement from the client application.

##### **waiting for reply**

Denotes that the SQL statement has been sent to the host database.

2. The status change time is shown only if the System Monitor UOW switch was turned on during processing. Otherwise, Not Collected is shown.

## Usage notes

The database administrator can use this command to match client application connections *to* the gateway with corresponding host connections *from* the gateway.

The database administrator can also use agent ID information to force specified applications off a Db2 Connect Server.

## LIST DCS DIRECTORY

Lists the contents of the Database Connection Services (DCS) directory.

### Authorization

None

### Required connection

None

### Command syntax

►►—LIST DCS DIRECTORY—————►►

### Command parameters

None

### Examples

The following example is sample output from **LIST DCS DIRECTORY**:

```
Database Connection Services (DCS) Directory
Number of entries in the directory = 1
DCS 1 entry:
Local database name = DB2
Target database name = DSN_DB_1
Application requestor name = =
DCS parameters = =
Comment = DB2/MVS Location name DSN_DB_1
DCS directory release level = 0x0100
```

These fields are identified as follows:

#### Local database name

Specifies the local alias of the target host database. This corresponds to the *database-name* parameter entered when the host database was cataloged in the DCS directory.

#### Target database name

Specifies the name of the host database that can be accessed. This corresponds to the *target-database-name* parameter entered when the host database was cataloged in the DCS directory.

**Application requester name**

Specifies the name of the program residing on the application requester or server.

## DCS parameters

String that contains the connection and operating environment parameters to use with the application requester. Corresponds to the parameter string entered when the host database was catalogued. The string must be enclosed by double quotation marks, and the parameters must be separated by commas.

## Comment

Describes the database entry.

## **DCS directory release level**

Specifies the version number of the Distributed Database Connection Services program under which the database was created.

## Usage notes

The DCS directory is created the first time that the **CATALOG DCS DATABASE** command is invoked. It is maintained on the path or drive where Db2 was installed, and provides information about host databases that the workstation can access if the Db2 Connect program has been installed. The host databases can be:

- Db2 databases on OS/390 and z/OS host
  - Db2 databases on System i hosts
  - Db2 databases on VSE & VM hosts

# **LIST DRDA INDOUBT TRANSACTIONS**

Provides a list of transactions that are indoubt between DRDA requesters and DRDA servers. If DRDA commit protocols are being used, lists indoubt transactions between DRDA sync point managers.

## Authorization

None

## Required connection

## Instance

## Command syntax

►—LIST DRDA INDOUBT TRANSACTIONS [WITH PROMPTING]►

## Command parameters

## WITH PROMPTING

Indicates that indoubt transactions are to be processed. If this parameter is specified, an interactive dialog mode is initiated, permitting the user to commit or roll back indoubt transactions. If this parameter is not specified, indoubt transactions are written to the standard output device, and the interactive dialog mode is not initiated.

A forget option is not supported. Once the indoubt transaction is committed or rolled back, the transaction is automatically forgotten.

Interactive dialog mode permits the user to:

- List all indoubt transactions (enter l)
- List indoubt transaction number  $x$  (enter l, followed by a valid transaction number)
- Quit (enter q)
- Commit transaction number  $x$  (enter c, followed by a valid transaction number)
- Roll back transaction number  $x$  (enter r, followed by a valid transaction number).

A blank space must separate the command letter from its argument.

Before a transaction is committed or rolled back, the transaction data is displayed, and the user is asked to confirm the action.

## Usage notes

DRDA indoubt transactions occur when communication is lost between coordinators and participants in distributed units of work. A distributed unit of work lets a user or application read and update data at multiple locations within a single unit of work. Such work requires a two-phase commit.

The first phase requests all the participants to prepare for a commit. The second phase commits or rolls back the transactions. If a coordinator or participant becomes unavailable after the first phase, the distributed transactions are indoubt.

Before issuing the **LIST DRDA INDOUBT TRANSACTIONS** command, the application process must be connected to the Db2 sync point manager (SPM) instance. Use the **spm\_name** database manager configuration parameter as the *dbalias* on the CONNECT statement.

TCP/IP connections, using the SPM to coordinate commits, use DRDA two-phase commit protocols.

## LIST HISTORY

Lists entries in the database history records. The database history records contain a record of recovery and administrative events.

Recovery events include full database and table space level backup, incremental backup, restore, and rollforward operations. Additional logged events include create, alter, drop, or rename table space, reorganize table, drop table, and load.

The **LIST HISTORY** command only returns history information for the database partition it is issued on. To list the history on multiple partitions, you can either issue the **LIST HISTORY** command from each individual database partition, or use the **db2\_all** prefix to run the **LIST HISTORY** command on all database partitions.

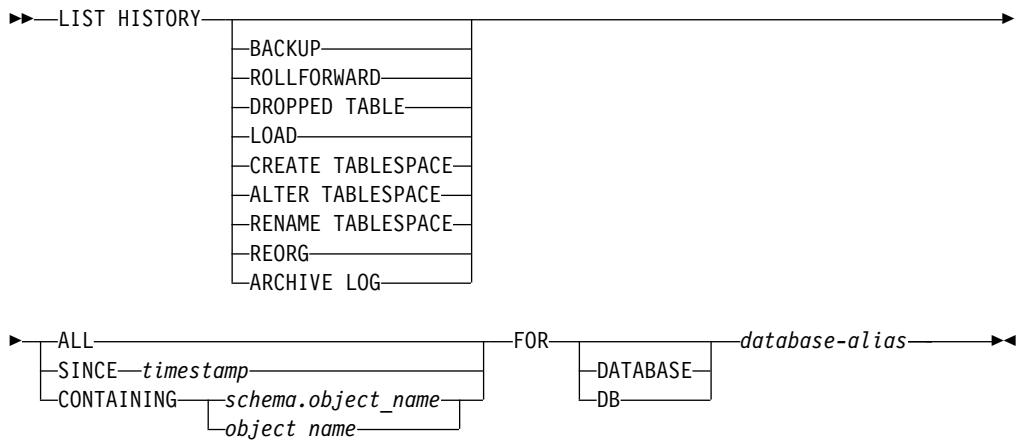
## Authorization

None

## Required connection

Instance. You must attach to any remote database in order to run this command against it. For a local database, an explicit attachment is not required.

## Command syntax



## Command parameters

### HISTORY

Lists all events that are currently logged in the database history records.

### BACKUP

Lists backup and restore operations.

### ROLLFORWARD

Lists rollforward operations.

### DROPPED TABLE

Lists dropped table records. A dropped table record is created only when the table is dropped and the table space containing it has the DROPPED TABLE RECOVERY option enabled. Returns the CREATE TABLE syntax for partitioned tables and indicates which table spaces contained data for the table that was dropped.

### LOAD

Lists load operations.

### CREATE TABLESPACE

Lists table space create and drop operations.

### RENAME TABLESPACE

Lists table space renaming operations.

### REORG

Lists reorganization operations. Includes information for each reorganized data partition of a partitioned table.

### ALTER TABLESPACE

Lists alter table space operations.

### ARCHIVE LOG

Lists archive log operations and the archived logs.

**ALL** Lists all entries of the specified type in the database history records.

**SINCE *timestamp***

A complete time stamp (format *yyyymmddhhmmss*), or an initial prefix (minimum *yyyy*) can be specified. All entries with time stamps equal to or greater than the time stamp provided are listed.

**CONTAINING *schema.object\_name***

This qualified name uniquely identifies a table.

**CONTAINING *object\_name***

This unqualified name uniquely identifies a table space.

**FOR DATABASE *database-alias***

Used to identify the database whose recovery database history records are to be listed.

## Examples

The following examples show different uses of the **LIST HISTORY** command:

```
db2 list history since 19980201 for sample
db2 list history backup containing userspace1 for sample
db2 list history dropped table all for db sample
```

### Example 1

The following sample output shows two entries, one for a Load (L) operation and another one for a backup (B) operation:

```
db2 list history all for SAMPLE
```

```
List History File for sample

Number of matching file entries = 2

Op Obj Timestamp+Sequence Type Dev Earliest Log Current Log Backup ID
--- ---
L T 20100106133005001 R S S0000000.LOG S0000000.LOG

"USERNAME"."T1" resides in 1 tablespace(s):

00001 USERSPACE1

Comment: DB2
Start Time: 20100106133005
End Time: 20100106133006
Status: A

EID: 3 Location: /home/hotel19/username/mydatafile.del

SQLCA Information

sqlcaid : SQLCA sqlcabc: 136 sqlcode: 3107 sqlerrml: 0

sqlerrmc:
sqlerrp : SQLUVLD
sqlerrd : (1) -2146107283 (2) 0 (3) 0
 (4) 0 (5) 0 (6) 0
sqlwarn : (1) W (2) (3) (4) (5) (6)
 (7) (8) (9) (10) (11)
sqlstate:

Op Obj Timestamp+Sequence Type Dev Earliest Log Current Log Backup ID
--- ---
B D 20100106135509001 F D S0000000.LOG S0000000.LOG

Contains 2 tablespace(s):

00001 SYSCATSPACE
00002 USERSPACE1

Comment: DB2 BACKUP SAMPLE OFFLINE
Start Time: 20100106135509
```

```

End Time: 20100106135512
Status: A

EID: 4 Location: /home/hotel19/username

```

### Example 2

The following sample output shows one entry for the reorganization reclaim operation:

```

db2 -v "list history reorg all for wsdb"

Op Obj Timestamp+Sequence Type Dev Earliest Log Current Log Backup ID

G T 20080924101408 N S0000000.LOG S0000000.LOG

Table: "ZHMFENG "."T1"

Comment: REORG RECLAIM
Start Time: 20080924101408
End Time: 20080924101409
Status: A

```

### Example 3

Use the **db2\_all** prefix to run the LIST HISTORY command on all database partitions:

```
db2_all "db2 list history since 20010601 for sample"
```

### Example 4

The following is an example of DB history records in a Db2 pureScale environment.

```

db2 list history since 20091020163200 for database sample

Op Obj Timestamp+Sequence Type Dev Backup ID

X D 20091020163218 1 D

Log Stream ID Earliest Log Current Log

3 S0000023.LOG C0000000

Comment:
Start Time: 20091020163218
End Time: 20091020163245
Status: A

EID: 28 Location: /notnfs/billings/arch_logs/billings/SAMPLE/NODE0000/LOGSTREAM0002/C0000000/S0000023.LOG

Op Obj Timestamp+Sequence Type Dev Backup ID

X D 20091020163219 1 D

Log Stream ID Earliest Log Current Log

0 S0000001.LOG C0000000

Comment:
Start Time: 20091020163219
End Time: 20091020163257
Status: A

EID: 29 Location: /notnfs/billings/arch_logs/billings/SAMPLE/NODE0000/LOGSTREAM0000/C0000000/S0000001.LOG

```

### Example 5

The following is an example of DB history records outside of a Db2 pureScale environment.

```
db2 list history since 20091020155300 for database sample
```

```

Op Obj Timestamp+Sequence Type Dev Earliest Log Current Log Backup ID

X D 20091020155341 1 D S0000004.LOG C0000000

Comment:
Start Time: 20091020155341
End Time: 20091020155345

```

```
Status: A

EID: 9 Location: /notnfs/billings/arch_logs/billings/SAMPLE/NODE0000/LOGSTREAM0000/C0000000/S0000004.LOG
```

## Usage notes

The SYSIBMADM.DB\_HISTORY administrative view can be used to retrieve data from all database partitions.

In a Db2 pureScale instance, all DB history records for the database are global. The DB history records can be retrieved using the list history or administrative view interface connected to any member.

The report generated by this command contains the following symbols:

### Operation

- A - Create table space
- B - Backup
- C - Load copy
- D - Drop table
- F - Rollforward
- G - Reorganize
- L - Load
- N - Rename table space
- O - Drop table space
- Q - Quiesce
- R - Restore
- T - Alter table space
- U - Unload
- X - Archive log

### Object

- D - Database
- I - Index
- P - Table space
- T - Table
- R - Partitioned table

### Type

Alter table space operation types:

- C - Add container
- R - Rebalance

Archive log operation types:

- F - Failover archive path
- M - Secondary (mirror) log path
- N - Archive log command
- P - Primary log path
- 1 - Primary log archive method
- 2 - Secondary log archive method

Backup and restore operation types:

- D - Delta offline
- E - Delta online
- F - Offline
- I - Incremental offline
- M - Merged
- N - Online
- O - Incremental online
- R - Rebuild

Load operation types:

I - Insert  
R - Replace

Rollforward operation types:

E - End of logs  
P - Point-in-time

Quiesce operation types:

S - Quiesce share  
U - Quiesce update  
X - Quiesce exclusive  
Z - Quiesce reset

History entry status flag:

A - Active  
D - Deleted  
E - Expired  
I - Inactive  
N - Not yet committed  
P - Pending delete  
X - Do not delete  
a - Incomplete active  
i - Incomplete inactive

## LIST INDOUBT TRANSACTIONS

Provides a list of transactions that are indoubt. The user can interactively commit, roll back, or forget the indoubt transactions.

The two-phase commit protocol comprises:

1. The PREPARE phase, in which the resource manager writes the log pages to disk, so that it can respond to either a COMMIT or a ROLLBACK primitive
2. The COMMIT (or ROLLBACK) phase, in which the transaction is actually committed or rolled back.

Forgetting a transaction releases resources held by a heuristically completed transaction (that is, one that has been committed or rolled back heuristically). An indoubt transaction is one which has been prepared, but not yet committed or rolled back.

### Scope

This command returns a list of indoubt transactions on the executed node.

### Authorization

None

### Required connection

Database. If implicit connect is enabled, a connection to the default database is established.

## Command syntax

```
►►—LIST INDOUBT TRANSACTIONS—►►
 | WITH PROMPTING |
```

## Command parameters

### WITH PROMPTING

Indicates that indoubt transactions are to be processed. If this parameter is specified, an interactive dialog mode is initiated, permitting the user to commit, roll back, or forget indoubt transactions. If this parameter is not specified, indoubt transactions are written to the standard output device, and the interactive dialog mode is not initiated.

Interactive dialog mode permits the user to:

- List all indoubt transactions (enter l)
- List indoubt transaction number  $x$  (enter l, followed by a valid transaction number)
- Quit (enter q)

**Note:** The transaction numbers are not persistent, so if you quit the interactive session and reissue the **LIST INDOUBT TRANSACTIONS** command, the transaction might be numbered differently.

- Commit transaction number  $x$  (enter c, followed by a valid transaction number)
- Roll back transaction number  $x$  (enter r, followed by a valid transaction number)
- Forget transaction number  $x$  (enter f, followed by a valid transaction number).
- Display help for the interactive session (enter h)

A blank space must separate the command letter from its argument.

Before a transaction is committed, rolled back, or forgotten, the transaction data is displayed, and the user is asked to confirm the action.

The **LIST INDOUBT TRANSACTIONS** command returns *type* information to show the role of the database in each indoubt transaction:

**TM** Indicates the indoubt transaction is using the database as a transaction manager database.

**RM** Indicates the indoubt transaction is using the database as a resource manager, meaning that it is one of the databases participating in the transaction, but is not the transaction manager database.

## Usage notes

An indoubt transaction is a global transaction that was left in an indoubt state. This occurs when either the Transaction Manager (TM) or at least one Resource Manager (RM) becomes unavailable after successfully completing the first phase (that is, the PREPARE phase) of the two-phase commit protocol. The RMs do not know whether to commit or to roll back their branch of the transaction until the TM can consolidate its own log with the indoubt status information from the RMs when they again become available. An indoubt transaction can also exist in an MPP environment.

If **LIST INDOUBT TRANSACTIONS** is issued against the currently connected database, the command returns the information about the indoubt transactions in that database.

Only transactions whose status is indoubt (i), or missing commit acknowledgment (m), or missing federated commit acknowledgment (d) can be committed.

Only transactions whose status is indoubt (i), missing federated rollback acknowledgment (b), or ended (e) can be rolled back.

Only transactions whose status is committed (c), rolled back (r), missing federated commit acknowledgment (d), or missing federated rollback acknowledgment (b) can be forgotten.

In the commit phase of a two-phase commit, the coordinator node waits for commit acknowledgments. If one or more nodes do not reply (for example, because of node failure), the transaction is placed in missing commit acknowledgment state.

Indoubt transaction information is valid only at the time that the command is issued. After you are in interactive dialog mode, transaction status might change because of external activities. However, the output is not refreshed on the client if the status changes on the server. If this happens, and you attempt to process an indoubt transaction which is no longer in an appropriate state, an error message is displayed. You need to quit the interactive session and reissue the **LIST INDOUBT TRANSACTIONS** command with the **WITH PROMPTING** option to obtain the most current status.

In the following sample interactive session, the user commits an in-doubt transaction:

```
$ db2 list indoubt transactions with prompting
1. originator: Db2 Enterprise Server Edition
 appl_id: *LOCAL.DB2.130919165159 sequence_no: 0001 status: i
 timestamp: 09/19/2013 16:51:59 auth_id: SMITH
 log_full: n type: RM
 xid: 53514C2000000017 00000000544D4442 00000000002F93DD A92F8C4FF3000000
0000BD
```

```
Enter in-doubt transaction command or 'q' to quit.
e.g. 'c 1' heuristically commits transaction 1.
c/r/f/l/q: c 1
```

```
1. originator: Db2 Enterprise Server Edition
 appl_id: *LOCAL.DB2.130919165159 sequence_no: 0001 status: i
 timestamp: 09/19/2013 16:51:59 auth_id: SMITH
 log_full: n type: RM
 xid: 53514C2000000017 00000000544D4442 00000000002F93DD A92F8C4FF3000000
0000BD
```

```
Do you want to heuristically COMMIT this in-doubt transaction ? (y/n) y
```

```
DB20000I "COMMIT INDOUBT TRANSACTION" completed successfully
```

```
c/r/f/l/q: c 5
```

```
DB20030E "5" is not a valid in-doubt transaction number.
```

```
c/r/f/l/q: 1
```

```
In-doubt Transactions for Database SAMPLE
```

```

1. originator: Db2 Enterprise Server Edition
 appl_id: *LOCAL.DB2.130919165159 sequence_no: 0001 status: c
 timestamp: 09/19/2013 16:51:59 auth_id: SMITH
 log_full: n type: RM
 xid: 53514C2000000017 00000000544D4442 0000000002F93DD A92F8C4FF3000000
0000BD

c/r/f/l/q: q

```

In the following sample interactive session, the user is unsuccessful at rolling back in-doubt transaction because it is unlisted, and then succeeds at rolling back a valid in-doubt transaction:

```

$ db2 list indoubt transactions with prompting

1. originator: Db2 Enterprise Server Edition
 appl_id: *LOCAL.DB2.130919161043 sequence_no: 0001 status: i
 timestamp: 09/19/2013 16:10:43 auth_id: JONES
 log_full: n type: RM
 xid: 53514C2000000017 00000000544D4442 0000000002F95FE B62F8C4FF3000000
0000C1

```

```

Enter in-doubt transaction command or 'q' to quit.
e.g. 'c 1' heuristically commits transaction 1.
c/r/f/l/q: r 5

```

```
DB20030E "5" is not a valid in-doubt transaction number.
```

```
c/r/f/l/q: 1
```

#### In-doubt Transactions for Database SAMPLE

```

1. originator: Db2 Enterprise Server Edition
 appl_id: *LOCAL.DB2.130919161043 sequence_no: 0001 status: i
 timestamp: 09/19/2013 16:10:43 auth_id: JONES
 log_full: n type: RM
 xid: 53514C2000000017 00000000544D4442 0000000002F95FE B62F8C4FF3000000
0000C1
c/r/f/l/q: r 1

```

```

1. originator: Db2 Enterprise Server Edition
 appl_id: *LOCAL.DB2.130919161043 sequence_no: 0001 status: i
 timestamp: 09/19/2013 16:10:43 auth_id: JONES
 log_full: n type: RM
 xid: 53514C2000000017 00000000544D4442 0000000002F95FE B62F8C4FF3000000
0000C1

```

```
Do you want to heuristically ROLLBACK this in-doubt transaction ? (y/n) y
```

```
DB20000I "ROLLBACK INDOUBT TRANSACTION" completed successfully
```

```
c/r/f/l/q: 1 1
```

```

1. originator: Db2 Enterprise Server Edition
 appl_id: *LOCAL.DB2.130919161043 sequence_no: 0001 status: r
 timestamp: 09/19/2013 16:10:43 auth_id: JONES
 log_full: n type: RM
 xid: 53514C2000000017 00000000544D4442 0000000002F95FE B62F8C4FF3000000
0000C1

```

```
c/r/f/l/q: f 1
```

```

1. originator: Db2 Enterprise Server Edition
 appl_id: *LOCAL.DB2.130919161043 sequence_no: 0001 status: i
 timestamp: 09/19/2013 16:10:43 auth_id: JONES
 log_full: n type: RM

```

```

 xid: 53514C2000000017 00000000544D4442 0000000002F95FE B62F8C4FF3000000
0000C1

Do you want to FORGET this in-doubt transaction ? (y/n) y

DB20000I "FORGET INDOUBT TRANSACTION" completed successfully

c/r/f/l/q: 1 1

1. originator: Db2 Enterprise Server Edition
 appl_id: *LOCAL.DB2.130919161043 sequence_no: 0001 status: f
 timestamp: 09/19/2013 16:10:43 auth_id: JONES
 log_full: n type: RM
 xid: 53514C2000000017 00000000544D4442 0000000002F95FE B62F8C4FF3000000
0000C1

c/r/f/l/q: q

```

In the following sample interactive session, the user attempts to roll back an in-doubt transaction whose status has changed:

```

$ db2 list indoubt transactions with prompting

1. originator: Db2 Enterprise Server Edition
 appl_id: *LOCAL.DB2.130919175827 sequence_no: 0001 status: i
 timestamp: 09/19/2013 13:58:35 auth_id: CASTELLE
 log_full: n type: RM
 xid: 00001D3400000008 0000000000010000 00000030

```

```

c/r/f/l/h/q: r 1

1. originator: Db2 Enterprise Server Edition
 appl_id: *LOCAL.DB2.130919175827 sequence_no: 0001 status: i
 timestamp: 09/19/2013 13:58:35 auth_id: SMITH
 log_full: n type: RM
 xid: 00001D3400000008 0000000000010000 00000030

```

Do you want to heuristically ROLLBACK this in-doubt transaction? (y/n) y

SQL1725N Could not perform the specified action because the status of the indoubt transaction changed after you issued the LIST INDOUBT TRANSACTIONS command.  
c/r/f/l/h/q: q

```

$ db2 list indoubt transactions with prompting

1. originator: Db2 Enterprise Server Edition
 appl_id: *LOCAL.DB2.130919175827 sequence_no: 0001 status: m
 timestamp: 09/19/2013 13:58:35 auth_id: CASTELLE
 log_full: n type: RM
 xid: 00001D3400000008 0000000000010000 00000030

```

```

c/r/f/l/h/q: c 1

1. originator: Db2 Enterprise Server Edition
 appl_id: *LOCAL.DB2.130919175827 sequence_no: 0001 status: i
 timestamp: 09/19/2013 13:58:35 auth_id: SMITH
 log_full: n type: RM
 xid: 00001D3400000008 0000000000010000 00000030

```

Do you want to heuristically COMMIT this in-doubt transaction? (y/n) y

DB20000I "COMMIT INDOUBT TRANSACTION" completed successfully

c/r/f/l/h/q: q

## LIST INSTANCE

Lists all database members, cluster caching facility and hosts associated with the current database, and provides details about their states.

### Scope

This command can be issued from any databasemember that is in the database instance. The same information will be returned from any database member.

### Authorization

None

### Required connection

Database

### Command syntax

```
►►LIST INSTANCE [SHOW DETAIL]►►
```

### Command parameters

#### SHOW DETAIL

The **LIST INSTANCE SHOW DETAIL** command is an extension of the **LIST INSTANCE** command. It will also return information about the partition number, the logical port and the high speed communication name. In a Db2 pureScale environment, the partition information will default to 0 for each partition.

### Example (Db2 pureScale instance)

The following outputs are for a four-member, two-cluster caching facility (CF) Db2 pureScale instance:

```
LIST INSTANCE
```

MEMBER_ID	TYPE	STATE	HOME_HOST	CURRENT_HOST	ALERT
0	MEMBER	STARTED	hostA	hostA	NO
1	MEMBER	STARTED	hostB	hostB	NO
2	MEMBER	STARTED	hostC	hostC	NO
3	MEMBER	STARTED	hostD	hostD	NO
128	CF	PRIMARY	hostE	-	NO
129	CF	PEER	hostF	-	NO

HOSTNAME	STATE	INSTANCE_STOPPED	ALERT
hostA	ACTIVE	NO	NO
hostB	ACTIVE	NO	NO
hostC	ACTIVE	NO	NO
hostD	ACTIVE	NO	NO
hostE	ACTIVE	NO	NO
hostF	ACTIVE	NO	NO

```
LIST INSTANCE SHOW DETAIL
```

ID	TYPE	STATE	HOME_HOST	CURRENT_HOST	ALERT	PARTITION_NUMBER	LOGICAL_PORT	NETNAME
0	MEMBER	STARTED	hostA	hostA	NO	0	0	hostA
1	MEMBER	STARTED	hostB	hostB	NO	0	0	hostB
2	MEMBER	STARTED	hostC	hostC	NO	0	0	hostC
3	MEMBER	STARTED	hostD	hostD	NO	0	0	hostD
128	CF	PRIMARY	hostE	-	NO	0	0	hostE
129	CF	PEER	hostF	-	NO	0	0	hostF

0 MEMBER	STARTED	hostA	hostA	NO	0	0 hostA-ib0
1 MEMBER	STARTED	hostB	hostB	NO	0	0 hostB-ib0
2 MEMBER	STARTED	hostC	hostC	NO	0	0 hostC-ib0
3 MEMBER	STARTED	hostD	hostD	NO	0	0 hostD-ib0
128 CF	PRIMARY	hostE	-	NO	0	0 hostE-ib0
129 CF	PEER	hostF	-	NO	0	0 hostF-ib0

HOSTNAME	STATE	INSTANCE_STOPPED	ALERT
hostA	ACTIVE	NO	NO
hostB	ACTIVE	NO	NO
hostC	ACTIVE	NO	NO
hostD	ACTIVE	NO	NO
hostE	ACTIVE	NO	NO
hostF	ACTIVE	NO	NO

### Example (partitioned database instance with integrated HA)

The following outputs are for a four host partitioned database instance with integrated HA:

LIST INSTANCE

MEMBER_ID	TYPE	STATE	HOME_HOST	CURRENT_HOST	ALERT
0 MEMBER	STARTED	hostA	hostA	NO	
1 MEMBER	STARTED	hostB	hostB	NO	
2 MEMBER	STARTED	hostC	hostC	NO	
3 MEMBER	STARTED	hostD	hostD	NO	

HOSTNAME	STATE	INSTANCE_STOPPED	ALERT
hostA	ACTIVE	-	NO
hostB	ACTIVE	-	NO
hostC	ACTIVE	-	NO
hostD	ACTIVE	-	NO

A non-partitioned single host database instance will return a single row for each table in the following output from **LIST INSTANCE SHOW DETAIL**:

LIST INSTANCE SHOW DETAIL

ID	TYPE	STATE	HOME_HOST	CURRENT_HOST	ALERT	PARTITION_NUMBER	LOGICAL_PORT	NETNAME
0 MEMBER	STARTED	hostA	hostA	NO		0		0 hostA-ib0
1 MEMBER	STARTED	hostB	hostB	NO		1		0 hostB-ib0
2 MEMBER	STARTED	hostC	hostC	NO		2		0 hostC-ib0
3 MEMBER	STARTED	hostD	hostD	NO		3		0 hostD-ib0

HOSTNAME	STATE	INSTANCE_STOPPED	ALERT
hostA	ACTIVE	-	NO
hostB	ACTIVE	-	NO
hostC	ACTIVE	-	NO
hostD	ACTIVE	-	NO

### Example (partitioned database instance without integrated HA)

The following outputs are for a 4 host partitioned database instance without integrated HA:

LIST INSTANCE

MEMBER_ID	TYPE	STATE	HOME_HOST	CURRENT_HOST	ALERT
-----------	------	-------	-----------	--------------	-------

0 MEMBER	-	hostA	-	-
1 MEMBER	-	hostB	-	-
2 MEMBER	-	hostC	-	-
3 MEMBER	-	hostD	-	-

HOSTNAME	STATE	INSTANCE_STOPPED	ALERT
hostA	-	-	-
hostB	-	-	-
hostC	-	-	-
hostD	-	-	-

A non-partitioned single host database instance will return a single row for each table in the following output for **LIST INSTANCE SHOW DETAIL**:

LIST INSTANCE SHOW DETAIL

ID	TYPE	STATE	HOME_HOST	CURRENT_HOST	ALERT	PARTITION_NUMBER	LOGICAL_PORT	NETNAME
0 MEMBER	-	hostA	-	-	-	0	0	hostA-ib0
1 MEMBER	-	hostB	-	-	-	1	0	hostB-ib0
2 MEMBER	-	hostC	-	-	-	2	0	hostC-ib0
3 MEMBER	-	hostD	-	-	-	3	0	hostD-ib0

HOSTNAME	STATE	INSTANCE_STOPPED	ALERT
----------	-------	------------------	-------

hostA	-	-	-
hostB	-	-	-
hostC	-	-	-
hostD	-	-	-

### Example (non-partitioned database instance with integrated HA)

The following output is from **LIST INSTANCE** for a single host database instance with integrated HA:

MEMBER_ID	TYPE	STATE	HOME_HOST	CURRENT_HOST	ALERT
0 MEMBER	STARTED	hostA	hostA	hostA	NO

HOSTNAME	STATE	INSTANCE_STOPPED	ALERT
----------	-------	------------------	-------

hostA	ACTIVE	-	NO
-------	--------	---	----

### Example (non-partitioned database instance without integrated HA)

The following output is from **LIST INSTANCE** for a single host database instance without integrated HA:

MEMBER_ID	TYPE	STATE	HOME_HOST	CURRENT_HOST	ALERT
0 MEMBER	-	hostA	hostA	hostA	-

HOSTNAME	STATE	INSTANCE_STOPPED	ALERT
----------	-------	------------------	-------

hostA	-	-	-
-------	---	---	---

## LIST NODE DIRECTORY

Lists the contents of the node directory.

### Authorization

None

## Required connection

None

## Command syntax

```
►►—LIST— [ADMIN] —NODE DIRECTORY— [SHOW DETAIL]—►►
```

## Command parameters

### ADMIN

Specifies administration server nodes.

### SHOW DETAIL

Specifies that the output should include the following information:

- Remote instance name
- System
- Operating system type

## Examples

The following is sample output from **LIST NODE DIRECTORY**:

```
Node Directory

Number of entries in the directory = 2

Node 1 entry:

Node name = LANNODE
Comment =
Directory entry type = LDAP
Protocol = TCPIP
Hostname = LAN.db2ntd3.torolab.ibm.com
Service name = 50000

Node 2 entry:

Node name = TLBA10ME
Comment =
Directory entry type = LOCAL
Protocol = TCPIP
Hostname = tlba10me
Service name = 447
```

The following is sample output from **LIST ADMIN NODE DIRECTORY**:

```
Node Directory

Number of entries in the directory = 2

Node 1 entry:

Node name = LOCALADM
Comment =
Directory entry type = LOCAL
Protocol = TCPIP
Hostname = jaguar
Service name = 523
```

Node 2 entry:

Node name	= MYDB2DAS
Comment	=
Directory entry type	= LDAP
Protocol	= TCPIP
Hostname	= peng.torolab.ibm.com
Service name	= 523

The common fields are identified as follows:

#### **Node name**

The name of the remote node. This corresponds to the name entered for the *nodename* parameter when the node was cataloged.

#### **Comment**

A comment associated with the node, entered when the node was cataloged. To change a comment in the node directory, uncatalog the node, and then catalog it again with the new comment.

#### **Directory entry type**

LOCAL means the entry is found in the local node directory file. LDAP means the entry is found on the LDAP server or LDAP cache.

#### **Protocol**

The communications protocol cataloged for the node.

For information about fields associated with a specific node type, see the applicable **CATALOG ... NODE** command.

### **Usage notes**

Regardless of the **DB2LDAPCACHE** miscellaneous variable setting, if using the **LIST DATABASE DIRECTORY** or the **LIST NODE DIRECTORY** commands, the list of local database and node entries are read from the LDAP server.

A node directory is created and maintained on each IBM Data Server Runtime Client. It contains an entry for each remote workstation having databases that the client can access. The Db2 client uses the communication end point information in the node directory whenever a database connection or instance attachment is requested.

The database manager creates a node entry and adds it to the node directory each time it processes a **CATALOG...NODE** command. The entries can vary, depending on the communications protocol being used by the node.

The node directory can contain entries for the following types of nodes:

- LDAP
- Local
- Named pipe
- TCPIP
- TCPIP4
- TCPIP6

## **LIST ODBC DATA SOURCES**

Lists all available user or system ODBC data sources.

A *data source*, in ODBC (Open Database Connectivity) terminology, is a user-defined name for a specific database. That name is used to access the database or file system through ODBC APIs. On Windows, either user or system data sources can be cataloged. A user data source is only visible to the user who cataloged it, whereas a system data source is visible to and can be used by all other users.

This command is available on Windows only.

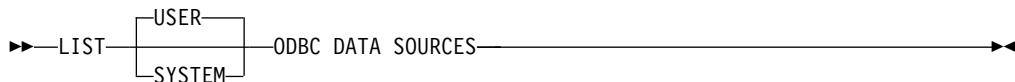
## Authorization

None

## Required connection

None

## Command syntax



## Command parameters

**USER** List only user ODBC data sources. This is the default if no keyword is specified.

### SYSTEM

List only system ODBC data sources.

## Examples

The following example is sample output from the **LIST ODBC DATA SOURCES** command:

User ODBC Data Sources	
Data source name	Description
SAMPLE	IBM DB2 ODBC DRIVER

## LIST PACKAGES/TABLES

Lists packages or tables associated with the current database.

## Authorization

For the system catalog SYSCAT.PACKAGES (**LIST PACKAGES**) and SYSCAT.TABLES (**LIST TABLES**), one of the following is required:

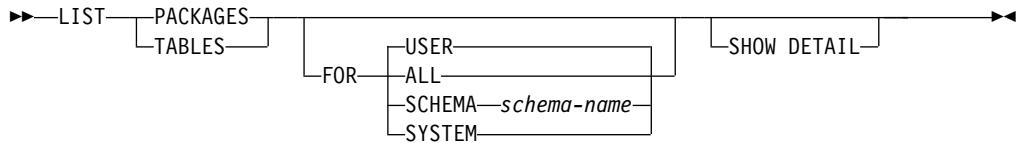
- SYSADM
- SYSCTRL
- SYSMAINT
- SYSMON
- DBADM
- CONTROL privilege

- SELECT privilege.

## Required connection

Database. If implicit connect is enabled, a connection to the default database is established.

## Command syntax



## Command parameters

**FOR** If the **FOR** clause is not specified, the packages or tables for **USER** are listed.

**ALL** Lists all packages or tables in the database.

**SCHEMA *schema-name***

Lists all packages or tables in the database for the specified schema only.

**SYSTEM**

Lists all system packages or tables in the database.

**USER** Lists all user packages or tables in the database for the current user.

## SHOW DETAIL

If this option is chosen with the **LIST TABLES** command, the full table name and schema name are displayed. If this option is not specified, the table name is truncated to 30 characters, and the ">" symbol in the 31st column represents the truncated portion of the table name; the schema name is truncated to 14 characters and the ">" symbol in the 15th column represents the truncated portion of the schema name. If this option is chosen with the **LIST PACKAGES** command, the full package schema (creator), version and bound by authid are displayed, and the package unique\_id (consistency token shown in hexadecimal form). If this option is not specified, the schema name and bound by ID are truncated to 8 characters and the ">" symbol in the 9th column represents the truncated portion of the schema or bound by ID; the version is truncated to 10 characters and the ">" symbol in the 11th column represents the truncated portion of the version.

## Examples

The following is sample output from **LIST PACKAGES**:

Package	Schema	Version	Bound by	Total sections	Valid	Format	Isolation level	Blocking
F4INS	USERA	VER1	SNOWBELL	221	Y	0	CS	U
F4INS	USERA	VER2.0	SNOWBELL	201	Y	0	RS	U
F4INS	USERA	VER2.3	SNOWBELL	201	N	3	CS	U
F4INS	USERA	VER2.5	SNOWBELL	201	Y	0	CS	U
PKG12	USERA		USERA	12	Y	3	RR	B
PKG15	USERA		USERA	42	Y	3	RR	B
SALARY	USERT	YEAR2000	USERT	15	Y	3	CS	N

The following is sample output from **LIST TABLES**:

Table/View	Schema	Type	Creation time
DEPARTMENT	SMITH	T	1997-02-19-13.32.25.971890
EMP_ACT	SMITH	T	1997-02-19-13.32.27.851115
EMP_PHOTO	SMITH	T	1997-02-19-13.32.29.953624
EMP_RESUME	SMITH	T	1997-02-19-13.32.37.837433
EMPLOYEE	SMITH	T	1997-02-19-13.32.26.348245
ORG	SMITH	T	1997-02-19-13.32.24.478021
PROJECT	SMITH	T	1997-02-19-13.32.29.300304
SALES	SMITH	T	1997-02-19-13.32.42.973739
STAFF	SMITH	T	1997-02-19-13.32.25.156337

9 record(s) selected.

## Usage notes

**LIST PACKAGES** and **LIST TABLES** commands are available to provide a quick interface to the system tables.

The following SELECT statements return information found in the system tables. They can be expanded to select the additional information that the system tables provide.

```
select tablename, tabschema, type, create_time
 from syscat.tables
 order by tabschema, tablename;

select pkgname, pkgschema, pkgversion, unique_id, boundby, total_sect,
 valid, format, isolation, blocking
 from syscat.packages
 order by pkgschema, pkgname, pkgversion;

select tablename, tabschema, type, create_time
 from syscat.tables
 where tabschema = 'SYSCAT'
 order by tabschema, tablename;

select pkgname, pkgschema, pkgversion, unique_id, boundby, total_sect,
 valid, format, isolation, blocking
 from syscat.packages
 where pkgschema = 'NULLID'
 order by pkgschema, pkgname, pkgversion;

select tablename, tabschema, type, create_time
 from syscat.tables
 where tabschema = USER
 order by tabschema, tablename;

select pkgname, pkgschema, pkgversion, unique_id, boundby, total_sect,
 valid, format, isolation, blocking
 from syscat.packages
 where pkgschema = USER
 order by pkgschema, pkgname, pkgversion;
```

## LIST STORAGE ACCESS

Lists the remote storage access aliases that have been created for the current database manager instance.

### Authorization

One of the following authorities:

- SYSADM

- SYSCTRL

### **Command syntax**

►►LIST STORAGE ACCESS—————►►

### **Usage notes**

- If you have SYSADM authority, when you issue this command you will see all storage access aliases even though you can only use storage access aliases that were created for your group or user ID.

## **LIST TABLESPACE CONTAINERS**

Lists containers for the specified table space.

**Important:** This command or API has been deprecated in Version 9.7 and might be removed in a future release. You can use the MON\_GET\_TABLESPACE and the MON\_GET\_CONTAINER table functions instead which return more information. For more information, see “LIST TABLESPACES and LIST TABLESPACE CONTAINERS commands have been deprecated” at [http://www.ibm.com/support/knowledgecenter/SSEPGG\\_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0055001.html](http://www.ibm.com/support/knowledgecenter/SSEPGG_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0055001.html).

The table space snapshot contains all of the information displayed by the **LIST TABLESPACE CONTAINERS** command.

### **Scope**

This command returns information only for the node on which it is executed.

### **Authorization**

One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT
- SYSMON
- DBADM

### **Required connection**

Database

### **Command syntax**

►►LIST TABLESPACE CONTAINERS FOR—*tablespace-id*—————►►

SHOW DETAIL

## Command parameters

### FOR *tablespace-id*

An integer that uniquely represents a table space used by the current database. To get a list of all the table spaces used by the current database, use the **LIST TABLESPACES** command.

### SHOW DETAIL

If this option is not specified, only the following basic information about each container is provided:

- Container ID
- Name
- Type (file, disk, or path).

If this option is specified, the following additional information about each container is provided:

- Total number of pages
- Number of usable pages
- Accessible (yes or no).

## Examples

The following is sample output from **LIST TABLESPACE CONTAINERS FOR 0**:

```
Tablespace Containers for Tablespace 0
```

Container ID	= 0
Name	= /home/smith/smith/NODE0000/SQL00001/SQLT0000.0
Type	= Path

The following is sample output from **LIST TABLESPACE CONTAINERS FOR 0 SHOW DETAIL** specified:

```
Tablespace Containers for Tablespace 0
```

Container ID	= 0
Name	= /home/smith/smith/NODE0000/SQL00001/SQLT0000.0
Type	= Path
Total pages	= 895
Useable pages	= 895
Accessible	= Yes

## LIST TABLESPACES

Lists table spaces and information about table spaces for the current database.

**Important:** This command or API has been deprecated in Version 9.7 and might be removed in a future release. You can use the MON\_GET\_TABLESPACE and the MON\_GET\_CONTAINER table functions instead which return more information. For more information, see “LIST TABLESPACES and LIST TABLESPACE CONTAINERS commands have been deprecated” at [http://www.ibm.com/support/knowledgecenter/SSEPGG\\_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0055001.html](http://www.ibm.com/support/knowledgecenter/SSEPGG_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0055001.html).

Information displayed by this command is also available in the table space snapshot.

## Scope

This command returns information only for the database partition on which it is executed.

## Authorization

one of the following authorities:

- SYSADM
  - SYSCTRL
  - SYSMAINT
  - SYSMON
  - DBADM
  - LOAD authority

## Required connection

Database

## Command syntax

►—LIST TABLESPACES—►

## Command parameters

**SHOW DETAIL**

If this option is not specified, only the following basic information about each table space is provided:

- Table space ID
  - Name
  - Type (system managed space or database managed space)
  - Contents (any data, long or index data, or temporary data)
  - State, a hexadecimal value indicating the current table space state. The externally visible state of a table space is composed of the hexadecimal sum of certain state values. For example, if the state is "quiesced: EXCLUSIVE" and "Load pending", the value is  $0x0004 + 0x0008$ , which is  $0x000c$ . The **db2tbst** (Get Tablespace State) command can be used to obtain the table space state associated with a given hexadecimal value. Following are the bit definitions listed in `salutil.h`:

0x0	Normal
0x1	Quiesced: SHARE
0x2	Quiesced: UPDATE
0x4	Quiesced: EXCLUSIVE
0x8	Load pending
0x10	Delete pending
0x20	Backup pending
0x40	Roll forward in progress
0x80	Roll forward pending
0x100	Restore pending
0x100	Recovery pending (not used)
0x200	Disable pending
0x400	Reorg in progress
0x800	Backup in progress
0x1000	Storage must be defined

0x2000	Restore in progress
0x4000	Offline and not accessible
0x8000	Drop pending
0x10000	Suspend Write
0x20000	Load in progress
0x2000000	Storage may be defined
0x4000000	StorDef is in 'final' state
0x8000000	StorDef was change before roll forward
0x10000000	DMS rebalance in progress
0x20000000	Table space deletion in progress
0x40000000	Table space creation in progress

**Note:** Db2 LOAD does not set the table space state to Load pending or Delete pending.

If this option is specified, the following additional information about each table space is provided:

- Total number of pages
- Number of usable pages
- Number of used pages
- Number of free pages
- High water mark (in pages)
- Page size (in bytes)
- Extent size (in pages)
- Prefetch size (in pages)
- Number of containers
- Minimum recovery time (earliest point in time to which a table space can be rolled forward; timestamp expressed in UTC time, displayed only if not zero)
- State change table space ID (displayed only if the table space state is "load pending" or "delete pending")
- State change object ID (displayed only if the table space state is "load pending" or "delete pending")
- Number of quiescers (displayed only if the table space state is "quiesced: SHARE", "quiesced: UPDATE", or "quiesced: EXCLUSIVE")
- Table space ID and object ID for each quiescer (displayed only if the number of quiescers is greater than zero).

## Examples

The following are two sample outputs from **LIST TABLESPACES SHOW DETAIL**.

```
Tablespaces for Current Database
Tablespace ID = 0
Name = SYSCATSPACE
Type = Database managed space
Contents = Any data
State = 0x0000
Detailed explanation:
 Normal
Total pages = 895
Useable pages = 895
Used pages = 895
Free pages = Not applicable
High water mark (pages) = Not applicable
Page size (bytes) = 4096
Extent size (pages) = 32
```

Prefetch size (pages)	= 32
Number of containers	= 1
Tablespace ID	= 1
Name	= TEMPSPACE1
Type	= System managed space
Contents	= Temporary data
State	= 0x0000
Detailed explanation:	
Normal	
Total pages	= 1
Useable pages	= 1
Used pages	= 1
Free pages	= Not applicable
High water mark (pages)	= Not applicable
Page size (bytes)	= 4096
Extent size (pages)	= 32
Prefetch size (pages)	= 32
Number of containers	= 1
Tablespace ID	= 2
Name	= USERSPACE1
Type	= Database managed space
Contents	= Any data
State	= 0x000c
Detailed explanation:	
Quiesced: EXCLUSIVE	
Load pending	
Total pages	= 337
Useable pages	= 337
Used pages	= 337
Free pages	= Not applicable
High water mark (pages)	= Not applicable
Page size (bytes)	= 4096
Extent size (pages)	= 32
Prefetch size (pages)	= 32
Number of containers	= 1
State change tablespace ID	= 2
State change object ID	= 3
Number of quiescers	= 1
Quiescer 1:	
Tablespace ID	= 2
Object ID	= 3

DB21011I In a partitioned database server environment, only the table spaces on the current node are listed.

Tablespaces for Current Database	
Tablespace ID	= 0
Name	= SYSCATSPACE
Type	= System managed space
Contents	= Any data
State	= 0x0000
Detailed explanation:	
Normal	
Total pages	= 1200
Useable pages	= 1200
Used pages	= 1200
Free pages	= Not applicable
High water mark (pages)	= Not applicable
Page size (bytes)	= 4096
Extent size (pages)	= 32
Prefetch size (pages)	= 32
Number of containers	= 1
Tablespace ID	= 1
Name	= TEMPSPACE1
Type	= System managed space

Contents	= Temporary data
State	= 0x0000
Detailed explanation:	
Normal	
Total pages	= 1
Useable pages	= 1
Used pages	= 1
Free pages	= Not applicable
High water mark (pages)	= Not applicable
Page size (bytes)	= 4096
Extent size (pages)	= 32
Prefetch size (pages)	= 32
Number of containers	= 1
Tablespace ID	= 2
Name	= USERSPACE1
Type	= System managed space
Contents	= Any data
State	= 0x0000
Detailed explanation:	
Normal	
Total pages	= 1
Useable pages	= 1
Used pages	= 1
Free pages	= Not applicable
High water mark (pages)	= Not applicable
Page size (bytes)	= 4096
Extent size (pages)	= 32
Prefetch size (pages)	= 32
Number of containers	= 1
Tablespace ID	= 3
Name	= DMS8K
Type	= Database managed space
Contents	= Any data
State	= 0x0000
Detailed explanation:	
Normal	
Total pages	= 2000
Useable pages	= 1952
Used pages	= 96
Free pages	= 1856
High water mark (pages)	= 96
Page size (bytes)	= 8192
Extent size (pages)	= 32
Prefetch size (pages)	= 32
Number of containers	= 2
Tablespace ID	= 4
Name	= TEMP8K
Type	= System managed space
Contents	= Temporary data
State	= 0x0000
Detailed explanation:	
Normal	
Total pages	= 1
Useable pages	= 1
Used pages	= 1
Free pages	= Not applicable
High water mark (pages)	= Not applicable
Page size (bytes)	= 8192
Extent size (pages)	= 32
Prefetch size (pages)	= 32
Number of containers	= 1

DB21011I In a partitioned database server environment, only the table spaces on the current node are listed.

## **Usage notes**

In a partitioned database environment, this command does not return all the table spaces in the database. To obtain a list of all the table spaces, query SYSCAT.TABLESPACES.

When the **LIST TABLESPACES SHOW DETAIL** command is issued, it will attempt to free all pending free extents in the table space. If the pending free extents are freed successfully, a record will be logged.

During a table space rebalance, the number of usable pages includes pages for the newly added container, but these new pages are not reflected in the number of free pages until the rebalance is complete. When a table space rebalance is not in progress, the number of used pages plus the number of free pages equals the number of usable pages.

## **LIST UTILITIES**

Displays to standard output the list of active utilities on the instance. The description of each utility can include attributes such as start time, description, throttling priority (if applicable), as well as progress monitoring information (if applicable).

### **Scope**

This command returns information for all database partitions.

### **Authorization**

One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT
- SYSMON

### **Required connection**

Instance

### **Command syntax**

```
►►—LIST UTILITIES—►►
 |
 SHOW DETAIL
```

### **Command parameters**

#### **SHOW DETAIL**

Displays detailed progress information for utilities that support progress monitoring.

### **Examples**

Sample output showing the progress information:

```
LIST UTILITIES SHOW DETAIL
```

```
ID = 1
Type = BACKUP
Database Name = SAMPLE
Description = offline db
Start Time = 09/17/2012 13:28:30.575198
State = Executing
Invocation Type = User
Throttling:
 Priority = Unthrottled
Progress Monitoring:
 Estimated Percentage Complete = 1
 Total Work = 747868852768 bytes
 Completed Work = 10738136885 bytes
 Start Time = 09/17/2012 13:28:30.575211
```

Sample output showing the partition number in the output when the Db2 Database Partitioning Feature (DPF) is enabled:

```
db2 BACKUP DATABASE DWDB ON DBPARTITIONNUM 16 TO /db2/part16
 COMPRESS WITHOUT PROMPTING
```

```
LIST UTILITIES SHOW DETAIL
```

```
ID = 1
Type = BACKUP
Database Name = DWDB
Partition Number = 16
Description = offline db
Start Time = 09/17/2012 13:28:30.575198
State = Executing
Invocation Type = User
Throttling:
 Priority = Unthrottled
Progress Monitoring:
 Estimated Percentage Complete = 1
 Total Work = 747868852768 bytes
 Completed Work = 10738136885 bytes
 Start Time = 09/17/2012 13:28:30.575211
```

## Usage notes

Use this command to monitor the status of running utilities. For example, you might use this utility to monitor the progress of an online backup. In another example, you might investigate a performance problem by using this command to determine which utilities are running. If the utility is suspected to be responsible for degrading performance then you might elect to throttle the utility (if the utility supports throttling). The ID from the **LIST UTILITIES** command is the same ID used in the **SET UTIL\_IMPACT\_PRIORITY** command.

The **LIST UTILITIES** command can be used to monitor the progress of deferred cleanup of indexes by asynchronous index cleanup.

Starting with Db2 Version 9.7 Fix Pack 1, the **LIST UTILITIES** command can be used to monitor the progress of the completion of a detach of a data partition from a partitioned table by the asynchronous partition detach task. Detaching a data partition from a data partitioned table is initiated by issuing a **ALTER TABLE** statement with the **DETACH PARTITION** clause.

## LOAD

Efficiently loads large amounts of data into a Db2 table.

The **LOAD** command loads data at the page level, bypasses trigger firing and logging, and delays constraint checking and index building until after the data is loaded into the Db2 table.

Data stored on the server can be in the form of a file, tape, or named pipe. Data stored on a remotely connected client can be in the form of a fully qualified file or named pipe. Data can also be loaded from a user-defined cursor or by using a user-written script or application. If the COMPRESS attribute for the table is set to YES, the data loaded is subject to compression on every data and database partition for which a dictionary exists in the table, including data in the XML storage object of the table.

Quick link to “File type modifiers for the load utility” on page 371.

## Restrictions

The load utility does not support loading data at the hierarchy level. The load utility is not compatible with range-clustered tables. The load utility does not support the NOT LOGGED INITIALLY parameter for the CREATE TABLE or ALTER TABLE statements.

## Scope

This command can be issued against multiple database partitions in a single request.

## Authorization

One or more of the following authorities:

- DATAACCESS
- LOAD authority on the database and the following privileges:
  - INSERT privilege on the table when the load utility is invoked in INSERT mode, TERMINATE mode (to terminate a previous load insert operation), or RESTART mode (to restart a previous load insert operation)
  - INSERT and DELETE privilege on the table when the load utility is invoked in REPLACE mode, TERMINATE mode (to terminate a previous load replace operation), or RESTART mode (to restart a previous load replace operation)
  - INSERT privilege on the exception table, if such a table is used as part of the load operation.
- To load data into a table that has protected columns, the session authorization ID must have LBAC credentials directly or indirectly through a group or a role that allow write access to all protected columns in the table. Otherwise the load fails and an error (SQLSTATE 5U014) is returned.
- To load data into a table that has protected rows, the session authorization ID must hold a security label that meets these criteria:
  - The security label is part of the security policy protecting the table.
  - The security label was granted to the session authorization ID directly or indirectly through a group or a role for write access or for all access.

If the session authorization ID does not hold such a security label, then the load fails and an error (SQLSTATE 5U014) is returned. The security label protects a loaded row if the session authorization ID LBAC credentials do not allow it to write to the security label that protects that row in the data. This does not happen, however, when the security policy protecting the table was created with

the RESTRICT NOT AUTHORIZED WRITE SECURITY LABEL option of the CREATE SECURITY POLICY statement. In this case the load fails and an error (SQLSTATE 42519) is returned.

When you load data into a table with protected rows, the target table has one column with a data type of DB2SECURITYLABEL. If the input row of data does not contain a value for that column, that row is rejected unless the usedefaults file type modifier is specified in the load command, in which case the security label you hold for write access from the security policy protecting the table is used. If you do not hold a security label for write access, the row is rejected and processing continues on to the next row.

- For a table with protected rows, if the REPLACE option is specified, the session authorization ID must have the authority to drop the table.
- If the LOCK WITH FORCE option is specified, any of SYSMAINT, SYSCTRL, or SYSADM authority is required.
- If the table has row access control activated, then **LOAD REPLACE** on that table would require the ability to drop the table. Specifically, you must have either CONTROL or DBADM on the table.

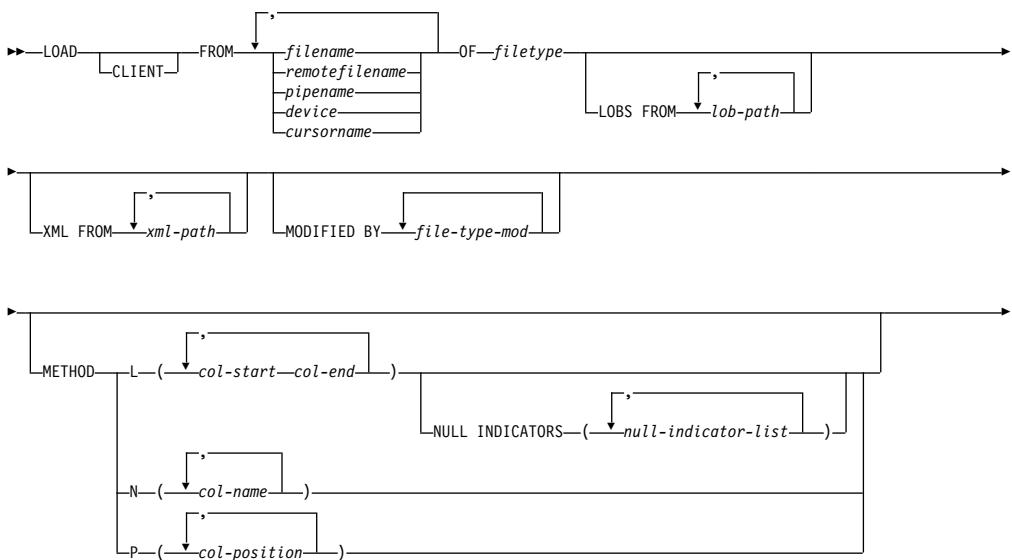
Since all load processes (and all Db2 server processes, in general) are owned by the instance owner, and all of these processes use the identification of the instance owner to access needed files, the instance owner must have read access to input data files. These input data files must be readable by the instance owner, regardless of who invokes the command.

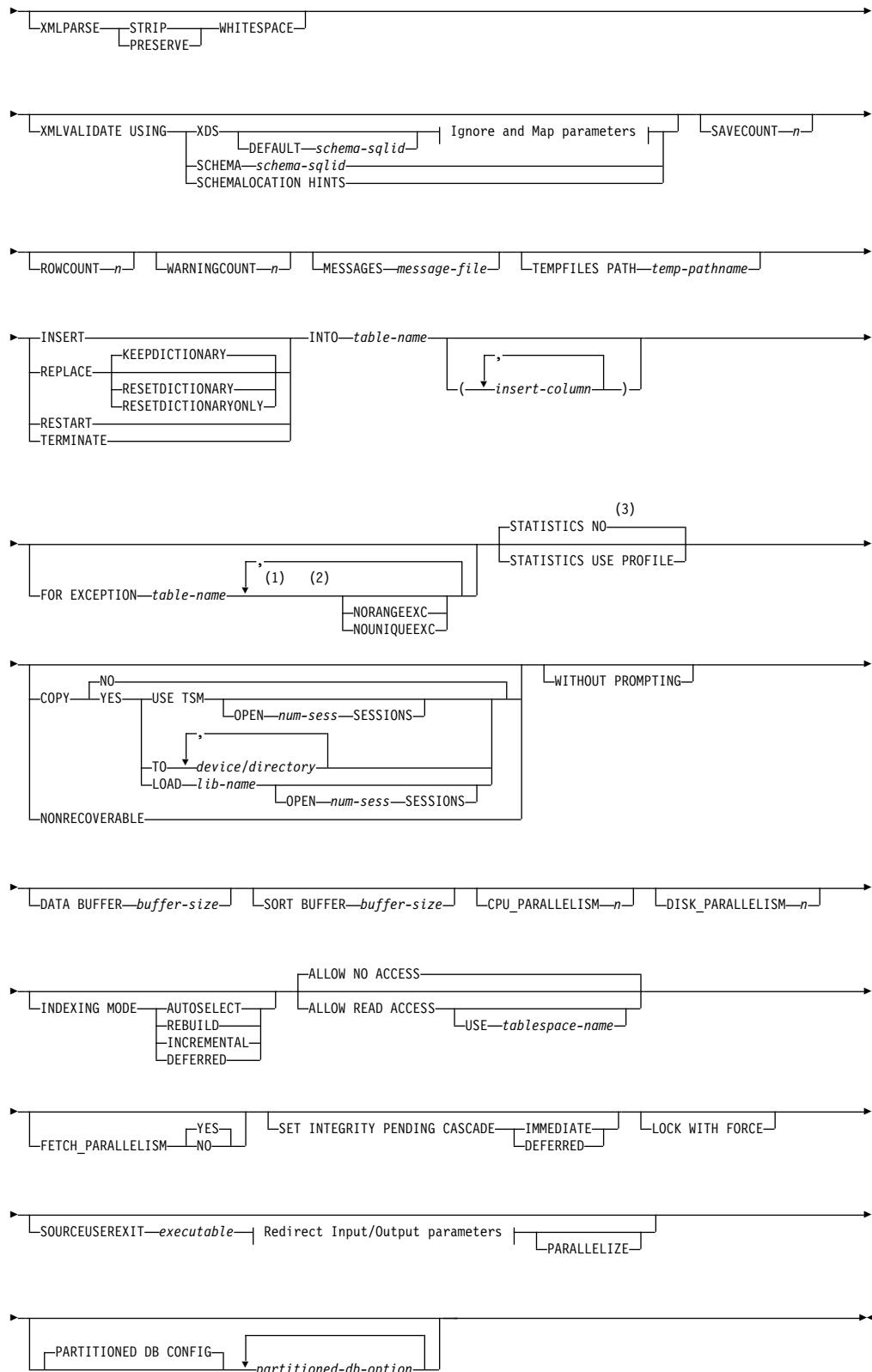
## Required connection

Database. If implicit connect is enabled, a connection to the default database is established.

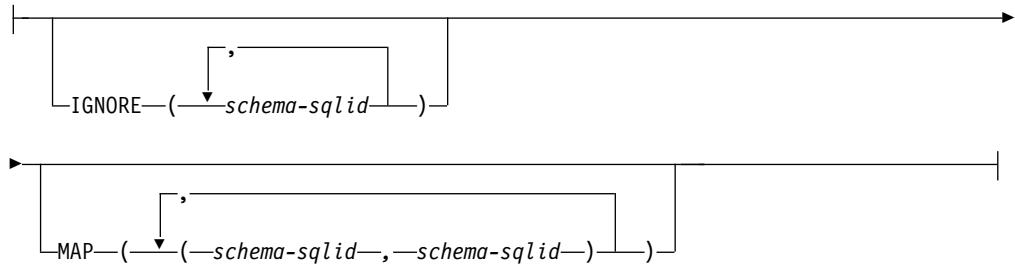
Instance. An explicit attachment is not required. If a connection to the database has been established, an implicit attachment to the local instance is attempted.

## Command syntax

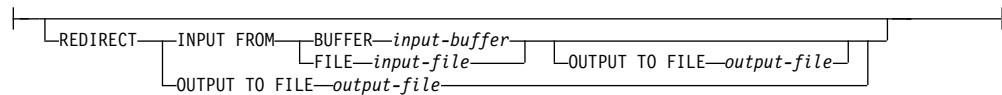




### Ignore and Map parameters:



### Redirect Input/Output parameters:



### Notes:

- 1 These keywords can appear in any order.
- 2 Each of these keywords can appear only once.
- 3 For column-organized tables, the default is the **STATISTICS USE PROFILE** parameter.

## Command parameters

**CLIENT** Specifies that the data to be loaded resides on a remotely connected client. This option is ignored if the load operation is not being invoked from a remote client. This option is ignored if specified in conjunction with the CURSOR file type.

### Note:

1. The **dumpfile** and **lobsinfile** modifiers and the **XML FROM** option refer to files on the server even when the **CLIENT** keyword is specified.
2. Code page conversion is not performed during a remote load operation. If the code page of the data is different from that of the server, the data code page should be specified using the **codepage** modifier.

In the following example, a data file (/u/user/data.del) residing on a remotely connected client is to be loaded into MYTABLE on the server database:

```
db2 load client from /u/user/data.del of del
modified by codepage=850 insert into mytable
```

**FROM filename | remotefilename | pipename | device | cursorname**

Specifies the file, pipe, device, or cursor referring to an SQL statement that contains the data being loaded. If the input source is a file, pipe, or device, it must reside on the database partition where the database resides, unless the **CLIENT** option is specified.

A **remotefilename** refers to a file that is on remote storage, such as IBM SoftLayer Object Storage or Amazon Simple Storage Service (S3), and is being accessed using a storage access alias. Local staging space is required

to temporarily store the file that is transferred from the remote storage server; refer to Remote storage requirements. The syntax of remote file names is:

`DB2REMOTE://<alias>//<storage-path>/<file-name>`

If several names are specified, they will be processed in sequence. If the last item specified is a tape device, the user is prompted for another tape. Valid response options are:

- c** Continue. Continue using the device that generated the warning message (for example, when a new tape has been mounted).
- d** Device terminate. Stop using the device that generated the warning message (for example, when there are no more tapes).
- t** Terminate. Terminate all devices.

**Note:**

- Use the fully qualified file name. If the server is remote, the fully qualified file name must be used. If the database resides on the same database partition as the caller, relative paths can be used.
- If data is exported into a file using the **EXPORT** command using the **ADMIN\_CMD** procedure, the data file is owned by the fenced user ID. This file is not usually accessible by the instance owner. To run the **LOAD** from CLP or the **ADMIN\_CMD** procedure, the data file must be accessible by the instance owner ID, so read access to the data file must be granted to the instance owner.
- Loading data from multiple IXF files is supported if the files are physically separate, but logically one file. It is *not* supported if the files are both logically and physically separate. If more than one logically and physically separate files are specified, then any file after the first one is ignored. (Multiple physical files would be considered logically one if they were all created with one invocation of the **EXPORT** command.)
- If loading data that resides on a client machine, the data must be in the form of either a fully qualified file or a named pipe.
- When loading XML data from files into tables in a partitioned database environment, the XML data files must be read-accessible to all the database partitions where loading is taking place.

**OF filetype**

Specifies the format of the data:

- ASC (non-delimited ASCII format)
- DEL (delimited ASCII format)
- IXF (Integration Exchange Format, PC version) is a binary format that is used exclusively by Db2 databases.
- CURSOR (a cursor declared against a SELECT or VALUES statement).

**Note:**

- When using a CURSOR file type to load XML data into a table in a distributed database environment, the PARTITION\_ONLY and LOAD\_ONLY modes are not supported.
- When performing a load using the CURSOR file type where the DATABASE keyword was specified during the DECLARE CURSOR statement, load internally creates a separate application to fetch the data; whereas when the DATABASE keyword is not specified, load fetches data within the same application. This difference between the two cases

can also cause locking behavior difference. In particular, if you currently specify the DATABASE keyword using the same database as the currently connected database (and same userid and password as the current connection, if specified), there might be cases where you get into a lock issue (such as a lock wait or lock timeout, depending on the database configuration) which can be worked around by omitting the DATABASE keyword.

#### **LOBS FROM** *lob-path*

The path to the data files containing LOB values to be loaded. The path must end with a slash. If the **CLIENT** option is specified, the path must be fully qualified. The names of the LOB data files are stored in the main data file (ASC, DEL, or IXF), in the column that will be loaded into the LOB column. The maximum number of paths that can be specified is 999. This will implicitly activate the **LOBSINFILE** behavior.

This option is ignored when specified in conjunction with the CURSOR file type.

#### **MODIFIED BY** *file-type-mod*

Specifies file type modifier options. See “File type modifiers for the load utility” on page 371.

#### **METHOD**

**L** Specifies the start and end column numbers from which to load data. A column number is a byte offset from the beginning of a row of data. It is numbered starting from 1. This method can only be used with ASC files, and is the only valid method for that file type.

#### **NULL INDICATORS** *null-indicator-list*

This option can only be used when the **METHOD L** parameter is specified; that is, the input file is an ASC file). The null indicator list is a comma-separated list of positive integers specifying the column number of each null indicator field. The column number is the byte offset of the null indicator field from the beginning of a row of data. There must be one entry in the null indicator list for each data field defined in the **METHOD L** parameter. A column number of zero indicates that the corresponding data field always contains data.

A value of Y in the NULL indicator column specifies that the column data is NULL. Any character other than Y in the NULL indicator column specifies that the column data is not NULL, and that column data specified by the **METHOD L** option will be loaded.

The NULL indicator character can be changed using the **MODIFIED BY** option.

**N** Specifies the names of the columns in the data file to be loaded. The case of these column names must match the case of the corresponding names in the system catalogs. Each table column that is not nullable should have a corresponding entry in the **METHOD N** list. For example, given data fields F1, F2, F3, F4, F5, and F6, and table columns C1 INT, C2 INT NOT NULL, C3 INT NOT NULL, and C4 INT, method N (F2, F1, F4, F3) is a valid request,

while method N (F2, F1) is not valid. This method can only be used with file types IXF or CURSOR.

- P** Specifies the field numbers (numbered from 1) of the input data fields to be loaded. Each table column that is not nullable should have a corresponding entry in the **METHOD P** list. For example, given data fields F1, F2, F3, F4, F5, and F6, and table columns C1 INT, C2 INT NOT NULL, C3 INT NOT NULL, and C4 INT, method P (2, 1, 4, 3) is a valid request, while method P (2, 1) is not valid. This method can only be used with file types IXF, DEL, or CURSOR, and is the only valid method for the DEL file type.

For each of the fields specified by method P, you need to define a corresponding column in the action statement, unless all columns are accounted for or the first *x* columns are going to be loaded, as shown in the following example:

```
db2 import from datafile1.del of del method P(1, 3, 4)
replace into table1 (c1, c3, c4)
```

#### **XML FROM** *xml-path*

Specifies one or more paths that contain the XML files. XDSs are contained in the main data file (ASC, DEL, or IXF), in the column that will be loaded into the XML column.

#### **XMLPARSE**

Specifies how XML documents are parsed. If this option is not specified, the parsing behavior for XML documents will be determined by the value of the CURRENT IMPLICIT XMLPARSE OPTION special register.

#### **STRIP WHITESPACE**

Specifies to remove whitespace when the XML document is parsed.

#### **PRESERVE WHITESPACE**

Specifies not to remove whitespace when the XML document is parsed.

#### **XMLVALIDATE**

Specifies that XML documents are validated against a schema, when applicable.

#### **USING XDS**

XML documents are validated against the XML schema identified by the XML Data Specifier (XDS) in the main data file. By default, if the **XMLVALIDATE** option is invoked with the **USING XDS** clause, the schema used to perform validation will be determined by the SCH attribute of the XDS. If an SCH attribute is not present in the XDS, no schema validation will occur unless a default schema is specified by the **DEFAULT** clause.

The **DEFAULT**, **IGNORE**, and **MAP** clauses can be used to modify the schema determination behavior. These three optional clauses apply directly to the specifications of the XDS, and not to each other. For example, if a schema is selected because it is specified by the **DEFAULT** clause, it will not be ignored if also specified by the **IGNORE** clause. Similarly, if a schema is selected because it is specified as the first part of a pair in the **MAP** clause, it will not be re-mapped if also specified in the second part of another **MAP** clause pair.

#### **USING SCHEMA** *schema-sqlid*

XML documents are validated against the XML schema with the

specified SQL identifier. In this case, the SCH attribute of the XML Data Specifier (XDS) will be ignored for all XML columns.

#### **USING SCHEMALOCATION HINTS**

XML documents are validated against the schemas identified by XML schema location hints in the source XML documents. If a schemaLocation attribute is not found in the XML document, no validation will occur. When the **USING SCHEMALOCATION HINTS** clause is specified, the SCH attribute of the XML Data Specifier (XDS) will be ignored for all XML columns.

See examples of the **XMLVALIDATE** option in the following section.

#### **IGNORE schema-sqlid**

This option can only be used when the **USING XDS** parameter is specified. The **IGNORE** clause specifies a list of one or more schemas to ignore if they are identified by an SCH attribute. If an SCH attribute exists in the XML Data Specifier for a loaded XML document, and the schema identified by the SCH attribute is included in the list of schemas to ignore, then no schema validation will occur for the loaded XML document.

##### **Note:**

If a schema is specified in the **IGNORE** clause, it cannot also be present in the left side of a schema pair in the **MAP** clause.

The **IGNORE** clause applies only to the XDS. A schema that is mapped by the **MAP** clause will not be subsequently ignored if specified by the **IGNORE** clause.

#### **DEFAULT schema-sqlid**

This option can only be used when the **USING XDS** parameter is specified. The schema specified through the **DEFAULT** clause identifies a schema to use for validation when the XML Data Specifier (XDS) of a loaded XML document does not contain an SCH attribute identifying an XML Schema.

The **DEFAULT** clause takes precedence over the **IGNORE** and **MAP** clauses. If an XDS satisfies the **DEFAULT** clause, the **IGNORE** and **MAP** specifications will be ignored.

#### **MAP schema-sqlid**

This option can only be used when the **USING XDS** parameter is specified. Use the **MAP** clause to specify alternate schemas to use in place of those specified by the SCH attribute of an XML Data Specifier (XDS) for each loaded XML document. The **MAP** clause specifies a list of one or more schema pairs, where each pair represents a mapping of one schema to another. The first schema in the pair represents a schema that is referred to by an SCH attribute in an XDS. The second schema in the pair represents the schema that should be used to perform schema validation.

If a schema is present in the left side of a schema pair in the **MAP** clause, it cannot also be specified in the **IGNORE** clause.

Once a schema pair mapping is applied, the result is final. The mapping operation is non-transitive, and therefore the schema chosen will not be subsequently applied to another schema pair mapping.

A schema cannot be mapped more than once, meaning that it cannot appear on the left side of more than one pair.

**SAVECOUNT *n***

Specifies that the load utility is to establish consistency points after every *n* rows. This value is converted to a page count, and rounded up to intervals of the extent size. Since a message is issued at each consistency point, this option should be selected if the load operation is monitored using **LOAD QUERY**. If the value of *n* is not sufficiently high, the synchronization of activities performed at each consistency point might impact performance.

The default value is zero, meaning that no consistency points are established, unless necessary.

This option is not allowed when specified in conjunction with the CURSOR file type or when loading a table containing an XML column.

The **SAVECOUNT** parameter is not supported for column-organized tables.

**ROWCOUNT *n***

Specifies the number of *n* physical records in the file to be loaded. If the anyorder file type modifier is enabled any *n* rows can be loaded from the file. Otherwise the first *n* rows are loaded.

**Note:** The anyorder file type modifier is enabled by default for certain table types. For more information, see anyorder.

**WARNINGCOUNT *n***

Stops the load operation after *n* warnings. Set this parameter if no warnings are expected, but verification that the correct file and table are being used is desired. If the load file or the target table is specified incorrectly, the load utility generates a warning for each row that it attempts to load, which causes the load to fail. If *n* is zero, or this option is not specified, the load operation continues regardless of the number of warnings issued.

If the load operation is stopped because the threshold of warnings is encountered, another load operation can be started in RESTART mode. The load operation automatically continues from the last consistency point. Alternatively, another load operation can be initiated in REPLACE mode, starting at the beginning of the input file.

In a partitioned database environment, a **LOAD** operation can have multiple load and partition agents. Each agent has a **WARNINGCOUNT** value. If the value of *n* is reached on a single agent, the **LOAD** operation fails. The *n* values are not cumulative. For example, if *n* is 3 and there are two agents, each with a **WARNINGCOUNT** of 2, the **LOAD** operation is successful.

**MESSAGES *message-file***

Specifies the destination for warning and error messages that occur during the load operation. If a message file is not specified, messages are written to standard output unless the instance is configured as a partitioned database environment. If the complete path to the file is not specified, the load utility uses the current directory and the default drive as the destination. If the name of a file that already exists is specified, the utility appends the information.

The message file is usually populated with messages at the end of the load operation and, as such, is not suitable for monitoring the progress of the operation.

**TEMPFILES PATH** *temp-pathname*

Specifies the name of the path to be used when creating temporary files during a load operation, and should be fully qualified according to the server database partition.

Temporary files take up file system space. Sometimes, this space requirement is quite substantial. The following list provides an estimate of how much file system space you should allocate for all temporary files:

- 136 bytes for each message that the load utility generates.
- 15 KB of overhead if the data file contains long field data or LOBs. This quantity can grow significantly if you specify the **INSERT** parameter and there is a large amount of long field or LOB data already in the table.
- On the server, storage space that is equivalent to the raw size of the input data if the column compression dictionary is being built and the data source, such as a pipe or a socket, cannot be reopened.

**INSERT** Adds the loaded data to the table without changing the existing table data.

A **LOAD INSERT** operation into a column-organized table maintains table statistics by default if the table was empty at the start of the load operation.

**REPLACE**

Deletes all data from the table, and inserts the new data. The table definition and index definitions are not changed. If you specify this parameter when moving data between hierarchies, you can replace only the data for an entire hierarchy, not individual subtables.

You cannot use this parameter to load data into system-period temporal tables.

A **LOAD REPLACE** operation into a column-organized table maintains table statistics by default.

**KEEPDICTIONARY**

An existing compression dictionary is preserved across the **LOAD REPLACE** operation.

This option is the default for row-organized tables.

Provided the table COMPRESS attribute is YES, the newly replaced data is subject to being compressed using the dictionary that existed before the invocation of the load. If no dictionary previously existed in the table, a new dictionary is built using the data that is being replaced into the table as long as the table COMPRESS attribute is YES.

The amount of data that is required to build the compression dictionary in this case is subject to the policies of ADC. This data is populated into the table as uncompressed. Once the dictionary is inserted into the table, the remaining data to be loaded is subject to being compressed with this dictionary. For a summary, see the following table.

Table 26. LOAD REPLACE KEEPDICTIONARY

Compress	Table row data dictionary exists	XML storage object dictionary exists <sup>1</sup>	Compression dictionary	Data compression
YES	YES	YES	Preserve table row data and XML dictionaries.	Data to be loaded is subject to compression.

Table 26. LOAD REPLACE KEEPDICTIONARY (continued)

Compress	Table row data dictionary exists	XML storage object dictionary exists <sup>1</sup>	Compression dictionary	Data compression
YES	YES	NO	Preserve table row data dictionary and build a new XML dictionary.	Table row data to be loaded is subject to compression. After XML dictionary is built, remaining XML data to be loaded is subject to compression.
YES	NO	YES	Build table row data dictionary and preserve XML dictionary.	After table row data dictionary is built, remaining table row data to be loaded is subject to compression. XML data to be loaded is subject to compression.
YES	NO	NO	Build new table row data and XML dictionaries.	After dictionaries are built, remaining data to be loaded is subject to compression.
NO	YES	YES	Preserve table row data and XML dictionaries.	Data to be loaded is not compressed.
NO	YES	NO	Preserve table row data dictionary.	Data to be loaded is not compressed.
NO	NO	YES	No effect on table row dictionary. Preserve XML dictionary.	Data to be loaded is not compressed.
NO	NO	NO	No effect.	Data to be loaded is not compressed.

**Note:**

1. A compression dictionary can be created for the XML storage object of a table only if the XML columns are added to the table in Db2 Version 9.7 or later, or if the table is migrated using an online table move.
2. If **LOAD REPLACE KEEPDICTIONARY** operation is interrupted, load utility can recover after either **LOAD RESTART** or **LOAD TERMINATE** is issued. Existing XML storage object dictionary may not be preserved after recovery from interrupted **LOAD REPLACE KEEPDICTIONARY** operation. A new XML storage object dictionary will be created if **LOAD RESTART** is used

**RESETDICTIONARY**

This directive instructs **LOAD REPLACE** processing to build a new dictionary for the table data object, provided that the table COMPRESS attribute is YES.

If the COMPRESS attribute is NO and a dictionary was already present in the table it will be removed and no new dictionary will be inserted into the table.

This option is the default for column-organized tables.

For column-organized tables, you cannot specify **LOAD REPLACE ... RESETDICTIONARY** on a subset of database partitions (SQL27906N). If you include the **OUTPUT\_DBPARTNUMS** option, all database partitions must be specified.

A compression dictionary can be built with just one user record. If the loaded data set size is zero and if there is a preexisting dictionary, the dictionary will not be preserved. The amount of data required to build a dictionary with this directive is not subject to the policies of ADC. For a summary, see the following table.

*Table 27. LOAD REPLACE RESETDICTIONARY*

Compress	Table row data dictionary exists	XML storage object dictionary exists <sup>1</sup>	Compression dictionary	Data compression
YES	YES	YES	Build new dictionaries <sup>2</sup> . If the DATA CAPTURE CHANGES option is enabled on the CREATE TABLE or ALTER TABLE statements, the current table row data dictionary is kept (and referred to as the <i>historical compression dictionary</i> ).	After dictionaries are built, remaining data to be loaded is subject to compression.
YES	YES	NO	Build new dictionaries <sup>2</sup> . If the DATA CAPTURE CHANGES option is enabled on the CREATE TABLE or ALTER TABLE statements, the current table row data dictionary is kept (and referred to as the <i>historical compression dictionary</i> ).	After dictionaries are built, remaining data to be loaded is subject to compression.
YES	NO	YES	Build new dictionaries.	After dictionaries are built, remaining data to be loaded is subject to compression.
YES	NO	NO	Build new dictionaries.	After dictionaries are built, remaining data to be loaded is subject to compression.
NO	YES	YES	Remove dictionaries.	Data to be loaded is not compressed.
NO	YES	NO	Remove table row data dictionary.	Data to be loaded is not compressed.
NO	NO	YES	Remove XML storage object dictionary.	Data to be loaded is not compressed.
NO	NO	NO	No effect.	All table data is not compressed.

**Notes:**

1. A compression dictionary can be created for the XML storage object of a table only if the XML columns are added to the table in Db2 Version 9.7 or later, or if the table is migrated using an online table move.

2. If a dictionary exists and the compression attribute is enabled, but there are no records to load into the table partition, a new dictionary cannot be built and the **RESETDICTIONARY** operation will not keep the existing dictionary.

#### **RESETDICTIONARYONLY**

This option creates a column compression dictionary that is based on the input file, without loading any rows. You can use this option to create the compression dictionary before you ingest any data by using SQL-based utilities.

This option is applicable to column-organized tables only.

You cannot specify **LOAD REPLACE ... RESETDICTIONARYONLY** on a subset of database partitions (SQL27906N). If you include the **OUTPUT\_DBPARTNUMS** option, all database partitions must be specified.

#### **TERMINATE**

One of four modes under which the load utility can execute. Terminates a previously interrupted load operation, and rolls back the operation to the point in time at which it started, even if consistency points were passed. The states of any table spaces involved in the operation return to normal, and all table objects are made consistent (index objects might be marked as invalid, in which case index rebuild will automatically take place at next access). If the load operation being terminated is a **LOAD REPLACE**, the table will be truncated to an empty table after the **LOAD TERMINATE** operation. If the load operation being terminated is a **LOAD INSERT**, the table will retain all of its original records after the **LOAD TERMINATE** operation. For summary of dictionary management, see Table 3.

The **LOAD TERMINATE** option will not remove a backup pending state from table spaces.

#### **RESTART**

Restarts an interrupted load operation. The load operation automatically continues from the last consistency point in the load, build, or delete phase. For summary of dictionary management, see Table 4.

The **RESTART** parameter is not supported for the following tables:

- Column-organized tables
- Random distribution tables using the random by generation method

To recover a table of this type after a failed load operation, use the **TERMINATE** or **REPLACE** parameter.

#### **INTO table-name**

Specifies the database table into which the data is to be loaded. This table cannot be a system table, a declared temporary table, or a created temporary table. An alias, or the fully qualified or unqualified table name can be specified. A qualified table name is in the form *schema.tablename*. If an unqualified table name is specified, the table will be qualified with the CURRENT SCHEMA.

If the database table contains implicitly hidden columns, you must specify whether data for the hidden columns is included in the load operation.

Use one of the following methods to indicate if data for hidden columns is included:

- Use *insert-column* to explicitly specify the columns into which data is to be inserted.

```
db2 load from delfile1 of del
 insert into table1 (c1, c2, c3,...)
```

- Use one of the hidden column file type modifiers: specify **implicitlyhiddeninclude** when the input file contains data for the hidden columns, or **implicitlyhiddenmissing** when the input file does not.  

```
db2 load from delfile1 of del modified by implicitlyhiddeninclude
 insert into table1
```
- Use the DB2\_DMU\_DEFAULT registry variable on the server-side to set the default behavior when data movement utilities encounter tables with implicitly hidden columns. Specify **IMPLICITLYHIDDENINCLUDE** when utilities assume that the implicitly hidden columns are included, or **IMPLICITLYHIDDENMISSING** when utilities assume that the implicitly hidden columns are not included.  

```
db2set DB2_DMU_DEFAULT=IMPLICITLYHIDDENINCLUDE
db2 load from delfile1 of del insert into table1
```

#### *insert-column*

Specifies the table column into which the data is to be inserted.

The load utility cannot parse columns whose names contain one or more spaces. For example,

```
db2 load from delfile1 of del noheader
 method P (1, 2, 3, 4, 5, 6, 7, 8, 9)
 insert into table1 (BLOB1, S2, I3, Int 4, I5, I6, DT7, I8, TM9)
```

will fail because of the Int 4 column. The solution is to enclose such column names with double quotation marks:

```
db2 load from delfile1 of del noheader
 method P (1, 2, 3, 4, 5, 6, 7, 8, 9)
 insert into table1 (BLOB1, S2, I3, "Int 4", I5, I6, DT7, I8, TM9)
```

#### **FOR EXCEPTION** *table-name*

Specifies the exception table into which rows in error are copied. Any row that violates a unique index or a primary key index is copied. If you specify an unqualified table name, the table name is qualified with the current schema. The table cannot be a column-organized table.

Information that is written to the exception table is *not* written to the dump file. In a partitioned database environment, an exception table must be defined for those database partitions on which the loading table is defined. The dump file, otherwise, contains rows that cannot be loaded because they are invalid or have syntax errors.

When loading XML data, using the **FOR EXCEPTION** clause to specify a load exception table is not supported in the following cases:

- When using label-based access control (LBAC).
- When loading data into a partitioned table.

#### **NORANGEEXC**

Indicates that if a row is rejected because of a range violation it will not be inserted into the exception table.

#### **NOUNIQUEEXC**

Indicates that if a row is rejected because it violates a unique constraint it will not be inserted into the exception table.

#### **STATISTICS USE PROFILE**

Instructs load to collect statistics during the load according to the profile defined for this table. This is the default for column-organized tables. The

profile must be created before issuing the **LOAD** command. The profile is created by the **RUNSTATS** command. For row-organized tables, if the profile does not exist and this parameter is specified, a warning is returned and no statistics are collected. For column-organized tables, if the profile does not exist and this parameter is specified, the load utility uses the same default **RUNSTATS** command options as those that are used during an automatic runstats operation.

During load, distribution statistics are not collected for columns of type XML.

#### **STATISTICS NO**

Specifies that no statistics are to be collected, and that the statistics in the catalogs are not to be altered. This parameter is the default for row-organized tables.

#### **COPY NO**

Specifies that the table space in which the table resides will be placed in backup pending state if forward recovery is enabled (that is, if either **logarchmeth1** or **logarchmeth2** is set to a value other than OFF). The **COPY NO** option will also put the table space state into the Load in Progress table space state. This is a transient state that will disappear when the load completes or fails. The data in any table in the table space cannot be updated or deleted until a table space backup or a full database backup is made. However, it is possible to access the data in any table by using the SELECT statement.

**LOAD** with **COPY NO** on a recoverable database leaves the table spaces in a backup pending state. For example, performing a **LOAD** with **COPY NO** and **INDEXING MODE DEFERRED** will leave indexes needing a refresh. Certain queries on the table might require an index scan and will not succeed until the indexes are refreshed. The index cannot be refreshed if it resides in a table space which is in the backup pending state. In that case, access to the table will not be allowed until a backup is taken. Index refresh is done automatically by the database when the index is accessed by a query. If one of **COPY NO**, **COPY YES**, or **NONRECOVERABLE** is not specified, and the database is recoverable (**logarchmeth1** or **logarchmeth2** is set to value other than OFF), then **COPY NO** is the default.

#### **COPY YES**

Saves a copy of the loaded data. This parameter is invalid if forward recovery is disabled.

#### **USE TSM**

Specifies that the copy will be stored using IBM Tivoli Storage Manager.

#### **OPEN num-sess SESSIONS**

The number of I/O sessions to be used with TSM or the vendor product. The default value is 1.

#### **TO device/directory**

Specifies the device or directory on which the copy image will be created.

The directory can be on a remote storage, such as IBM® SoftLayer® Object Storage or Amazon Simple Storage Service (S3), and is being accessed using a storage access alias. Local staging space is required to temporarily store the copy image that is to be

transferred to the remote storage server. The maximum copy image size for the remote storage is currently supported at 5GB.

#### **LOAD** *lib-name*

The name of the shared library (DLL on Windows operating systems) containing the vendor backup and restore I/O functions to be used. It can contain the full path. If the full path is not given, it will default to the path where the user exit programs reside.

#### **NONRECOVERABLE**

Specifies that the load transaction is to be marked as unrecoverable and that it will not be possible to recover it by a subsequent roll forward action. The roll forward utility will skip the transaction and will mark the table into which data was being loaded as "invalid". The utility will also ignore any subsequent transactions against that table. After the roll forward operation is completed, such a table can only be dropped or restored from a backup (full or table space) taken after a commit point following the completion of the nonrecoverable load operation.

With this option, table spaces are not put in backup pending state following the load operation, and a copy of the loaded data does not have to be made during the load operation. If one of **COPY NO**, **COPY YES**, or **NONRECOVERABLE** is not specified, and the database is not recoverable (**logarchmeth1** and **logarchmeth2** are both set to OFF), then **NONRECOVERABLE** is the default.

#### **WITHOUT PROMPTING**

Specifies that the list of data files contains all the files that are to be loaded, and that the devices or directories listed are sufficient for the entire load operation. If a continuation input file is not found, or the copy targets are filled before the load operation finishes, the load operation will fail, and the table will remain in load pending state.

If this option is not specified, and the tape device encounters an end of tape for the copy image, or the last item listed is a tape device, the user is prompted for a new tape on that device.

#### **DATA BUFFER** *buffer-size*

Specifies the number of 4 KB pages (regardless of the degree of parallelism) to use as buffered space for transferring data within the utility. If the value specified is less than the algorithmic minimum, the minimum required resource is used, and no warning is returned.

This memory is allocated directly from the utility heap, whose size can be modified through the **util\_heap\_sz** database configuration parameter. Beginning in version 9.5, the value of the DATA BUFFER option of the **LOAD** command can temporarily exceed **util\_heap\_sz** if more memory is available in the system. In this situation, the utility heap is dynamically increased as needed until the **database\_memory** limit is reached. This memory will be released once the load operation completes.

If a value is not specified, an intelligent default is calculated by the utility at run time. The default is based on a percentage of the free space available in the utility heap at the instantiation time of the loader, as well as some characteristics of the table.

#### **SORT BUFFER** *buffer-size*

This option specifies a value that overrides the **sortheap** database configuration parameter during a load operation. It is relevant only when loading tables with indexes and only when the **INDEXING MODE** parameter is

not specified as DEFERRED. The value that is specified cannot exceed the value of **sortheap**. This parameter is useful for throttling the sort memory that is used when loading tables with many indexes without changing the value of **sortheap**, which would also affect general query processing.

#### **CPU\_PARALLELISM *n***

Specifies the number of processes or threads that the load utility will create for parsing, converting, and formatting records when building table objects. This parameter is designed to exploit the number of processes running per database partition. It is particularly useful when loading presorted data, because record order in the source data is preserved. If the value of this parameter is zero, or has not been specified, the load utility uses an intelligent default value (usually based on the number of CPUs available) at run time.

##### **Note:**

1. If this parameter is used with tables containing either LOB or LONG VARCHAR fields, its value becomes one, regardless of the number of system CPUs or the value specified by the user.
2. Specifying a small value for the **SAVECOUNT** parameter causes the loader to perform many more I/O operations to flush both data and table metadata. When **CPU\_PARALLELISM** is greater than one, the flushing operations are asynchronous, permitting the loader to exploit the CPU. When **CPU\_PARALLELISM** is set to one, the loader waits on I/O during consistency points. A load operation with **CPU\_PARALLELISM** set to two, and **SAVECOUNT** set to 10 000, completes faster than the same operation with **CPU\_PARALLELISM** set to one, even though there is only one CPU.

#### **DISK\_PARALLELISM *n***

Specifies the number of processes or threads that the load utility will create for writing data to the table space containers. If a value is not specified, the utility selects an intelligent default based on the number of table space containers and the characteristics of the table.

#### **INDEXING MODE**

Specifies whether the load utility is to rebuild indexes or to extend them incrementally. Valid values are:

#### **AUTOSELECT**

The load utility will automatically decide between REBUILD or INCREMENTAL mode. The decision is based on the amount of data being loaded and the depth of the index tree. Information relating to the depth of the index tree is stored in the index object. **RUNSTATS** is not required to populate this information. AUTOSELECT is the default indexing mode.

#### **REBUILD**

All indexes will be rebuilt. The utility must have sufficient resources to sort all index key parts for both old and appended table data.

If the LogIndexBuild database configuration parameter is turned on, the transaction log contains the image of each index page after it is created. If the LogIndexBuild database configuration parameter is turned off, only the allocation and initialization of each page is logged by the Index Manager (about 250 bytes per page approximately as opposed to the non-empty portion of each page).

#### **INCREMENTAL**

Indexes will be extended with new data. This approach consumes index free space. It only requires enough sort space to append index keys for the inserted records. This method is only supported in cases where the index object is valid and accessible at the start of a load operation (it is, for example, not valid immediately following a load operation in which the DEFERRED mode was specified). If this mode is specified, but not supported due to the state of the index, a warning is returned, and the load operation continues in REBUILD mode. Similarly, if a load restart operation is begun in the load build phase, INCREMENTAL mode is not supported.

If the LogIndexBuild database configuration parameter is turned on, the Db2 software generates the log records for the insertion of every key into the index as well as any page splits performed. If this parameter is turned off (which is common when not using HADR), the amount of index logging performed by the Index Manager depends on whether or not the ALLOW READ ACCESS option was specified. If the ALLOW READ ACCESS option is specified, the log record is generated including logs for page splits. If the ALLOW READ ACCESS option is not specified, no log record from the Index Manager is generated.

#### **DEFERRED**

The load utility will not attempt index creation if this mode is specified. Indexes will be marked as needing a refresh. The first access to such indexes that is unrelated to a load operation might force a rebuild, or indexes might be rebuilt when the database is restarted. This approach requires enough sort space for all key parts for the largest index. The total time subsequently taken for index construction is longer than that required in REBUILD mode. Therefore, when performing multiple load operations with deferred indexing, it is advisable (from a performance viewpoint) to let the last load operation in the sequence perform an index rebuild, rather than allow indexes to be rebuilt at first non-load access.

Deferred indexing is only supported for tables with non-unique indexes, so that duplicate keys inserted during the load phase are not persistent after the load operation.

#### **ALLOW NO ACCESS**

Load will lock the target table for exclusive access during the load. The table state will be set to Load In Progress during the load. **ALLOW NO ACCESS** is the default behavior. It is the only valid option for **LOAD REPLACE**.

When there are constraints on the table, the table state will be set to Set Integrity Pending as well as Load In Progress. The SET INTEGRITY statement must be used to take the table out of Set Integrity Pending state.

#### **ALLOW READ ACCESS**

Load will lock the target table in a share mode. The table state will be set to both Load In Progress and Read Access. Readers can access the non-delta portion of the data while the table is being load. In other words, data that existed before the start of the load will be accessible by readers to the table, data that is being loaded is not available until the load is complete.

**Important:** Starting with Version 10.1 Fix Pack 1, the ALLOW READ ACCESS parameter is deprecated and might be removed in a future release. For more details, see “ALLOW READ ACCESS parameter in the LOAD command is deprecated” at .

The **ALLOW READ ACCESS** parameter is not supported for column-organized tables.

**LOAD TERMINATE** or **LOAD RESTART** of an **ALLOW READ ACCESS** load can use this parameter; **LOAD TERMINATE** or **LOAD RESTART** of an **ALLOW NO ACCESS** load cannot use this parameter. Furthermore, this option is not valid if the indexes on the target table are marked as requiring a rebuild.

When there are constraints on the table, the table state will be set to Set Integrity Pending as well as Load In Progress, and Read Access. At the end of the load, the table state Load In Progress will be removed but the table states Set Integrity Pending and Read Access will remain. The **SET INTEGRITY** statement must be used to take the table out of Set Integrity Pending. While the table is in Set Integrity Pending and Read Access states, the non-delta portion of the data is still accessible to readers, the new (delta) portion of the data will remain inaccessible until the **SET INTEGRITY** statement has completed. A user can perform multiple loads on the same table without issuing a **SET INTEGRITY** statement. Only the original (checked) data will remain visible, however, until the **SET INTEGRITY** statement is issued.

**ALLOW READ ACCESS** also supports the following modifiers:

#### **USE *tablespace-name***

If the indexes are being rebuilt, a shadow copy of the index is built in table space *tablespace-name* and copied over to the original table space at the end of the load during an INDEX COPY PHASE. Only system temporary table spaces can be used with this option. If not specified then the shadow index will be created in the same table space as the index object. If the shadow copy is created in the same table space as the index object, the copy of the shadow index object over the old index object is instantaneous. If the shadow copy is in a different table space from the index object a physical copy is performed. This could involve considerable I/O and time. The copy happens while the table is offline at the end of a load during the INDEX COPY PHASE.

Without this option the shadow index is built in the same table space as the original. Since both the original index and shadow index by default reside in the same table space simultaneously, there might be insufficient space to hold both indexes within one table space. Using this option ensures that you retain enough table space for the indexes.

This option is ignored if the user does not specify **INDEXING MODE REBUILD** or **INDEXING MODE AUTOSELECT**. This option will also be ignored if **INDEXING MODE AUTOSELECT** is chosen and load chooses to incrementally update the index.

#### **FETCH\_PARALLELISM YES | NO**

When you perform a load from a cursor where the cursor is declared using the **DATABASE** keyword, or when using the API `sqlu_remotefetch_entry` media entry, and this option is set to YES, the load utility attempts to parallelize fetching from the remote data source if possible. Currently, you can parallelize data fetching only if the cursor's select-statement is of the

simple form "SELECT \* FROM <tablename>". If set to NO, no parallel fetching is performed. The default value is YES. For more information, see "Moving data using the CURSOR file type".

#### **SET INTEGRITY PENDING CASCADE**

If **LOAD** puts the table into Set Integrity Pending state, the **SET INTEGRITY PENDING CASCADE** option allows the user to specify whether or not Set Integrity Pending state of the loaded table is immediately cascaded to all descendants (including descendant foreign key tables, descendant immediate materialized query tables and descendant immediate staging tables).

#### **IMMEDIATE**

Indicates that Set Integrity Pending state is immediately extended to all descendant foreign key tables, descendant immediate materialized query tables and descendant staging tables. For a **LOAD INSERT** operation, Set Integrity Pending state is not extended to descendant foreign key tables even if the **IMMEDIATE** option is specified.

When the loaded table is later checked for constraint violations (using the IMMEDIATE CHECKED option of the SET INTEGRITY statement), descendant foreign key tables that were placed in Set Integrity Pending Read Access state will be put into Set Integrity Pending No Access state.

#### **DEFERRED**

Indicates that only the loaded table will be placed in the Set Integrity Pending state. The states of the descendant foreign key tables, descendant immediate materialized query tables and descendant immediate staging tables will remain unchanged.

descendant foreign key tables might later be implicitly placed in Set Integrity Pending state when their parent tables are checked for constraint violations (using the IMMEDIATE CHECKED option of the SET INTEGRITY statement). descendant immediate materialized query tables and descendant immediate staging tables will be implicitly placed in Set Integrity Pending state when one of its underlying tables is checked for integrity violations. A query of a table that is in the Set Integrity Pending state might succeed if an eligible materialized query table that is not in the Set Integrity Pending state is accessed by the query instead of the specified table. A warning (SQLSTATE 01586) will be issued to indicate that descendant tables have been placed in Set Integrity Pending state. See the Notes section of the SET INTEGRITY statement for when these descendant tables will be put into Set Integrity Pending state.

If the **SET INTEGRITY PENDING CASCADE** option is not specified:

- Only the loaded table will be placed in Set Integrity Pending state. The state of descendant foreign key tables, descendant immediate materialized query tables and descendant immediate staging tables will remain unchanged, and can later be implicitly put into Set Integrity Pending state when the loaded table is checked for constraint violations.

If **LOAD** does not put the target table into Set Integrity Pending state, the **SET INTEGRITY PENDING CASCADE** option is ignored.

#### **LOCK WITH FORCE**

The utility acquires various locks including table locks in the process of loading. Rather than wait, and possibly timeout, when acquiring a lock,

this option allows load to force off other applications that hold conflicting locks on the target table. Applications holding conflicting locks on the system catalog tables will not be forced off by the load utility. Forced applications will roll back and release the locks the load utility needs. The load utility can then proceed. This option requires the same authority as the **FORCE APPLICATIONS** command (SYSADM, SYSCTRL, or SYSMAINT).

**ALLOW NO ACCESS** loads might force applications holding conflicting locks at the start of the load operation. At the start of the load operation, the utility can force applications that are attempting to either query or modify the table.

**ALLOW READ ACCESS** loads can force applications holding conflicting locks at the start or end of the load operation. At the start of the load operation, the load utility can force applications that are attempting to modify the table. At the end of the load operation, the load utility can force applications that are attempting to either query or modify the table.

#### **SOURCEUSEREXIT** *executable*

Specifies the name of an executable file that is called to feed data into the utility.

The **SOURCEUSEREXIT** parameter is not supported for column-organized tables.

#### **REDIRECT**

##### **INPUT FROM**

###### **BUFFER** *input-buffer*

The stream of bytes specified in *input-buffer* is passed into the STDIN file descriptor of the process executing the given executable.

###### **FILE** *input-file*

The contents of this client-side file are passed into the STDIN file descriptor of the process executing the given executable.

##### **OUTPUT TO**

###### **FILE** *output-file*

The STDOUT and STDERR file descriptors are captured to the fully qualified server-side file specified.

#### **PARALLELIZE**

Increases the throughput of data coming into the load utility by invoking multiple user exit processes simultaneously. This option is only applicable in multi-partition database environments and is ignored in single-partition database environments.

For more information, see “Moving data using a customized application (user exit)”.

#### **PARTITIONED DB CONFIG** *partitioned-db-option*

Allows you to execute a load into a table distributed across multiple database partitions. The **PARTITIONED DB CONFIG** parameter allows you to specify partitioned database-specific configuration options. The *partitioned-db-option* values can be any of the following options:

```

PART_FILE_LOCATION x
OUTPUT_DBPARTNUMS x
PARTITIONING_DBPARTNUMS x
MODE x
MAX_NUM_PART_AGENTS x
ISOLATE_PART_ERRS x
STATUS_INTERVAL x
PORT_RANGE x
CHECK_TRUNCATION
MAP_FILE_INPUT x
MAP_FILE_OUTPUT x
TRACE x
NEWLINE
DISTFILE x
OMIT_HEADER
RUN_STAT_DBPARTNUM x

```

Detailed descriptions of these options are provided in “Load configuration options for partitioned database environments”.

#### **RESTARTCOUNT**

Deprecated.

#### **USING *directory***

Deprecated.

### **Example 1**

TABLE1 has 5 columns:

- COL1 VARCHAR 20 NOT NULL WITH DEFAULT
- COL2 SMALLINT
- COL3 CHAR 4
- COL4 CHAR 2 NOT NULL WITH DEFAULT
- COL5 CHAR 2 NOT NULL

ASCFILE1 has 7 elements:

- ELE1 positions 01 to 20
- ELE2 positions 21 to 22
- ELE3 positions 23 to 23
- ELE4 positions 24 to 27
- ELE5 positions 28 to 31
- ELE6 positions 32 to 32
- ELE7 positions 33 to 40

Data Records:

```

1....5....10....15....20....25....30....35....40
Test data 1 XXN 123abcdN
Test data 2 and 3 QQY wxyzN
Test data 4,5 and 6 WWN6789 Y

```

The following command loads the table from the file:

```

db2 load from ascfile1 of asc modified by stripblanks reclen=40
 method L (1 20, 21 22, 24 27, 28 31)
 null indicators (0,0,23,32)
 insert into table1 (col1, col5, col2, col3)

```

**Note:**

1. The specification of **stripblanks** in the **MODIFIED BY** parameter forces the truncation of blanks in VARCHAR columns (COL1, for example, which is 11, 17 and 19 bytes long, in rows 1, 2 and 3).
2. The specification of **reclen=40** in the **MODIFIED BY** parameter indicates that there is no newline character at the end of each input record, and that each record is 40 bytes long. The last 8 bytes are not used to load the table.
3. Since COL4 is not provided in the input file, it will be inserted into TABLE1 with its default value (it is defined NOT NULL WITH DEFAULT).
4. Positions 23 and 32 are used to indicate whether COL2 and COL3 of TABLE1 will be loaded NULL for a given row. If there is a Y in the column's null indicator position for a given record, the column will be NULL. If there is an N, the data values in the column's data positions of the input record (as defined in L(.....)) are used as the source of column data for the row. In this example, neither column in row 1 is NULL; COL2 in row 2 is NULL; and COL3 in row 3 is NULL.
5. In this example, the NULL INDICATORS for COL1 and COL5 are specified as 0 (zero), indicating that the data is not nullable.
6. The NULL INDICATOR for a given column can be anywhere in the input record, but the position must be specified, and the Y or N values must be supplied.

## Example 2 (Loading LOBs from Files)

TABLE1 has 3 columns:

- COL1 CHAR 4 NOT NULL WITH DEFAULT
- LOB1 LOB
- LOB2 LOB

ASCFI1E1 has 3 elements:

- ELE1 positions 01 to 04
- ELE2 positions 06 to 13
- ELE3 positions 15 to 22

The following files reside in either /u/user1 or /u/user1/bin:

- ASCFILE2 has LOB data
- ASCFILE3 has LOB data
- ASCFILE4 has LOB data
- ASCFILE5 has LOB data
- ASCFILE6 has LOB data
- ASCFILE7 has LOB data

Data Records in ASCFILE1:

```
1...5....10...15...20...25...30.
REC1 ASCFILE2 ASCFILE3
REC2 ASCFILE4 ASCFILE5
REC3 ASCFILE6 ASCFILE7
```

The following command loads the table from the file:

```
db2 load from ascfile1 of asc
 lobs from /u/user1, /u/user1/bin
 modified by lobsinfile reclen=22
 method L (1 4, 6 13, 15 22)
 insert into table1
```

**Note:**

1. The specification of **lobsinfile** in the **MODIFIED BY** parameter tells the loader that all LOB data is to be loaded from files.
2. The specification of **reclen=22** in the **MODIFIED BY** parameter indicates that there is no newline character at the end of each input record, and that each record is 22 bytes long.
3. LOB data is contained in 6 files, ASCFILE2 through ASCFILE7. Each file contains the data that will be used to load a LOB column for a specific row. The relationship between LOBs and other data is specified in ASCFILE1. The first record of this file tells the loader to place REC1 in COL1 of row 1. The contents of ASCFILE2 will be used to load LOB1 of row 1, and the contents of ASCFILE3 will be used to load LOB2 of row 1. Similarly, ASCFILE4 and ASCFILE5 will be used to load LOB1 and LOB2 of row 2, and ASCFILE6 and ASCFILE7 will be used to load the LOBs of row 3.
4. The LOBS FROM parameter contains 2 paths that will be searched for the named LOB files when those files are required by the loader.
5. To load LOBs directly from ASCFILE1 (a nondelimited ASCII file), without the **lobsinfile** modifier, the following rules must be observed:
  - The total length of any record, including LOBs, cannot exceed 32 KB.
  - LOB fields in the input records must be of fixed length, and LOB data padded with blanks as necessary.
  - The **stripblanks** modifier must be specified, so that the trailing blanks used to pad LOBs can be removed as the LOBs are inserted into the database.

### Example 3 (Using Dump Files)

Table FRIENDS is defined as:

```
table friends "(c1 INT NOT NULL, c2 INT, c3 CHAR(8))"
```

If an attempt is made to load the following data records into this table,

```
23, 24, bobby
, 45, john
4,, mary
```

the second row is rejected because the first INT is NULL, and the column definition specifies NOT NULL. Columns which contain initial characters that are not consistent with the DEL format will generate an error, and the record will be rejected. Such records can be written to a dump file.

DEL data appearing in a column outside of character delimiters is ignored, but does generate a warning. For example:

```
22,34,"bob"
24,55,"sam" sdf
```

The utility will load "sam" in the third column of the table, and the characters "sdf" will be flagged in a warning. The record is not rejected. Another example:

```
22 3, 34,"bob"
```

The utility will load 22,34,"bob", and generate a warning that some data in column one following the 22 was ignored. The record is not rejected.

## **Example 4 (Loading a Table with an Identity Column)**

TABLE1 has 4 columns:

- C1 VARCHAR(30)
- C2 INT GENERATED BY DEFAULT AS IDENTITY
- C3 DECIMAL(7,2)
- C4 CHAR(1)

TABLE2 is the same as TABLE1, except that C2 is a GENERATED ALWAYS identity column.

Data records in DATAFILE1 (DEL format):

```
"Liszt"
"Hummel",,187.43, H
"Grieg",100, 66.34, G
"Satie",101, 818.23, I
```

Data records in DATAFILE2 (DEL format):

```
"Liszt", 74.49, A
"Hummel", 0.01, H
"Grieg", 66.34, G
"Satie", 818.23, I
```

### **Note:**

1. The following command generates identity values for rows 1 and 2, since no identity values are supplied in DATAFILE1 for those rows. However, row 3 is assigned the user-supplied identity value of 100 and row 4 is assigned the user-supplied identity value of 101.  

```
db2 load from datafile1.del of del replace into table1
```
2. To load DATAFILE1 into TABLE1 so that identity values are generated for all rows, issue one of the following commands:  

```
db2 load from datafile1.del of del method P(1, 3, 4)
 replace into table1 (c1, c3, c4)
db2 load from datafile1.del of del modified by identityignore
 replace into table1
```
3. To load DATAFILE2 into TABLE1 so that identity values are generated for each row, issue one of the following commands:  

```
db2 load from datafile2.del of del replace into table1 (c1, c3, c4)
db2 load from datafile2.del of del modified by identitymissing
 replace into table1
```
4. To load DATAFILE1 into TABLE2 so that the identity values of 100 and 101 are assigned to rows 3 and 4, issue the following command:  

```
db2 load from datafile1.del of del modified by identityoverride
 replace into table2
```

In this case, rows 1 and 2 will be rejected, because the utility has been instructed to override system-generated identity values in favor of user-supplied values. If user-supplied values are not present, however, the row must be rejected, because identity columns are implicitly not NULL.

5. If DATAFILE1 is loaded into TABLE2 without using any of the identity-related file type modifiers, rows 1 and 2 will be loaded, but rows 3 and 4 will be rejected, because they supply their own non-NULL values, and the identity column is GENERATED ALWAYS.

## **Example 5 (Loading a Table with a Row Change Timestamp Column)**

TABLE1 has 4 columns:

- C1 VARCHAR(30)
- C2 ROW CHANGE TIMESTAMP GENERATED BY DEFAULT
- C3 DECIMAL(7,2)
- C4 CHAR(1)

TABLE2 is the same as TABLE1, except that C2 is a GENERATED ALWAYS column.

Data records in DATAFILE1 (DEL format):

```
"Liszt"
"Hummel",,187.43, H
"Grieg", 2006-05-23-15.55.53.209971, 66.34, G
"Satie", 2006-05-22-19.34.14.947681, 818.23, I
```

Data records in DATAFILE2 (DEL format):

```
"Liszt", 74.49, A
"Hummel", 0.01, H
"Grieg", 66.34, G
"Satie", 818.23, I
```

### **Note:**

1. The following command generates ROW CHANGE TIMESTAMP values for rows 1 and 2, since no ROW CHANGE TIMESTAMP values are supplied in DATAFILE1 for those rows. Rows 3 and 4, however, are assigned the user-supplied ROW CHANGE TIMESTAMP values of 2006-05-23-15.55.53.209971 and 2006-05-22-19.34.14.947681.

```
db2 load from datafile1.del of del replace
into table1
```

2. To load DATAFILE1 into TABLE1 so that ROW CHANGE TIMESTAMP values are generated for all rows, issue one of the following commands:

```
db2 load from datafile1.del of del method P(1, 3, 4) replace into table1
(c1, c3, c4)
```

```
db2 load from datafile1.del of del modified by rowchangetimestampignore
replace into table1
```

3. To load DATAFILE2 into TABLE1 so that ROW CHANGE TIMESTAMP values are generated for each row, issue one of the following commands:

```
db2 load from datafile2.del of del replace into table1 (c1, c3, c4)
```

```
db2 load from datafile2.del of del modified by rowchangetimestampmissing
replace into table1
```

4. To load DATAFILE1 into TABLE2 so that the ROW CHANGE TIMESTAMP values of 2006-05-23-15.55.53.209971 and 2006-05-22-19.34.14.947681 are assigned to rows 3 and 4, issue the following command:

```
db2 load from datafile1.del of del modified by rowchangetimestampoverride
replace into table2
```

In this case, rows 1 and 2 will be rejected, because the utility has been instructed to override system-generated ROW CHANGE TIMESTAMP values in favor of user-supplied values. If user-supplied values are not present, however, the row must be rejected, because row change timestamp columns are implicitly not NULL.

- If DATAFILE1 is loaded into TABLE2 without using any of the ROW CHANGE related file type modifiers, rows 1 and 2 will be loaded, but rows 3 and 4 will be rejected, because they supply their own non-NULL values, and the row change timestamp column is GENERATED ALWAYS.

### **Example 6 (Loading using the CURSOR file type)**

Table ABC.TABLE1 has 3 columns:

```
ONE INT
TWO CHAR(10)
THREE DATE
```

Table ABC.TABLE2 has 3 columns:

```
ONE VARCHAR
TWO INT
THREE DATE
```

Executing the following commands will load all the data from ABC.TABLE1 into ABC.TABLE2:

```
db2 declare mycurs cursor for select two,one,three from abc.table1
db2 load from mycurs of cursor insert into abc.table2
```

If ABC.TABLE1 resides in a database different from the database ABC.TABLE2 is in, the DATABASE, USER, and USING options of the DECLARE CURSOR statement can be used to perform the load. For example, if ABC.TABLE1 resides in database DB1, and the user ID and password for DB1 are user1 and pwd1, executing the following commands will load all the data from ABC.TABLE1 into ABC.TABLE2:

```
db2 declare mycurs cursor database DB1 user user1 using pwd1
 for select two,one,three from abc.table1
db2 load from mycurs of cursor insert into abc.table2
```

### **Example : Loading XML data**

The user has constructed a data file with XDS fields to describe the documents that are to be inserted into the table. It might appear like this :

```
1, "<XDS FIL=""file1.xml"" />"
2, "<XDS FIL='file2.xml' OFF='23' LEN='45' />"
```

For the first row, the XML document is identified by the file named file1.xml. Since the character delimiter is the double quote character, and double quotation marks exist inside the XDS, the double quotation marks contained within the XDS are doubled. For the second row, the XML document is identified by the file named file2.xml, and starts at byte offset 23, and is 45 bytes in length.

The user issues a load command without any parsing or validation options for the XML column, and the data is loaded successfully:

```
LOAD
FROM data.del of DEL INSERT INTO mytable
```

### **Example : Loading XML data from CURSOR**

Loading data from cursor is the same as with a regular relational column type. The user has two tables, T1 and T2, each of which consist of a single XML column named C1. To LOAD from T1 into T2, the user will first declare a cursor:

```
DECLARE
X1 CURSOR FOR SELECT C1 FROM T1;
```

Next, the user may issue a **LOAD** using the cursor type:

```
LOAD FROM X1 of
CURSOR INSERT INTO T2
```

Applying the XML specific **LOAD** options to the cursor type is the same as loading from a file.

## Examples of using the XMLVALIDATE clause

### XMLVALIDATE USING XDS

- The user would like to validate according to the schema indicated in the XDS. If there are any XDS values without SCH attributes, these documents will be validated against the schema that is used in this clause.

```
XMLVALIDATE
USING XDS DEFAULT S1.SCHEMA_B
```

- The user would like to validate but IGNORE certain schemas that are mentioned in the XDS.

```
XMLVALIDATE USING XDS IGNORE S1.SCHEMA_C
```

- The user would like to validate but remap some of the schemas in the XDS.

```
XMLVALIDATE USING XDS MAP((S1.SCHEMA_A,
S2.SCHEMA_B), (S3.SCHEMA_C, S5.SCHEMA_E))
```

Given the previously mentioned XDS, any document with an SCH attribute of S1.SCHEMA\_A will be validated against S2.SCHEMA\_B. Also, any document with an SCH attribute of S3.SCHEMA\_C will be validated against S5.SCHEMA\_E.

- The user would like to use a combination of the **DEFAULT**, **IGNORE**, and **MAP** options:

```
XMLVALIDATE USING XDS
DEFAULT S8.SCHEMA_H
IGNORE (S9.SCHEMA_I, S10.SCHEMA_J)
MAP ((S1.SCHEMA_A, S2.SCHEMA_B), (S3.SCHEMA_C, S5.SCHEMA_E),
(S6.SCHEMA_F, S3.SCHEMA_C), (S4.SCHEMA_D, S7.SCHEMA_G))
```

- For an XML column that contains the following XDS:

```
<XDS FIL='xmlfile.001.xml' />
```

The XML schema with SQL identifier "S8.SCHEMA\_H" is used to validate the document in file `xmlfile.001.xml`, since "S8.SCHEMA\_H" was specified as the default schema to use.

- For an XML column that contains the following XDS:

```
<XDS FIL='xmlfile.002.xml' OFF='10' LEN='500' SCH='S10.SCHEMA_J' />
```

No schema validation occurs for the document in file `xmlfile.002.xml`, since although the XDS specifies "S10.SCHEMA\_J" as the schema to use, that schema is part of the **IGNORE** clause. The document contents can be found at byte offset 10 in the file (meaning the 11th byte), and is 500 bytes long.

- For an XML column that contains the following XDS:

```
<XDS FIL='xmlfile.003.xml' SCH='S6.SCHEMA_F' />
```

The XML schema with SQL identifier "S3.SCHEMA\_C" is used to validate the document in file `xmlfile.003.xml`. This is because the **MAP** clause specifies that schema "S6.SCHEMA\_F" should be mapped to

schema "S3.SCHEMA\_C". Further mapping does not take place, therefore the mapping of schema "S3.SCHEMA\_C" to schema "S5.SCHEMA\_E" does not apply in this case.

- For an XML column that contains the following XDS:

```
<XDS FIL='xmlfile.004.xml' SCH='S11.SCHEMA_K' />
```

The XML schema with SQL identifier "S11.SCHEMA\_K" is used to validate the document in file `xmlfile.004.xml`. None of the **DEFAULT**, **IGNORE**, or **MAP** specifications apply in this case.

### XMLVALIDATE USING SCHEMA

The user wants to validate all XML documents according to a single SCHEMA. For the following **XMLVALIDATE** clause:

```
XMLVALIDATE USING SCHEMA S2.SCHEMA_B
```

- For an XML column that contains the following XDS:

```
<XDS FIL='xmlfile.001.xml' />
```

The document in file `xmlfile.001.xml` is validated using the XML schema with SQL identifier "S2.SCHEMA\_B".

- For an XML column that contains the following XDS:

```
<XDS FIL='xmlfile.002.xml' SCH='S1.SCHEMA_A' />
```

The document in file `xmlfile.002.xml` is validated using the XML schema with SQL identifier "S2.SCHEMA\_B". The SCH attribute is ignored, since validation is being performed using a schema specified by the **USING SCHEMA** clause.

### XMLVALIDATE USING SCHEMALOCATION HINTS

The user would like to validate against schema information located within the document itself. For the following **XMLVALIDATE** clause:

```
XMLVALIDATE
USING SCHEMALOCATION HINTS
```

- For an XML column that contains the following XDS:

```
<XDS FIL='xmlfile.001.xml' />
```

The XML schema used is determined by the schemaLocation attribute in the document contents, and no validation would occur if one is not present.

- For an XML column that contains the following XDS:

```
<XDS FIL='xmlfile.002.xml' SCH='S1.SCHEMA_A' />
```

The XML schema used is determined by the schemaLocation attribute in the document contents, and no validation would occur if one is not present. The SCH attribute is ignored, since validation is being performed using **SCHEMALOCATION HINTS**.

### Usage notes

- Data is loaded in the sequence that appears in the input file. If a particular sequence is desired, the data should be sorted before a load is attempted. If preservation of the source data order is not required, consider using the **ANYORDER** file type modifier, described in the following "File type modifiers for the load utility" section.

- The load utility builds indexes based on existing definitions. The exception tables are used to handle duplicates on unique keys. The utility does not enforce referential integrity, perform constraints checking, or update materialized query tables that are dependent on the tables being loaded. Tables that include referential or check constraints are placed in Set Integrity Pending state. Summary tables that are defined with REFRESH IMMEDIATE, and that are dependent on tables being loaded, are also placed in Set Integrity Pending state. Issue the SET INTEGRITY statement to take the tables out of Set Integrity Pending state. Load operations cannot be carried out on replicated materialized query tables.
- If a clustering index exists on the table, the data should be sorted on the clustering index before loading. Data does not need to be sorted before loading into a multidimensional clustering (MDC) table, however.
- If you specify an exception table when loading into a protected table, any rows that are protected by invalid security labels will be sent to that table. This might allow users that have access to the exception table to access to data that they would not normally be authorized to access. For better security be careful who you grant exception table access to, delete each row as soon as it is repaired and copied to the table being loaded, and drop the exception table as soon as you are done with it.
- Security labels in their internal format might contain newline characters. If you load the file using the DEL file format, those newline characters can be mistaken for delimiters. If you have this problem use the older default priority for delimiters by specifying the **delprioritychar** file type modifier in the **LOAD** command.
- For performing a load using the CURSOR file type where the DATABASE keyword was specified during the DECLARE CURSOR statement, the user ID and password used to authenticate against the database currently connected to (for the load) will be used to authenticate against the source database (specified by the DATABASE option of the DECLARE CURSOR statement). If no user ID or password was specified for the connection to the loading database, a user ID and password for the source database must be specified during the DECLARE CURSOR statement.
- Loading a multiple-part PC/IXF file whose individual parts are copied from a Windows system to an AIX system is supported. The names of all the files must be specified in the **LOAD** command. For example, LOAD FROM DATA.IXF, DATA.002 OF IXF INSERT INTO TABLE1. Loading to the Windows operating system from logically split PC/IXF files is not supported.
- When restarting a failed **LOAD**, the behavior will follow the existing behavior in that the BUILD phase will be forced to use the REBUILD mode for indexes.
- The Load utility might generate a very large copy of the image file when the **COPY YES** option is used. This behavior is expected when the **LOAD** command writes out an entire buffer of data to the copy image for every LOB/LF column value that is loaded. The buffer is an internal object, and its size is determined by several internal and external factors. Typically, the buffer size is between 68KB and a few hundred KB.
- Loading XML documents between databases is not supported and returns error message SQL1407N.
- The **LOAD** utility does not support loading into tables that contain columns that reference fenced procedures. If you issue the **LOAD** command on such table, you will receive error message SQL1376N. To work around this restriction, you can redefine the routine to be unfenced, or use the import utility.

- If a table contains a generated column expression in which the user-defined function is a compiled compound SQL, you can use the **LOAD** utility only with the generatedoverride file type modifier to insert data into the table. You can also use the import utility to insert data into these tables.
- If the database table contains implicitly hidden columns, you must specify whether data for the hidden columns is included in the load operation.
- The IMPORT utility does not match the number of columns in a table and the number of fields in a data file. The utility checks for a sufficient amount of data in the data file and if a row in the data file does not contain sufficient columns of data, the row may either be rejected with a warning message if the corresponding table columns without data are defined as NOT NULL, or be inserted successfully without a warning message if the corresponding table columns are defined as NULL. Alternatively, if a row contains a higher number of columns than required, the sufficient number of columns are processed while the remaining columns of data are omitted and no warning message is given.
- The **STATISTICS** options only work for the **LOAD REPLACE** option and do not work for other **LOAD** command options.
- When LOAD utility with COPY YES option is used, and the table contains LOB columns, LOAD always enforces COMPACT YES behavior even when the LOB column is defined with COMPACT NOT.

## **Summary of LOAD TERMINATE and LOAD RESTART dictionary management**

The following chart summarizes the compression dictionary management behavior for **LOAD** processing under the **TERMINATE** directive.

*Table 28. LOAD TERMINATE dictionary management*

Table COMPRESS attribute	Does table row data dictionary existed before <b>LOAD</b> ?	XML storage object dictionary exists before <b>LOAD</b> <sup>1</sup>	TERMINATE: <b>LOAD REPLACE KEEPDICTIONARY</b> or <b>LOAD INSERT</b>	TERMINATE: <b>LOAD REPLACE RESETDICTIONARY</b>
YES	YES	YES	Keep existing dictionaries.	Neither dictionary is kept. <sup>2</sup>
YES	YES	NO	Keep existing dictionary.	Nothing is kept. <sup>2</sup>
YES	NO	YES	Keep existing dictionary.	Nothing is kept.
YES	NO	NO	Nothing is kept.	Nothing is kept.
NO	YES	YES	Keep existing dictionaries.	Nothing is kept.
NO	YES	NO	Keep existing dictionary.	Nothing is kept.
NO	NO	YES	Keep existing dictionary.	Nothing is kept.
NO	NO	NO	Do nothing.	Do nothing.

**Note:**

1. A compression dictionary can be created for the XML storage object of a table only if the XML columns are added to the table in Db2 Version 9.7 or later, or if the table is migrated using an online table move.
2. In the special case that the table has data capture enabled, the table row data dictionary is kept.

**LOAD RESTART** truncates a table up to the last consistency point reached. As part of **LOAD RESTART** processing, a compression dictionary will exist in the table if it was

present in the table at the time the last **LOAD** consistency point was taken. In that case, **LOAD RESTART** will not create a new dictionary. For a summary of the possible conditions, see Table 4.

*Table 29. LOAD RESTART dictionary management*

Table COMPRESS Attribute	Table row data dictionary exist before <b>LOAD</b> consistency point? <sup>1</sup>	XML Storage object dictionary existed before last <b>LOAD</b> ? <sup>2</sup>	RESTART: LOAD <b>REPLACE</b> <b>KEEPDICTIONARY</b> or <b>LOAD INSERT</b>	RESTART: LOAD <b>REPLACE</b> <b>RESETDICTIONARY</b>
YES	YES	YES	Keep existing dictionaries.	Keep existing dictionaries.
YES	YES	NO	Keep existing table row data dictionary and build XML dictionary subject to ADC.	Keep existing table row data dictionary and build XML dictionary.
YES	NO	YES	Build table row data dictionary subject to ADC. Keep existing XML dictionary.	Build table row data dictionary. Keep existing XML dictionary.
YES	NO	NO	Build table row data and XML dictionaries subject to ADC.	Build table row data and XML dictionaries.
NO	YES	YES	Keep existing dictionaries.	Remove existing dictionaries.
NO	YES	NO	Keep existing table row data dictionary.	Remove existing table row data dictionary.
NO	NO	YES	Keep existing XML dictionary.	Remove existing XML dictionary.
NO	NO	NO	Do nothing.	Do nothing.

#### Notes:

1. The **SAVECOUNT** option is not allowed when loading XML data, load operations that fail during the load phase restart from the beginning of the operation.
2. A compression dictionary can be created for the XML storage object of a table only if the XML columns are added to the table in Db2 Version 9.7 or later, or if the table is migrated using an online table move.

#### File type modifiers for the load utility

*Table 30. Valid file type modifiers for the load utility: All file formats*

Modifier	Description
<b>anyorder</b>	This modifier specifies that the preservation of the source data order is not required. Using this modifier yields significant additional performance benefits on SMP systems. Use this modifier with the <b>cpu_parallelism</b> parameter. If the value of the <b>cpu_parallelism</b> parameter is 1, this modifier is ignored. This modifier is not supported if the value of the <b>SAVECOUNT</b> parameter is greater than 0, because crash recovery after a consistency point requires that data be loaded in sequence. This modifier is implicitly turned on for all load operations for column-organized tables, multidimensional clustering (MDC) tables, and range-partitioned tables.

Table 30. Valid file type modifiers for the load utility: All file formats (continued)

Modifier	Description
<b>cdeanalyzefrequency=x</b>	<i>x</i> is an integer between 0 - 99 inclusive. This value controls how much data is sampled in the ANALYZE phase to produce a compression dictionary. In a massively parallel processing (MPP), the sampling size is not aggregated across members. The ANALYZE phase is stopped when the first member reaches max.
<b>generatedignore</b>	This modifier informs the load utility that data for all generated columns is present in the data file but should be ignored. This results in all generated column values being generated by the utility. This modifier cannot be used with either the <b>generatedmissing</b> or the <b>generatedoverride</b> modifier.
<b>generatedmissing</b>	If this modifier is specified, the utility assumes that the input data file contains no data for the generated column (not even NULLs). This results in all generated column values being generated by the utility. This modifier cannot be used with either the <b>generatedignore</b> or the <b>generatedoverride</b> modifier.
<b>generatedoverride</b>	<p>This modifier instructs the load utility to accept user-supplied data for all generated columns in the table (contrary to the normal rules for these types of columns). This is useful when migrating data from another database system, or when loading a table from data that was recovered using the <b>RECOVER DROPPED TABLE</b> option on the <b>ROLLFORWARD DATABASE</b> command. When this modifier is used, any rows with no data or NULL data for a non-nullable generated column will be rejected (SQL3116W). When this modifier is used, the table will be placed in Set Integrity Pending state. To take the table out of Set Integrity Pending state without verifying the user-supplied values, issue the following command after the load operation:</p> <pre>SET INTEGRITY FOR <i>table-name</i> GENERATED COLUMN IMMEDIATE UNCHECKED</pre> <p>To take the table out of Set Integrity Pending state and force verification of the user-supplied values, issue the following command after the load operation:</p> <pre>SET INTEGRITY FOR <i>table-name</i> IMMEDIATE CHECKED.</pre> <p>When this modifier is specified and there is a generated column in any of the partitioning keys, dimension keys or distribution keys, then the <b>LOAD</b> command automatically converts the modifier to <b>generatedignore</b> and proceeds with the load. This has the effect of regenerating all the generated column values.</p> <p>This modifier cannot be used with either the <b>generatedmissing</b> or the <b>generatedignore</b> modifier.</p> <p>This modifier cannot be used for column-organized tables (SQLSTATE 42858).</p> <p>Random distribution tables that use the random by generation method have an internally generated column called the <b>RANDOM DISTRIBUTION KEY</b>. This modifier does not apply to that column, only to other generated columns in the table. Values for the <b>RANDOM DISTRIBUTION KEY</b> will always be regenerated.</p>
<b>identityignore</b>	This modifier informs the load utility that data for the identity column is present in the data file but should be ignored. This results in all identity values being generated by the utility. The behavior will be the same for both GENERATED ALWAYS and GENERATED BY DEFAULT identity columns. This means that for GENERATED ALWAYS columns, no rows will be rejected. This modifier cannot be used with either the <b>identitymissing</b> or the <b>identityoverride</b> modifier.
<b>identitymissing</b>	If this modifier is specified, the utility assumes that the input data file contains no data for the identity column (not even NULLs), and will therefore generate a value for each row. The behavior will be the same for both GENERATED ALWAYS and GENERATED BY DEFAULT identity columns. This modifier cannot be used with either the <b>identityignore</b> or the <b>identityoverride</b> modifier.

Table 30. Valid file type modifiers for the load utility: All file formats (continued)

Modifier	Description
<b>identityoverride</b>	This modifier should be used only when an identity column defined as GENERATED ALWAYS is present in the table to be loaded. It instructs the utility to accept explicit, non-NULL data for such a column (contrary to the normal rules for these types of identity columns). This is useful when migrating data from another database system when the table must be defined as GENERATED ALWAYS, or when loading a table from data that was recovered using the <b>DROPPED TABLE RECOVERY</b> option on the <b>ROLLFORWARD DATABASE</b> command. When this modifier is used, any rows with no data or NULL data for the identity column will be rejected (SQL3116W). This modifier cannot be used with either the <b>identitymissing</b> or the <b>identityignore</b> modifier. The load utility will not attempt to maintain or verify the uniqueness of values in the table's identity column when this option is used.
<b>implicitlyhiddeninclude</b>	If this modifier is specified, the utility assumes that the input data file contains data for the implicitly hidden columns and this data will also be loaded. This modifier cannot be used with the <b>implicitlyhiddenmissing</b> modifier. See the "Notes" on page 385 section for information about the precedence when multiple modifiers are specified.  Random distribution tables that use the random by generation method have a hidden column as its distribution column called <b>RANDOM DISTRIBUTION KEY</b> . This modifier does not apply to that column, only to the other hidden columns in the table. The <b>RANDOM DISTRIBUTION KEY</b> will be treated as if it were missing.
<b>implicitlyhiddenmissing</b>	If this modifier is specified, the utility assumes that the input data file does not contain data for the implicitly hidden columns and the utility will generate values for those hidden columns. This modifier cannot be used with the <b>implicitlyhiddeninclude</b> modifier. See the "Notes" on page 385 section for information about the precedence when multiple modifiers are specified.
<b>indexfreespace=x</b>	$x$ is an integer between 0 and 99 inclusive. The value is interpreted as the percentage of each index page that is to be left as free space when load rebuilds the index. Load with <b>INDEXING MODE INCREMENTAL</b> ignores this option. The first entry in a page is added without restriction; subsequent entries are added to maintain the percent free space threshold. The default value is the one used at CREATE INDEX time.  This value takes precedence over the PCTFREE value specified in the CREATE INDEX statement. The <b>indexfreespace</b> option affects index leaf pages only.

Table 30. Valid file type modifiers for the load utility: All file formats (continued)

Modifier	Description
<b>lobsinfile</b>	<p><i>lob-path</i> specifies the path to the files containing LOB data. The ASC, DEL, or IXF load input files contain the names of the files having LOB data in the LOB column.</p> <p>This option is not supported in conjunction with the CURSOR filetype.</p> <p>The <b>LOBS FROM</b> clause specifies where the LOB files are located when the <b>lobsinfile</b> modifier is used. The <b>LOBS FROM</b> clause will implicitly activate the <b>lobsinfile</b> behavior. The <b>LOBS FROM</b> clause conveys to the <b>LOAD</b> utility the list of paths to search for the LOB files while loading the data.</p> <p>Each path contains at least one file that contains at least one LOB pointed to by a Lob Location Specifier (LLS) in the data file. The LLS is a string representation of the location of a LOB in a file stored in the LOB file path. The format of an LLS is <i>filename.ext.nnn.mmm/</i>, where <i>filename.ext</i> is the name of the file that contains the LOB, <i>nnn</i> is the offset in bytes of the LOB within the file, and <i>mmm</i> is the length of the LOB in bytes. For example, if the string db2exp.001.123.456/ is stored in the data file, the LOB is located at offset 123 in the file db2exp.001, and is 456 bytes long.</p> <p>To indicate a null LOB , enter the size as -1. If the size is specified as 0, it is treated as a 0 length LOB. For null LOBS with length of -1, the offset and the file name are ignored. For example, the LLS of a null LOB might be db2exp.001.7.-1/.</p>
<b>maxanalyzesize=x</b>	<p><i>x</i> is the size that has a value of &lt;Number&gt;&lt;Megabytes   Gigabytes&gt;. The default size is 128 GB. <b>maxanalyzesize</b> controls how much data is sampled in the ANALYZE phase to produce compression dictionary. In a massively parallel processing (MPP), the sampling size is not aggregated across members. The ANALYZE phase is stopped when first member reaches max.</p> <p><b>Note:</b> A value of 0 means unlimited (full size). Here is an example:</p> <pre>modified by maxanalyzesize=1G modified by maxanalyzesize=100M</pre>
<b>noheader</b>	<p>Skips the header verification code (applicable only to load operations into tables that reside in a single-partition database partition group).</p> <p>If the default MPP load (mode PARTITION_AND_LOAD) is used against a table residing in a single-partition database partition group, the file is not expected to have a header. Thus the <b>noheader</b> modifier is not needed. If the LOAD_ONLY mode is used, the file is expected to have a header. The only circumstance in which you should need to use the <b>noheader</b> modifier is if you wanted to perform LOAD_ONLY operation using a file that does not have a header.</p>
<b>norowwarnings</b>	Suppresses all warnings about rejected rows.
<b>pagefreespace=x</b>	<p><i>x</i> is an integer between 0 and 100 inclusive. The value is interpreted as the percentage of each data page that is to be left as free space. If the specified value is invalid because of the minimum row size, (for example, a row that is at least 3 000 bytes long, and an <i>x</i> value of 50), the row will be placed on a new page. If a value of 100 is specified, each row will reside on a new page. The PCTFREE value of a table determines the amount of free space designated per page. If a <b>pagefreespace</b> value on the load operation or a PCTFREE value on a table have not been set, the utility will fill up as much space as possible on each page. The value set by <b>pagefreespace</b> overrides the PCTFREE value specified for the table.</p>
<b>periodignore</b>	This modifier informs the load utility that data for the period columns is present in the data file but should be ignored. When this modifier is specified, all period column values are generated by the utility. This modifier cannot be used with the <b>periodmissing</b> modifier or the <b>periodoverride</b> modifier.

Table 30. Valid file type modifiers for the load utility: All file formats (continued)

Modifier	Description
<b>periodmissing</b>	If this modifier is specified, the utility assumes that the input data file contains no data for the period columns. When this modifier is specified, all period column values are generated by the utility. This modifier cannot be used with the <b>periodignore</b> modifier or the <b>periodoverride</b> modifier.
<b>periodoverride</b>	This modifier instructs the load utility to accept user-supplied data for GENERATED ALWAYS AS ROW BEGIN and GENERATED ALWAYS AS ROW END columns in a system-period temporal table. This behavior is contrary to the normal rules for these types of columns. The modifier can be useful when you want to maintain history data and load data that includes time stamps into a system-period temporal table. When this modifier is used, any rows with no data or NULL data in a ROW BEGIN or ROW END column are rejected.
<b>rowchangetimestampignore</b>	This modifier informs the load utility that data for the row change timestamp column is present in the data file but should be ignored. This results in all ROW CHANGE TIMESTAMPs being generated by the utility. The behavior will be the same for both GENERATED ALWAYS and GENERATED BY DEFAULT columns. This means that for GENERATED ALWAYS columns, no rows will be rejected. This modifier cannot be used with either the <b>rowchangetimestampmissing</b> or the <b>rowchangetimestampoverride</b> modifier.
<b>rowchangetimestampmissing</b>	If this modifier is specified, the utility assumes that the input data file contains no data for the row change timestamp column (not even NULLs), and will therefore generate a value for each row. The behavior will be the same for both GENERATED ALWAYS and GENERATED BY DEFAULT columns. This modifier cannot be used with either the <b>rowchangetimestampignore</b> or the <b>rowchangetimestampoverride</b> modifier.
<b>rowchangetimestampoverride</b>	This modifier should be used only when a row change timestamp column defined as GENERATED ALWAYS is present in the table to be loaded. It instructs the utility to accept explicit, non-NUL data for such a column (contrary to the normal rules for these types of row change timestamp columns). This is useful when migrating data from another database system when the table must be defined as GENERATED ALWAYS, or when loading a table from data that was recovered using the <b>DROPPED TABLE RECOVERY</b> option on the <b>ROLLFORWARD DATABASE</b> command. When this modifier is used, any rows with no data or NULL data for the ROW CHANGE TIMESTAMP column will be rejected (SQL3116W). This modifier cannot be used with either the <b>rowchangetimestampmissing</b> or the <b>rowchangetimestampignore</b> modifier. The load utility will not attempt to maintain or verify the uniqueness of values in the table's row change timestamp column when this option is used.

Table 30. Valid file type modifiers for the load utility: All file formats (continued)

Modifier	Description
<b>seclabelchar</b>	<p>Indicates that security labels in the input source file are in the string format for security label values rather than in the default encoded numeric format. <b>LOAD</b> converts each security label into the internal format as it is loaded. If a string is not in the proper format the row is not loaded and a warning (SQLSTATE 01H53, SQLCODE SQL3242W) is returned. If the string does not represent a valid security label that is part of the security policy protecting the table then the row is not loaded and a warning (SQLSTATE 01H53, SQLCODE SQL3243W) is returned.</p> <p>This modifier cannot be specified if the <b>seclabelname</b> modifier is specified, otherwise the load fails and an error (SQLCODE SQL3525N) is returned.</p> <p>If you have a table consisting of a single DB2SECURITYLABEL column, the data file might look like this:</p> <pre>"CONFIDENTIAL:ALPHA:G2" "CONFIDENTIAL;SIGMA:G2" "TOP SECRET:ALPHA:G2"</pre> <p>To load or import this data, the <b>seclabelchar</b> file type modifier must be used:</p> <pre>LOAD FROM input.del OF DEL MODIFIED BY SECLABELCHAR INSERT INTO t1</pre>
<b>seclabelname</b>	<p>Indicates that security labels in the input source file are indicated by their name rather than the default encoded numeric format. <b>LOAD</b> will convert the name to the appropriate security label if it exists. If no security label exists with the indicated name for the security policy protecting the table the row is not loaded and a warning (SQLSTATE 01H53, SQLCODE SQL3244W) is returned.</p> <p>This modifier cannot be specified if the <b>seclabelchar</b> modifier is specified, otherwise the load fails and an error (SQLCODE SQL3525N) is returned.</p> <p>If you have a table consisting of a single DB2SECURITYLABEL column, the data file might consist of security label names similar to:</p> <pre>"LABEL1" "LABEL1" "LABEL2"</pre> <p>To load or import this data, the <b>seclabelname</b> file type modifier must be used:</p> <pre>LOAD FROM input.del OF DEL MODIFIED BY SECLABELNAME INSERT INTO t1</pre> <p><b>Note:</b> If the file type is ASC, any spaces following the name of the security label will be interpreted as being part of the name. To avoid this use the <b>stripblanks</b> file type modifier to make sure the spaces are removed.</p>
<b>totalfreespace=x</b>	<p><i>x</i> is an integer greater than or equal to 0. The value is interpreted as the percentage of the total pages in the table that is to be appended to the end of the table as free space. For example, if <i>x</i> is 20, and the table has 100 data pages after the data has been loaded, 20 additional empty pages will be appended. The total number of data pages for the table will be 120. The data pages total does not factor in the number of index pages in the table. This option does not affect the index object. If two loads are done with this option specified, the second load will not reuse the extra space appended to the end by the first load.</p>
<b>transactionidignore</b>	<p>This modifier informs the load utility that data for the TRANSACTION START ID column is present in the data file but should be ignored. When this modifier is specified, the value for the TRANSACTION START ID column is generated by the utility. This modifier cannot be used with the <b>transactionidmissing</b> modifier or the <b>transactionidoverride</b> modifier.</p>

*Table 30. Valid file type modifiers for the load utility: All file formats (continued)*

Modifier	Description
<b>transactionidmissing</b>	If this modifier is specified, the utility assumes that the input data file contains no data for the TRANSACTION START ID columns. When this modifier is specified, the value for the TRANSACTION START ID column is generated by the utility. This modifier cannot be used with the <b>transactionidignore</b> modifier or the <b>transactionidoverride</b> modifier.
<b>transactionidoverride</b>	This modifier instructs the load utility to accept user-supplied data for the GENERATED ALWAYS AS TRANSACTION START ID column in a system-period temporal table. This behavior is contrary to the normal rules for this type of column. When this modifier is used, any rows with no data or NULL data in a TRANSACTION START ID column are rejected.
<b>usedefaults</b>	If a source column for a target table column has been specified, but it contains no data for one or more row instances, default values are loaded. Examples of missing data are: <ul style="list-style-type: none"> <li>For DEL files: two adjacent column delimiters (" ,") or two adjacent column delimiters separated by an arbitrary number of spaces (" , ,") are specified for a column value.</li> <li>For DEL/ASC files: A row that does not have enough columns, or is not long enough for the original specification. For ASC files, NULL column values are not considered explicitly missing, and a default will not be substituted for NULL column values. NULL column values are represented by all space characters for numeric, date, time, and /timestamp columns, or by using the NULL INDICATOR for a column of any type to indicate the column is NULL.</li> </ul> Without this option, if a source column contains no data for a row instance, one of the following occurs: <ul style="list-style-type: none"> <li>For DEL/ASC files: If the column is nullable, a NULL is loaded. If the column is not nullable, the utility rejects the row.</li> </ul>

*Table 31. Valid file type modifiers for the load utility: ASCII file formats (ASC/DEL)*

Modifier	Description
<b>codepage=x</b>	x is an ASCII character string. The value is interpreted as the code page of the data in the input data set. Converts character data (and numeric data specified in characters) from this code page to the database code page during the load operation.  The following rules apply: <ul style="list-style-type: none"> <li>For pure DBCS (graphic), mixed DBCS, and EUC, delimiters are restricted to the range of x00 to x3F, inclusive.</li> <li>For DEL data specified in an EBCDIC code page, the delimiters might not coincide with the shift-in and shift-out DBCS characters.</li> <li><b>nullindchar</b> must specify symbols included in the standard ASCII set between code points x20 and x7F, inclusive. This refers to ASCII symbols and code points. EBCDIC data can use the corresponding symbols, even though the code points will be different.</li> </ul> This option is not supported in conjunction with the CURSOR filetype.

Table 31. Valid file type modifiers for the load utility: ASCII file formats (ASC/DEL) (continued)

Modifier	Description
<b>dateformat="x"</b>	<p><i>x</i> is the format of the date in the source file.<sup>1</sup> Valid date elements are:</p> <ul style="list-style-type: none"> <li>YYYY - Year (four digits ranging from 0000 - 9999)</li> <li>M - Month (one or two digits ranging from 1 - 12)</li> <li>MM - Month (two digits ranging from 01 - 12; mutually exclusive with M)</li> <li>D - Day (one or two digits ranging from 1 - 31)</li> <li>DD - Day (two digits ranging from 01 - 31; mutually exclusive with D)</li> <li>DDD - Day of the year (three digits ranging from 001 - 366; mutually exclusive with other day or month elements)</li> </ul> <p>A default value of 1 is assigned for each element that is not specified. Some examples of date formats are:</p> <ul style="list-style-type: none"> <li>"D-M-YYYY"</li> <li>"MM.DD.YYYY"</li> <li>"YYYYDDD"</li> </ul>
<b>dumpfile = <i>x</i></b>	<p><i>x</i> is the fully qualified (according to the server database partition) name of an exception file to which rejected rows are written. A maximum of 32 KB of data is written per record. The following section is an example that shows how to specify a dump file:</p> <pre>db2 load from data of del   modified by dumpfile = /u/user/filename   insert into table_name</pre> <p>The file will be created and owned by the instance owner. To override the default file permissions, use the <b>dumpfileaccessall</b> file type modifier.</p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. In a partitioned database environment, the path should be local to the loading database partition, so that concurrently running load operations do not attempt to write to the same file.</li> <li>2. The contents of the file are written to disk in an asynchronous buffered mode. In the event of a failed or an interrupted load operation, the number of records committed to disk cannot be known with certainty, and consistency cannot be guaranteed after a <b>LOAD RESTART</b>. The file can only be assumed to be complete for a load operation that starts and completes in a single pass.</li> <li>3. If the specified file already exists, it will not be re-created, but it will be truncated.</li> </ol>
<b>dumpfileaccessall</b>	<p>Grants read access to 'OTHERS' when a dump file is created.</p> <p>This file type modifier is only valid when:</p> <ol style="list-style-type: none"> <li>1. it is used in conjunction with <b>dumpfile</b> file type modifier</li> <li>2. the user has SELECT privilege on the load target table</li> <li>3. it is issued on a Db2 server database partition that resides on a UNIX operating system</li> </ol> <p>If the specified file already exists, its permissions will not be changed.</p>
<b>fastparse</b>	<p>Use with caution. Reduces syntax checking on user-supplied column values, and enhances performance. Tables are guaranteed to be architecturally correct (the utility performs sufficient data checking to prevent a segmentation violation or trap), however, the coherence of the data is not validated. Only use this option if you are certain that your data is coherent and correct. For example, if the user-supplied data contains an invalid timestamp column value of :1&gt;0-00-20-07.11.12.000000, this value is inserted into the table if <b>fastparse</b> is specified, and rejected if <b>fastparse</b> is not specified.</p>

Table 31. Valid file type modifiers for the load utility: ASCII file formats (ASC/DEL) (continued)

Modifier	Description
<b>implieddecimal</b>	The location of an implied decimal point is determined by the column definition; it is no longer assumed to be at the end of the value. For example, the value 12345 is loaded into a DECIMAL(8,2) column as 123.45, not 12345.00.  This modifier cannot be used with the <b>packeddecimal</b> modifier.
<b>timeformat="x"</b>	x is the format of the time in the source file. <sup>1</sup> Valid time elements are:  H - Hour (one or two digits ranging from 0 - 12 for a 12 hour system, and 0 - 24 for a 24 hour system) HH - Hour (two digits ranging from 00 - 12 for a 12 hour system, and 00 - 24 for a 24 hour system; mutually exclusive with H) M - Minute (one or two digits ranging from 0 - 59) MM - Minute (two digits ranging from 00 - 59; mutually exclusive with M) S - Second (one or two digits ranging from 0 - 59) SS - Second (two digits ranging from 00 - 59; mutually exclusive with S) SSSSS - Second of the day after midnight (5 digits ranging from 00000 - 86400; mutually exclusive with other time elements) TT - Meridian indicator (AM or PM)  A default value of 0 is assigned for each element that is not specified. Some examples of time formats are: "HH:MM:SS" "HH.MM TT" "SSSSS"

Table 31. Valid file type modifiers for the load utility: ASCII file formats (ASC/DEL) (continued)

Modifier	Description
<b>timestampformat="x"</b>	x is the format of the time stamp in the source file. <sup>1</sup> Valid time stamp elements are: YYYY - Year (four digits ranging from 0000 - 9999) M - Month (one or two digits ranging from 1 - 12) MM - Month (two digits ranging from 01 - 12; mutually exclusive with M and MMM) MMM - Month (three-letter case-insensitive abbreviation for the month name; mutually exclusive with M and MM) D - Day (one or two digits ranging from 1 - 31) DD - Day (two digits ranging from 01 - 31; mutually exclusive with D) DDD - Day of the year (three digits ranging from 001 - 366; mutually exclusive with other day or month elements) H - Hour (one or two digits ranging from 0 - 12 for a 12 hour system, and 0 - 24 for a 24 hour system) HH - Hour (two digits ranging from 00 - 12 for a 12 hour system, and 00 - 24 for a 24 hour system; mutually exclusive with H) M - Minute (one or two digits ranging from 0 - 59) MM - Minute (two digits ranging from 00 - 59; mutually exclusive with M, minute) S - Second (one or two digits ranging from 0 - 59) SS - Second (two digits ranging from 00 - 59; mutually exclusive with S) SSSS - Second of the day after midnight (5 digits ranging from 00000 - 86400; mutually exclusive with other time elements) U (1 to 12 times) - Fractional seconds (number of occurrences of U represent the number of digits with each digit ranging from 0 to 9) TT - Meridian indicator (AM or PM)
<b>timestampformat="x"</b> (Continued)	A default value of 1 is assigned for unspecified YYYY, M, MM, D, DD, or DDD elements. A default value of 'Jan' is assigned to an unspecified MMM element. A default value of 0 is assigned for all other unspecified elements. The following section is an example of a time stamp format:  "YYYY/MM/DD HH:MM:SS.UUUUUU"  The valid values for the MMM element include: 'jan', 'feb', 'mar', 'apr', 'may', 'jun', 'jul', 'aug', 'sep', 'oct', 'nov' and 'dec'. These values are case insensitive.  If the <b>timestampformat</b> modifier is not specified, the load utility formats the timestamp field using one of two possible formats:  YYYY-MM-DD-HH.MM.SS YYYY-MM-DD HH:MM:SS  The load utility chooses the format by looking at the separator between the DD and HH. If it is a dash '-', the load utility uses the regular dashes and dots format (YYYY-MM-DD-HH.MM.SS). If it is a blank space, then the load utility expects a colon ':' to separate the HH, MM and SS.  In either format, if you include the microseconds field (UUUUUU), the load utility expects the dot '.' as the separator. Either YYYY-MM-DD-HH.MM.SS.UUUUUU or YYYY-MM-DD HH:MM:SS.UUUUUU are acceptable.  The following example illustrates how to load data containing user defined date and time formats into a table called schedule:  db2 load from delfile2 of del modified by timestampformat="yyyy.mm.dd hh:mm tt" insert into schedule

Table 31. Valid file type modifiers for the load utility: ASCII file formats (ASC/DEL) (continued)

Modifier	Description
<b>usegraphiccodepage</b>	<p>If <b>usegraphiccodepage</b> is given, the assumption is made that data being loaded into graphic or double-byte character large object (DBCLOB) data field(s) is in the graphic code page. The rest of the data is assumed to be in the character code page. The graphic code page is associated with the character code page. <b>LOAD</b> determines the character code page through either the <b>codepage</b> modifier, if it is specified, or through the code page of the database if the <b>codepage</b> modifier is not specified.</p> <p>This modifier should be used in conjunction with the delimited data file generated by drop table recovery only if the table being recovered has graphic data.</p> <p><b>Restrictions</b></p> <p>The <b>usegraphiccodepage</b> modifier MUST NOT be specified with DEL files created by the <b>EXPORT</b> utility, as these files contain data encoded in only one code page. The <b>usegraphiccodepage</b> modifier is also ignored by the double-byte character large objects (DBCLOBs) in files.</p>
<b>xmlchar</b>	<p>Specifies that XML documents are encoded in the character code page.</p> <p>This option is useful for processing XML documents that are encoded in the specified character code page but do not contain an encoding declaration.</p> <p>For each document, if a declaration tag exists and contains an encoding attribute, the encoding must match the character code page, otherwise the row containing the document will be rejected. The character code page is the value specified by the <b>codepage</b> file type modifier, or the application code page if it is not specified. By default, either the documents are encoded in Unicode, or they contain a declaration tag with an encoding attribute.</p>
<b>xmlgraphic</b>	<p>Specifies that XML documents are encoded in the specified graphic code page.</p> <p>This option is useful for processing XML documents that are encoded in a specific graphic code page but do not contain an encoding declaration.</p> <p>For each document, if a declaration tag exists and contains an encoding attribute, the encoding must match the graphic code page, otherwise the row containing the document will be rejected. The graphic code page is the graphic component of the value specified by the <b>codepage</b> file type modifier, or the graphic component of the application code page if it is not specified. By default, documents are either encoded in Unicode, or they contain a declaration tag with an encoding attribute.</p>

Table 32. Valid file type modifiers for the load utility: ASC file formats (Non-delimited ASCII)

Modifier	Description
<b>binarynumerics</b>	<p>Numeric (but not DECIMAL) data must be in binary form, not the character representation. This avoids costly conversions.</p> <p>This option is supported only with positional ASC, using fixed length records specified by the <b>reclen</b> option.</p> <p>The following rules apply:</p> <ul style="list-style-type: none"> <li>• No conversion between data types is performed, with the exception of BIGINT, INTEGER, and SMALLINT.</li> <li>• Data lengths must match their target column definitions.</li> <li>• FLOATs must be in IEEE Floating Point format.</li> <li>• Binary data in the load source file is assumed to be big-endian, regardless of the platform on which the load operation is running.</li> </ul> <p>NULLs cannot be present in the data for columns affected by this modifier. Blanks (normally interpreted as NULL) are interpreted as a binary value when this modifier is used.</p>
<b>nochecklengths</b>	If <b>nochecklengths</b> is specified, an attempt is made to load each row, even if the source data has a column definition that exceeds the size of the target table column. Such rows can be successfully loaded if code page conversion causes the source data to shrink; for example, 4-byte EUC data in the source could shrink to 2-byte DBCS data in the target, and require half the space. This option is particularly useful if it is known that the source data will fit in all cases despite mismatched column definitions.
<b>nullindchar=x</b>	<p><i>x</i> is a single character. Changes the character denoting a NULL value to <i>x</i>. The default value of <i>x</i> is Y.<sup>2</sup></p> <p>This modifier is case sensitive for EBCDIC data files, except when the character is an English letter. For example, if the NULL indicator character is specified to be the letter N, then n is also recognized as a NULL indicator.</p>
<b>packeddecimal</b>	<p>Loads packed-decimal data directly, since the <b>binarynumerics</b> modifier does not include the DECIMAL field type.</p> <p>This option is supported only with positional ASC, using fixed length records specified by the <b>reclen</b> option.</p> <p>Supported values for the sign nibble are:</p> <ul style="list-style-type: none"> <li>+ = 0xC 0xA 0xE 0xF</li> <li>- = 0xD 0xB</li> </ul> <p>NULLs cannot be present in the data for columns affected by this modifier. Blanks (normally interpreted as NULL) are interpreted as a binary value when this modifier is used.</p> <p>Regardless of the server platform, the byte order of binary data in the load source file is assumed to be big-endian; that is, when using this modifier on Windows operating systems, the byte order must not be reversed.</p> <p>This modifier cannot be used with the <b>implieddecimal</b> modifier.</p>
<b>reclen=x</b>	<i>x</i> is an integer with a maximum value of 32 767. <i>x</i> characters are read for each row, and a newline character is not used to indicate the end of the row.

Table 32. Valid file type modifiers for the load utility: ASC file formats (Non-delimited ASCII) (continued)

Modifier	Description
<b>stripblanks</b>	<p>Truncates any trailing blank spaces when loading data into a variable-length field. If this option is not specified, blank spaces are kept.</p> <p>This option cannot be specified together with <b>stripnulls</b>. These are mutually exclusive options. This option replaces the obsolete <b>t</b> option, which is supported for earlier compatibility only.</p>
<b>stripnulls</b>	<p>Truncates any trailing NULLs (0x00 characters) when loading data into a variable-length field. If this option is not specified, NULLs are kept.</p> <p>This option cannot be specified together with <b>stripblanks</b>. These are mutually exclusive options. This option replaces the obsolete <b>padwithzero</b> option, which is supported for earlier compatibility only.</p>
<b>zoneddecimal</b>	<p>Loads zoned decimal data, since the <b>binarynumerics</b> modifier does not include the DECIMAL field type. This option is supported only with positional ASC, using fixed length records specified by the <b>reclen</b> option.</p> <p>Half-byte sign values can be one of the following value:</p> <ul style="list-style-type: none"> <li>+ = 0xC 0xA 0xE 0xF 0x3</li> <li>- = 0xD 0xB 0x7</li> </ul> <p>Supported values for digits are 0x0 to 0x9.</p> <p>Supported values for zones are 0x3 and 0xF.</p>

Table 33. Valid file type modifiers for the load utility: DEL file formats (Delimited ASCII)

Modifier	Description
<b>chardelx</b>	<p>x is a single character string delimiter. The default value is a double quotation mark (""). The specified character is used in place of double quotation marks to enclose a character string.<sup>2, 3</sup> If you want to explicitly specify the double quotation mark (") as the character string delimiter, you should specify it as follows:  modified by chardel ""</p> <p>The single quotation mark (') can also be specified as a character string delimiter as follows:  modified by chardel ''</p>
<b>coldelx</b>	x is a single character column delimiter. The default value is a comma (,). The specified character is used in place of a comma to signal the end of a column. <sup>2, 3</sup>
<b>decplusblank</b>	Plus sign character. Causes positive decimal values to be prefixed with a blank space instead of a plus sign (+). The default action is to prefix positive decimal values with a plus sign.
<b>decptx</b>	x is a single character substitute for the period as a decimal point character. The default value is a period (.). The specified character is used in place of a period as a decimal point character. <sup>2, 3</sup>

Table 33. Valid file type modifiers for the load utility: DEL file formats (Delimited ASCII) (continued)

Modifier	Description
<b>delprioritychar</b>	<p>The current default priority for delimiters is: record delimiter, character delimiter, column delimiter. This modifier protects existing applications that depend on the older priority by reverting the delimiter priorities to: character delimiter, record delimiter, column delimiter. Syntax:</p> <pre>db2 load ... modified by delprioritychar ...</pre> <p>For example, given the following DEL data file:</p> <pre>"Smith, Joshua",4000,34.98&lt;row delimiter&gt; "Vincent,&lt;row delimiter&gt;, is a manager", ... ... 4005,44.37&lt;row delimiter&gt;</pre> <p>With the <b>delprioritychar</b> modifier specified, there will be only two rows in this data file. The second &lt;row delimiter&gt; will be interpreted as part of the first data column of the second row, while the first and the third &lt;row delimiter&gt; are interpreted as actual record delimiters. If this modifier is <i>not</i> specified, there will be three rows in this data file, each delimited by a &lt;row delimiter&gt;.</p>
<b>keepblanks</b>	<p>Preserves the leading and trailing blanks in each field of type CHAR, VARCHAR, LONG VARCHAR, or CLOB. Without this option, all leading and trailing blanks that are not inside character delimiters are removed, and a NULL is inserted into the table for all blank fields.</p> <p>The following example illustrates how to load data into a table called TABLE1, while preserving all leading and trailing spaces in the data file:</p> <pre>db2 load from delfile3 of del modified by keepblanks insert into table1</pre>
<b>nochardel</b>	<p>The load utility will assume all bytes found between the column delimiters to be part of the column's data. Character delimiters will be parsed as part of column data. This option should not be specified if the data was exported using a Db2 database system (unless <b>nochardel</b> was specified at export time). It is provided to support vendor data files that do not have character delimiters. Improper usage might result in data loss or corruption.</p> <p>This option cannot be specified with <b>chardelx</b>, <b>delprioritychar</b> or <b>nodoubledel</b>. These are mutually exclusive options.</p>
<b>nodoubledel</b>	Suppresses recognition of double character delimiters.

Table 34. Valid file type modifiers for the load utility: IXF file format

Modifier	Description
<b>forcein</b>	<p>Directs the utility to accept data despite code page mismatches, and to suppress translation between code pages.</p> <p>Fixed length target fields are checked to verify that they are large enough for the data. If <b>nochecklengths</b> is specified, no checking is done, and an attempt is made to load each row.</p>
<b>nochecklengths</b>	If <b>nochecklengths</b> is specified, an attempt is made to load each row, even if the source data has a column definition that exceeds the size of the target table column. Such rows can be successfully loaded if code page conversion causes the source data to shrink; for example, 4-byte EUC data in the source could shrink to 2-byte DBCS data in the target, and require half the space. This option is particularly useful if it is known that the source data will fit in all cases despite mismatched column definitions.

## Notes

1. Double quotation marks around the date format string are mandatory. Field separators cannot contain any of the following characters: a-z, A-Z, and 0-9. The field separator should not be the same as the character delimiter or field delimiter in the DEL file format. A field separator is optional if the start and end positions of an element are unambiguous. Ambiguity can exist if (depending on the modifier) elements such as D, H, M, or S are used, because of the variable length of the entries.

For time stamp formats, care must be taken to avoid ambiguity between the month and the minute descriptors, since they both use the letter M. A month field must be adjacent to other date fields. A minute field must be adjacent to other time fields. Following are some ambiguous time stamp formats:

"M" (could be a month, or a minute)  
"M:M" (Which is which?)  
"M:YYYY:M" (Both are interpreted as month.)  
"S:M:YYYY" (adjacent to both a time value and a date value)

In ambiguous cases, the utility will report an error message, and the operation will fail.

Following are some unambiguous time stamp formats:

"M:YYYY" (Month)  
"S:M" (Minute)  
"M:YYYY:S:M" (Month....Minute)  
"M:H:YYYY:M:D" (Minute....Month)

Some characters, such as double quotation marks and backslashes, must be preceded by an escape character (for example, \).

2. Character values provided for the **chardel**, **coldel**, or **decpt** file type modifiers must be specified in the code page of the source data.

The character code point (instead of the character symbol), can be specified using the syntax xJJ or 0xJJ, where JJ is the hexadecimal representation of the code point. For example, to specify the # character as a column delimiter, use one of the following statements:

```
... modified by coldel# ...
... modified by coldel0x23 ...
... modified by coldelX23 ...
```

3. "Delimiter considerations for moving data" lists restrictions that apply to the characters that can be used as delimiter overrides.
4. The load utility does not issue a warning if an attempt is made to use unsupported file types with the **MODIFIED BY** option. If this is attempted, the load operation fails, and an error code is returned.
5. When multiple modifiers suffixed with **ignore**, **include**, **missing**, and **override** are specified, they are applied in the order that they are listed. In the following statement, data for implicitly hidden columns that are not identity columns is included in the input data. While data for all identity columns, regardless of their implicitly hidden status, is not.

```
db2 load from delfile1 of del modified by
 implicitlyhiddeninclude identitymissing insert into table1
```

However, changing the order of the file type modifiers in the following statement means that data for all implicitly hidden columns (including hidden identity columns) is included in the input data. While data for identity columns that are not implicitly hidden is not.

```
db2 load from delfile1 of del modified by
 identitymissing implicitlyhiddeninclude insert into table1
```

Table 35. LOAD behavior when using code page and usegraphiccodepage

codepage=N	usegraphiccodepage	LOAD behavior
Absent	Absent	All data in the file is assumed to be in the database code page, not the application code page, even if the <b>CLIENT</b> option is specified.
Present	Absent	All data in the file is assumed to be in code page N. <b>Warning:</b> Graphic data will be corrupted when loaded into the database if N is a single-byte code page.
Absent	Present	Character data in the file is assumed to be in the database code page, even if the <b>CLIENT</b> option is specified. Graphic data is assumed to be in the code page of the database graphic data, even if the <b>CLIENT</b> option is specified.  If the database code page is single-byte, then all data is assumed to be in the database code page.  <b>Warning:</b> Graphic data will be corrupted when loaded into a single-byte database.
Present	Present	Character data is assumed to be in code page N. Graphic data is assumed to be in the graphic code page of N.  If N is a single-byte or double-byte code page, then all data is assumed to be in code page N.  <b>Warning:</b> Graphic data will be corrupted when loaded into the database if N is a single-byte code page.

## LOAD QUERY

Checks the status of a load operation during processing and returns the table state. If a load is not processing, then the table state alone is returned.

A connection to the same database, and a separate CLP session are also required to successfully invoke this command. It can be used either by local or remote users.

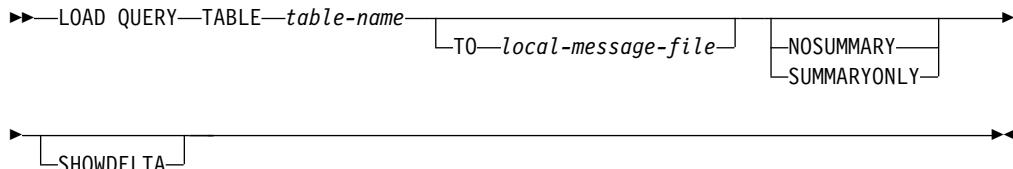
### Authorization

None

### Required connection

Database

### Command syntax



## Command parameters

### TABLE *table-name*

Specifies the name of the table into which data is currently being loaded. If an unqualified table name is specified, the table will be qualified with the CURRENT SCHEMA.

**Note:** In partitioned database environments, results are returned from the current partition only. No results are returned on partitions where the table is not defined.

### T0 *local-message-file*

Specifies the destination for warning and error messages that occur during the load operation. This file cannot be the *message-file* specified for the LOAD command. If the file already exists, all messages that the load utility has generated are appended to it.

### NOSUMMARY

Specifies that no load summary information (rows read, rows skipped, rows loaded, rows rejected, rows deleted, rows committed, and number of warnings) is to be reported.

### SUMMARYONLY

Specifies that only load summary information is to be reported.

### SHOWDELTA

Specifies that only new information (pertaining to load events that have occurred since the last invocation of the LOAD QUERY command) is to be reported.

## Examples

A user loading a large amount of data into the STAFF table in the BILLYBOB database, wants to check the status of the load operation. The user can specify:

```
db2 connect to billybob
db2 load query table staff to /u/mydir/staff.tempmsg
```

The output file /u/mydir/staff.tempmsg might look like the following output:

```
SQL3501W The table space(s) in which the table resides will not be placed in
backup pending state since forward recovery is disabled for the database.
```

```
SQL3109N The utility is beginning to load data from file
"/u/mydir/data/staffbig.del"
```

```
SQL3500W The utility is beginning the "LOAD" phase at time "03-21-2002
11:31:16.597045".
```

```
SQL3519W Begin Load Consistency Point. Input record count = "0".
```

```
SQL3520W Load Consistency Point was successful.
```

```
SQL3519W Begin Load Consistency Point. Input record count = "104416".
```

```
SQL3520W Load Consistency Point was successful.
```

```
SQL3519W Begin Load Consistency Point. Input record count = "205757".
```

```
SQL3520W Load Consistency Point was successful.
```

```
SQL3519W Begin Load Consistency Point. Input record count = "307098".
```

```
SQL3520W Load Consistency Point was successful.
```

```
SQL3519W Begin Load Consistency Point. Input record count = "408439".
```

```
SQL3520W Load Consistency Point was successful.
```

```
SQL3532I The Load utility is currently in the "LOAD" phase.
```

```
Number of rows read = 453376
Number of rows skipped = 0
Number of rows loaded = 453376
Number of rows rejected = 0
Number of rows deleted = 0
Number of rows committed = 408439
Number of warnings = 0
```

```
Tablestate:
Load in Progress
```

## Usage notes

In addition to locks, the load utility uses table states to control access to the table. The **LOAD QUERY** command can be used to determine the table state; **LOAD QUERY** can be used on tables that are not currently being loaded. For a partitioned table, the state reported is the most restrictive of the corresponding visible data partition states. For example, if a single data partition is in the Read Access Only state and all other data partitions are in Normal state, the load query operation returns the Read Access Only state. A load operation will not leave a subset of data partitions in a state different from the rest of the table. The table states described by **LOAD QUERY** are as follows:

### Normal

A table is in Normal state if it is not in any of the other (abnormal) table states. Normal state is the initial state of a table after it is created.

### Set Integrity Pending

The table has constraints which have not yet been verified. Use the SET INTEGRITY statement to take the table out of Set Integrity Pending state. The load utility places a table in Set Integrity Pending state when it begins a load operation on a table with constraints.

### Load in Progress

This is a transient state that is only in effect during a load operation.

### Load Pending

A load operation has been active on this table but has been aborted before the data could be committed. Issue a **LOAD TERMINATE**, **LOAD RESTART**, or **LOAD REPLACE** command to bring the table out of this state.

### Read Access Only

A table is in this state during a load operation if the **ALLOW READ ACCESS** option was specified. Read Access Only is a transient state that allows other applications and utilities to have read access to data that existed before the load operation.

### Reorg Pending

A **REORG** command recommended ALTER TABLE statement has been executed on the table. A classic **REORG** must be performed before the table is accessible again.

### **Unavailable**

The table is unavailable. The table can only be dropped or restored from a backup. Rolling forward through a non-recoverable load operation will place a table in the unavailable state.

### **Not Load Restartable**

The table is in a partially loaded state that will not allow a load restart operation. The table will also be in load pending state. Issue a **LOAD TERMINATE** or a **LOAD REPLACE** command to bring the table out of the not load restartable state. A table is placed in not load restartable state when a rollforward operation is performed after a failed load operation that has not been successfully restarted or terminated, or when a restore operation is performed from an online backup that was taken while the table was in load in progress or load pending state. In either case, the information required for a load restart operation is unreliable, and the not load restartable state prevents a load restart operation from taking place.

### **Unknown**

The **LOAD QUERY** command is unable to determine the table state.

There are currently at least 25 table or table space states supported by the IBM Db2 database product. These states are used to control access to data under certain circumstances, or to elicit specific user actions, when required, to protect the integrity of the database. Most of them result from events related to the operation of one of the Db2 database utilities, such as the load utility, or the backup and restore utilities.

Although dependent table spaces are no longer quiesced (a quiesce is a persistent lock) before a load operation, the Load in Progress table space state prevents the backup of dependent tables during a load operation. The Load in Progress table space state is different from the Load in Progress table state: All load operations use the Load in Progress table state, but load operations (against a recoverable database) with the **COPY NO** option specified also use the Load in Progress table space state.

The following table describes each of the supported table states. The table also provides you with working examples that show you exactly how to interpret and respond to states that you might encounter while administering your database. The examples are taken from command scripts that were run on AIX; you can copy, paste and run them yourself. If you are running the Db2 database product on a system that is not UNIX, ensure that any path names are in the correct format for your system. Most of the examples are based on tables in the SAMPLE database that comes with the Db2 database product. A few examples require scenarios that are not part of the SAMPLE database, but you can use a connection to the SAMPLE database as a starting point.

*Table 36. Supported table states*

State	Examples
Load Pending	<p>Given load input file staffdata.del with a substantial amount of data (for example, 20000 or more records), create a small table space that contains the target table of the load operation, a new table called NEWSTAFF:</p> <pre>connect to sample; create tablespace ts1 managed by database using (file '/home/melnyk/melnyk/NODE0000/SQL00001/ts1c1' 256); create table newstaff like staff in ts1; load from staffdata.del of del insert into newstaff; load query table newstaff; load from staffdata.del of del terminate into newstaff; load query table newstaff; connect reset;</pre> <p>Information returned by the <b>LOAD QUERY</b> command shows that the NEWSTAFF table is in Load Pending state; after a load terminate operation, the table is in Normal state.</p>
Load in Progress	<p>Given load input file staffdata.del with a substantial amount of data (for example, 20000 or more records):</p> <pre>connect to sample; create table newstaff like staff; load from staffdata.del of del insert into newstaff;</pre> <p>While the load operation is running, execute the following script from another session:</p> <pre>connect to sample; load query table newstaff; connect reset;</pre> <p>Information returned by the <b>LOAD QUERY</b> command shows that the NEWSTAFF table is in Load in Progress state.</p>
Normal	<pre>connect to sample; create table newstaff like staff; load query table newstaff;</pre> <p>Information returned by the <b>LOAD QUERY</b> command shows that the NEWSTAFF table is in Normal state.</p>

Table 36. Supported table states (continued)

State	Examples
Not Load Restartable	<p>Given load input file staffdata.del with a substantial amount of data (for example, 20000 or more records):</p> <pre>update db cfg for sample using logarchmeth1 logretain; backup db sample; connect to sample; create tablespace ts1 managed by database using (file '/home/melnyk/melnyk/NODE0000 /SQL00001/ts1c1' 256); create table newstaff like staff in ts1; connect reset; backup db sample;</pre> <p>The timestamp for this backup image is: 20040629205935</p> <pre>connect to sample; load from staffdata.del of del insert into newstaff copy yes to /home/melnyk/backups; connect reset; restore db sample taken at 20040629205935; rollforward db sample to end of logs and stop; connect to sample; load query table newstaff; connect reset;</pre> <p>Information returned by the <b>LOAD QUERY</b> command shows that the NEWSTAFF table is in Not Load Restartable and Load Pending state.</p> <pre>connect to sample; load from staffdata.del of del terminate into newstaff copy yes to /home/melnyk/backups; load query table newstaff; connect reset;</pre> <p>Information returned by the <b>LOAD QUERY</b> command shows that the NEWSTAFF table is now in Normal state.</p>
Read Access Only	<p>Given load input file staffdata.del with a substantial amount of data (for example, 20000 or more records):</p> <pre>connect to sample; export to st_data.del of del select * from staff; create table newstaff like staff; import from st_data.del of del insert into newstaff; load from staffdata.del of del insert into newstaff allow read access;</pre> <p>While the load operation is running, execute the following script from another session:</p> <pre>connect to sample; load query table newstaff; select * from newstaff; connect reset;</pre> <p>Information returned by the <b>LOAD QUERY</b> command shows that the NEWSTAFF table is in Read Access Only and Load in Progress state. The query returns only the exported contents of the STAFF table, data that existed in the NEWSTAFF table before the load operation.</p>
Set Integrity Pending	<p>Given load input file staff_data.del with content:</p> <pre>11,"Melnyk",20,"Sales",10,70000,15000;</pre> <pre>connect to sample; alter table staff add constraint max_salary check (100000 - salary &gt; 0); load from staff_data.del of del insert into staff; load query table staff;</pre> <p>Information returned by the <b>LOAD QUERY</b> command shows that the STAFF table is in Set Integrity Pending state.</p>

Table 36. Supported table states (continued)

State	Examples
Unavailable	<p>Given load input file <code>staff_data.del</code> with content:</p> <pre>11,"Melnyk",20,"Sales",10,70000,15000; update db cfg for sample using logarchmeth1 logretain; backup db sample;</pre> <p>The timestamp for this backup image is: 20040629182012</p> <pre>connect to sample; load from staff_data.del of del insert into staff nonrecoverable; connect reset; restore db sample taken at 20040629182012; rollforward db sample to end of logs and stop; connect to sample; load query table staff; connect reset;</pre> <p>Information returned by the <b>LOAD QUERY</b> command shows that the STAFF table is in Unavailable state.</p>

The progress of a load operation can also be monitored with the **LIST UTILITIES** command.

## MIGRATE DATABASE

Converts a previous version of a Db2 database to the formats corresponding to the release run by the instance.

This command is deprecated and will be discontinued in a future release. You should use the **UPGRADE DATABASE** command instead.

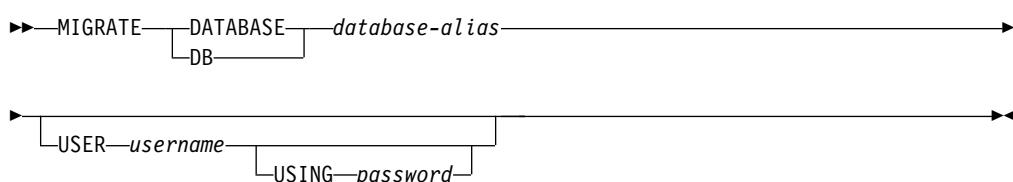
### Authorization

SYSADM

### Required connection

This command establishes a database connection.

### Command syntax



### Command parameters

#### DATABASE *database-alias*

Specifies the alias of the database to be migrated to the currently installed version of the database manager.

#### USER *username*

Identifies the user name under which the database is to be migrated.

### **USING *password***

The password used to authenticate the user name. If the password is omitted, but a user name was specified, the user is prompted to enter it.

### **Usage notes**

Refer to the **UPGRADE DATABASE** command documentation.

## **PING**

Tests the network response time of the underlying connectivity between a client and a connected database server.

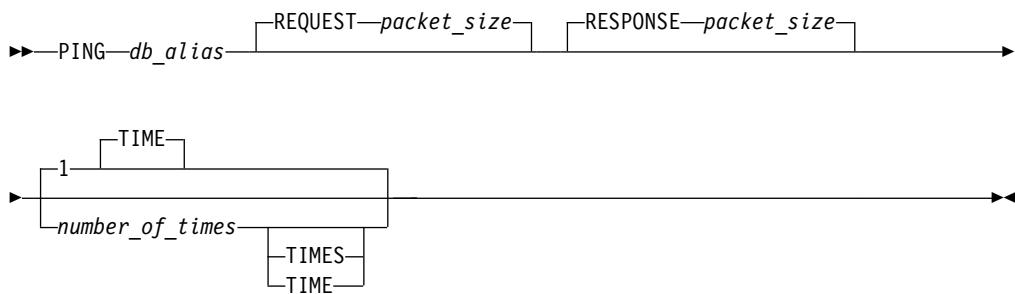
### **Authorization**

None

### **Required connection**

Database

### **Command syntax**



### **Command parameters**

#### ***db\_alias***

Specifies the database alias for the database on a DRDA server that the ping is being sent to. This parameter, although mandatory, is not currently used. It is reserved for future use. Any valid database alias name can be specified.

#### **REQUEST *packet\_size***

Specifies the size, in bytes, of the packet to be sent to the server. The size must be between 0 and 32767 inclusive. The default is 10 bytes. This option is only valid on servers running Db2 Version 8 or later, or Db2 for z/OS Version 8 or later.

#### **RESPONSE *packet\_size***

Specifies the size, in bytes, of the packet to be returned back to client. The size must be between 0 and 32767 inclusive. The default is 10 bytes. This option is only valid on servers running Db2 Version 8 or later, or Db2 for z/OS Version 8 or later.

#### ***number\_of\_times***

Specifies the number of iterations for this test. The value must be between 1 and 32767 inclusive. The default is 1. One timing will be returned for each iteration.

## **Examples**

### **Example 1**

To test the network response time for the connection to the host database hostdb once:

```
db2 ping hostdb 1
or
db2 ping hostdb
```

The command will display output that looks like this:

```
Elapsed time: 7221 microseconds
```

### **Example 2**

To test the network response time for the connection to the host database hostdb 5 times:

```
db2 ping hostdb 5
or
db2 ping hostdb 5 times
```

The command will display output that looks like this:

```
Elapsed time: 8412 microseconds
Elapsed time: 11876 microseconds
Elapsed time: 7789 microseconds
Elapsed time: 10124 microseconds
Elapsed time: 10988 microseconds
```

### **Example 3**

To test the network response time for a connection to the host database hostdb, with a 100-byte request packet and a 200-byte response packet:

```
db2 ping hostdb request 100 response 200
or
db2 ping hostdb request 100 response 200 1 time
```

## **Usage notes**

A database connection must exist before invoking this command, otherwise an error will result.

The elapsed time returned is for the connection between the IBM data server client and the Db2 server.

This command will not work when it is used from a Db2 Universal Database Version 7 client through a Db2 Connect Version 8 to a connected Db2 host database server.

## **PRECOMPILE**

Processes an application program source file containing embedded SQL statements. A modified source file is produced, containing host language calls for the SQL statements and, by default, a package is created in the database.

## Scope

This command can be issued from any database partition in db2nodes.cfg. In a partitioned database environment, it can be issued from any database partition server defined in the db2nodes.cfg file. It updates the database catalogs on the catalog database partition. Its effects are visible to all database partitions.

## Authorization

One of the following authorizations:

- DBADM authority
- If EXPLAIN ONLY is specified, EXPLAIN authority or an authority that implicitly includes EXPLAIN is sufficient.
- If a package does not exist, BINDADD authority and:
  - If the schema name of the package does not exist, IMPLICIT\_SCHEMA authority on the database.
  - If the schema name of the package does exist, CREATEIN privilege on the schema.
- If the package exists, one of the following privileges:
  - ALTERIN privilege on the schema
  - BIND privilege on the package

In addition, if capturing explain information using the EXPLAIN or the EXPLSNAP clause, one of the following authorizations is required:

- INSERT privilege on the explain tables
- DATAACCESS authority

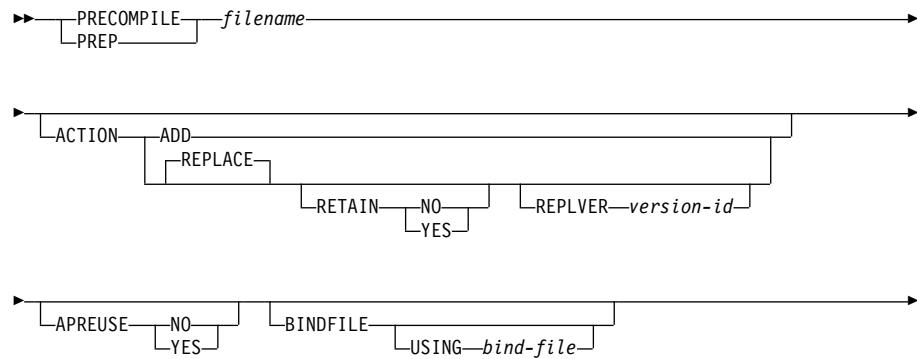
The user also needs all privileges required to compile any static SQL statements in the application. Privileges granted to groups are not used for authorization checking of static statements.

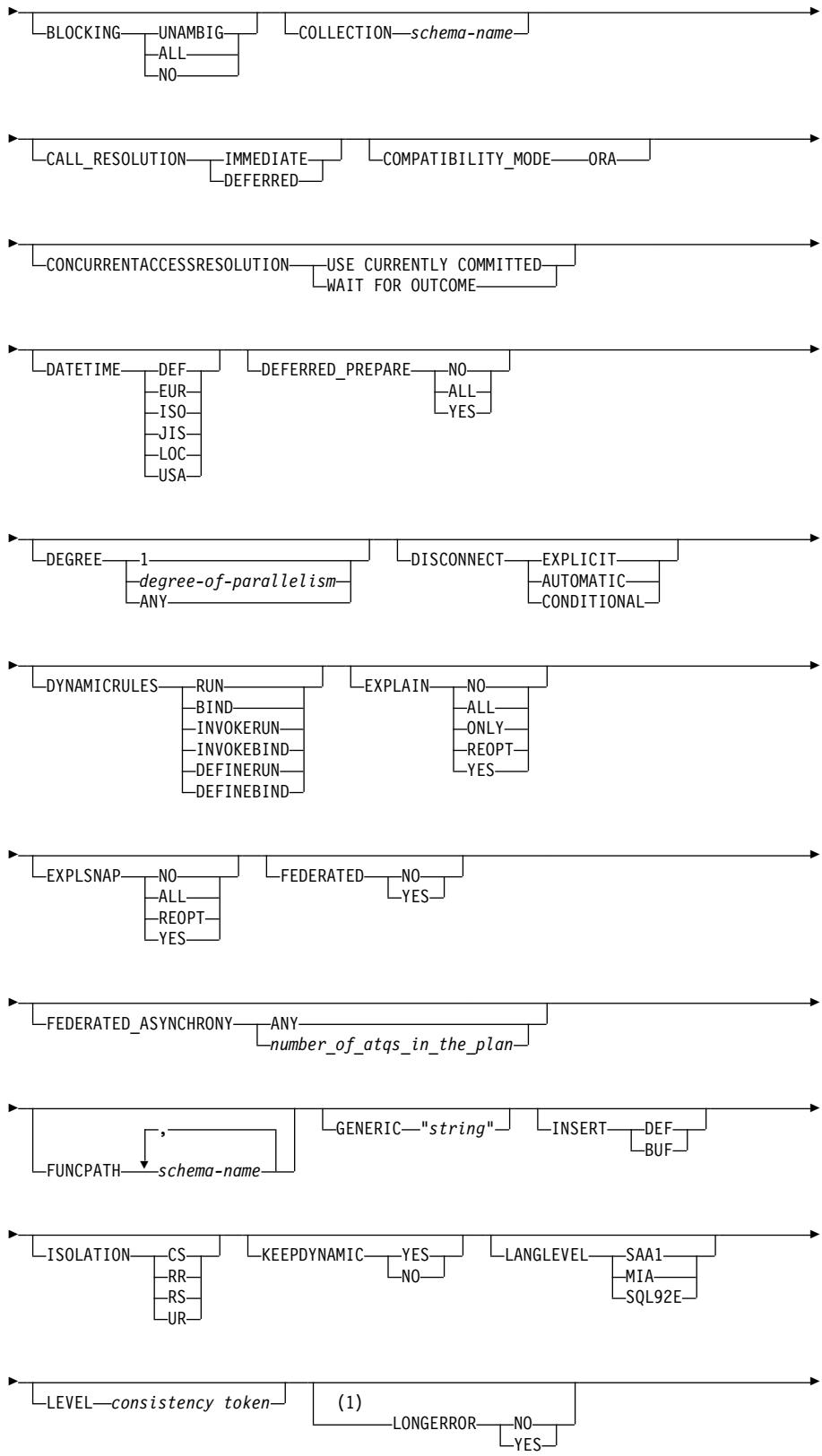
## Required connection

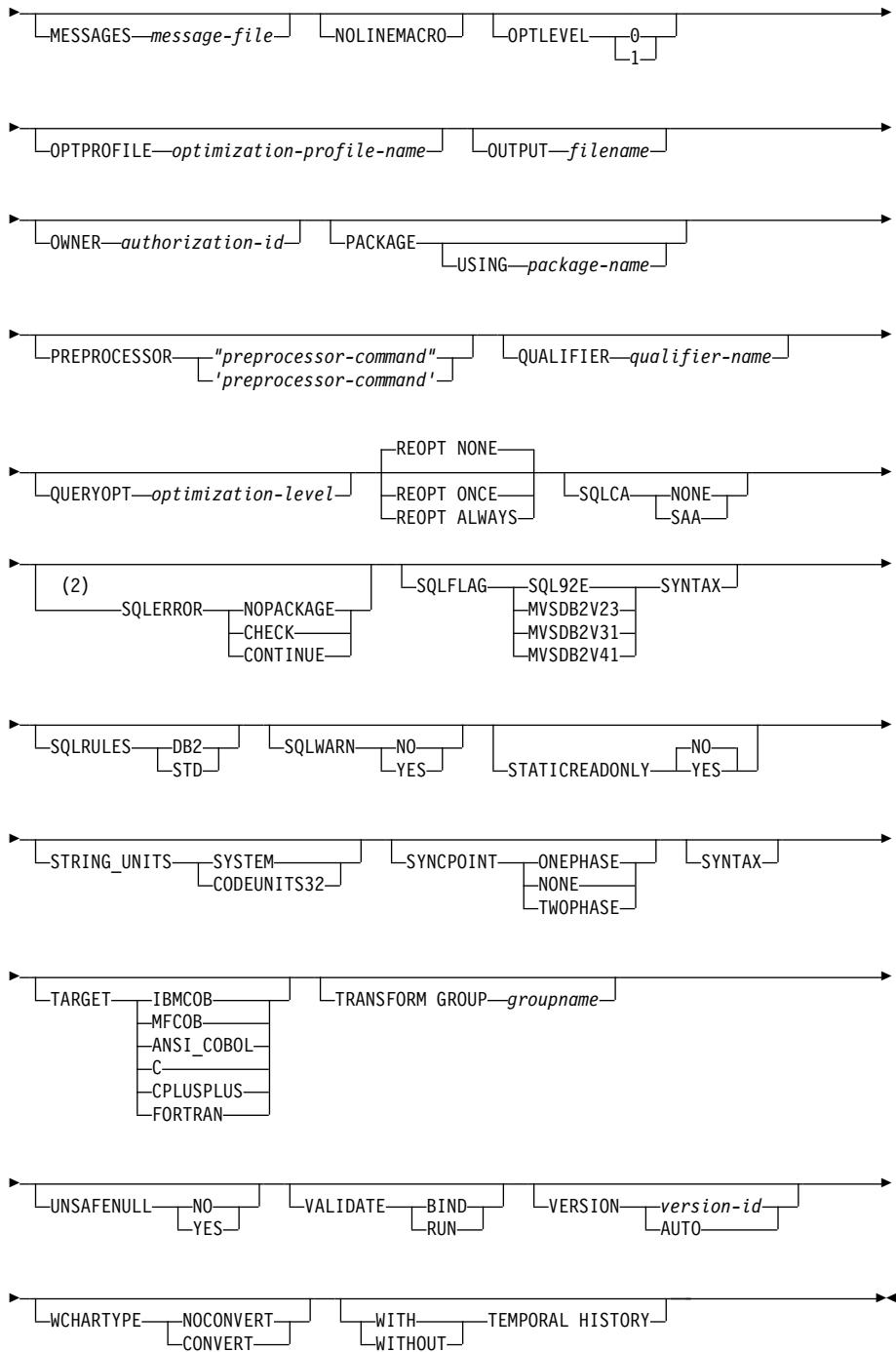
Database. If implicit connect is enabled, a connection to the default database is established.

## Command syntax

### For Db2



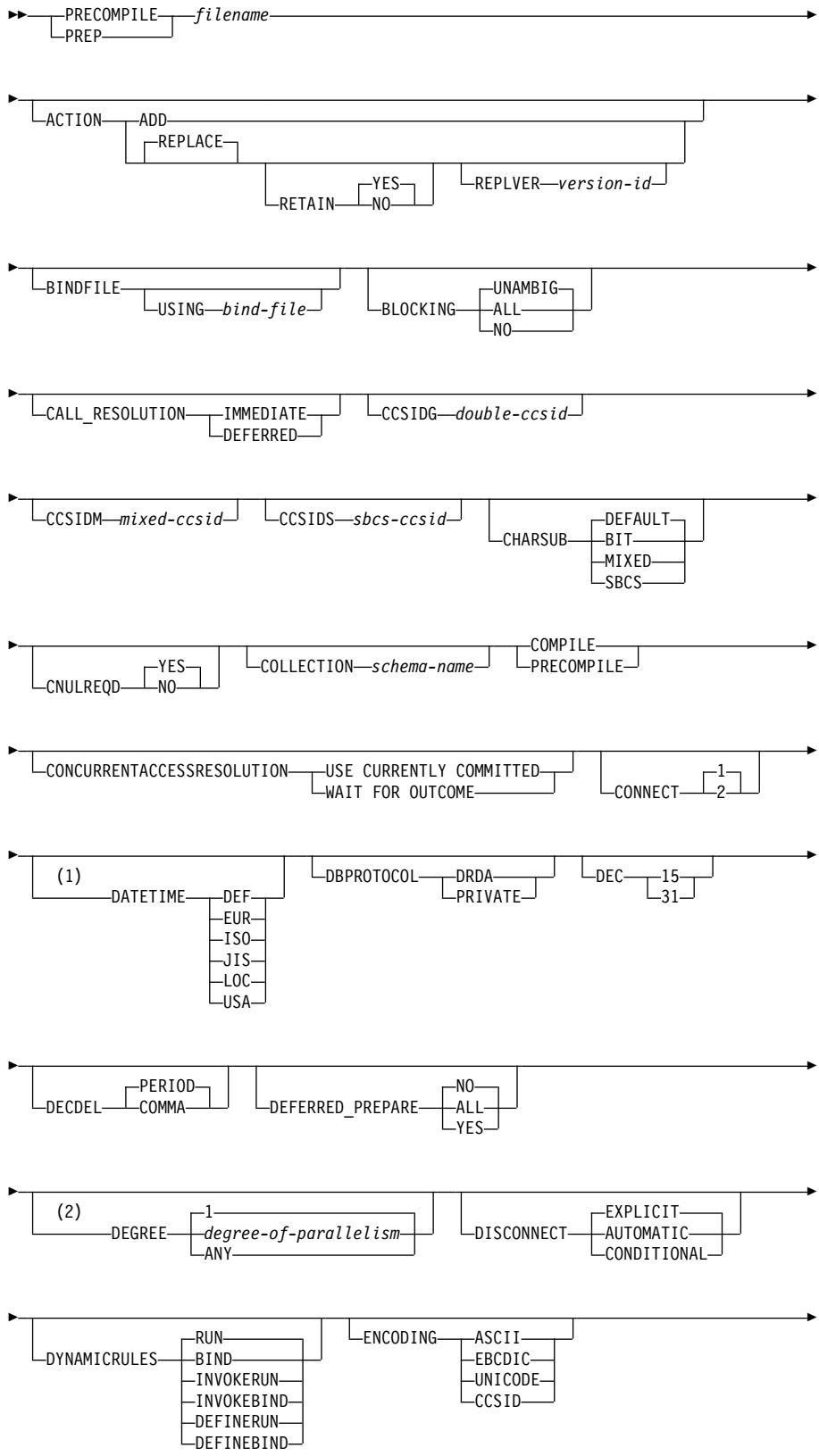


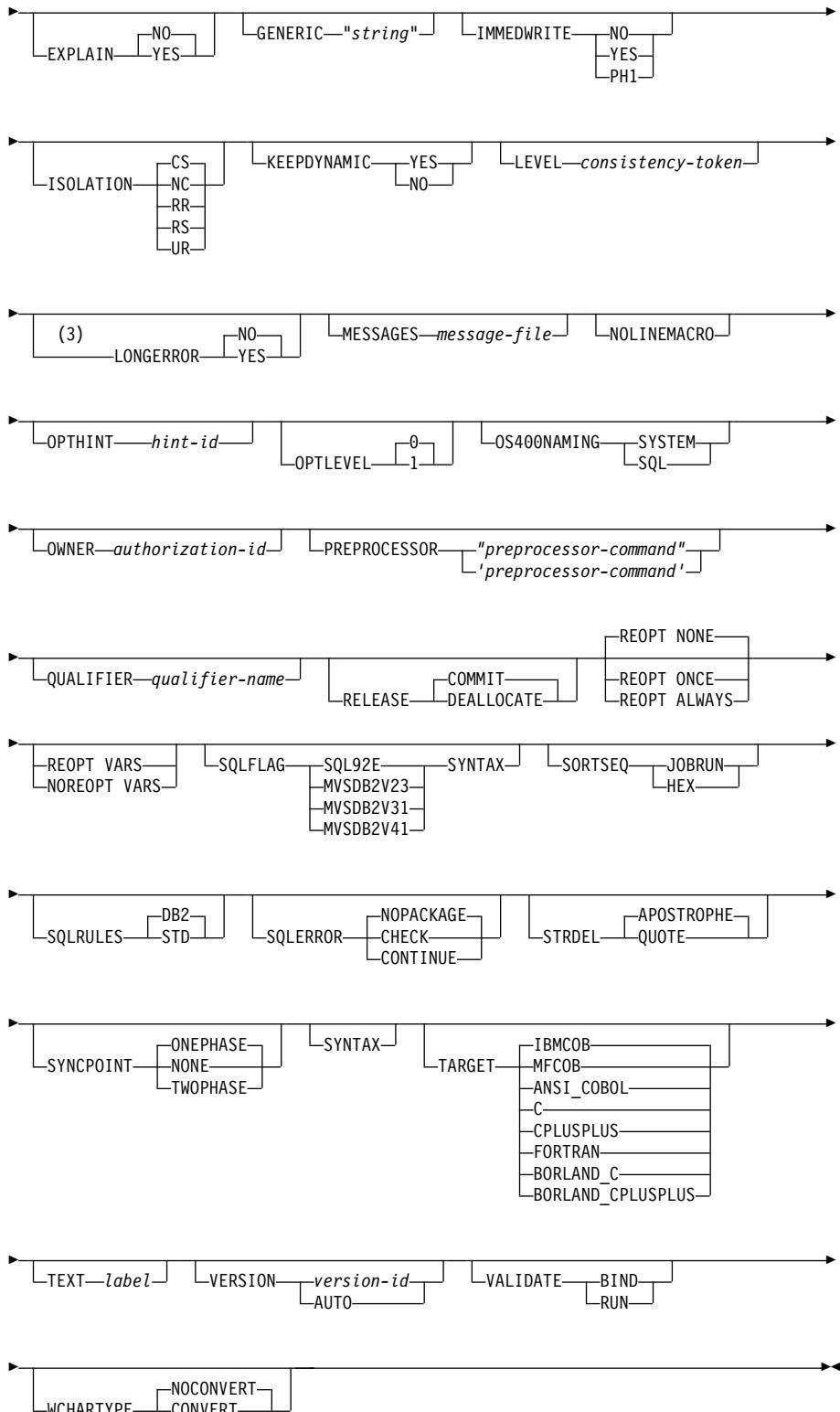


#### Notes:

- 1 NO is the default for 32 bit systems and for 64 bit Windows systems where long host variables can be used as declarations for INTEGER columns. YES is the default for 64 bit UNIX systems.
- 2 SYNTAX is a synonym for SQLERROR(CHECK).

**For DB2® Database on servers other than Linux, Windows and UNIX**





#### Notes:

- 1 If the server does not support the **DATETIME** DEF option, it is mapped to **DATETIME ISO**.

- 2 The **DEGREE** option is only supported by DRDA Level 2 Application Servers.
- 3 NO is the default for 32 bit systems and for 64 bit Windows systems where long host variables can be used as declarations for INTEGER columns. YES is the default for 64 bit UNIX systems.

## Command parameters

### *filename*

Specifies the source file to be precompiled. An extension of:

- .sqc must be specified for C applications (generates a .c file)
- .sqx (Windows operating systems), or .sqC (UNIX and Linux operating systems) must be specified for C++ applications (generates a .cxx file on Windows operating systems, or a .C file on UNIX and Linux operating systems)
- .sqb must be specified for COBOL applications (generates a .cbl file)
- .sqf must be specified for FORTRAN applications (generates a .for file on Windows operating systems, or a .f file on UNIX and Linux operating systems).

The preferred extension for C++ applications containing embedded SQL on UNIX and Linux operating systems is sqC; however, the sqx convention, which was invented for systems that are not case sensitive, is tolerated by UNIX and Linux operating systems.

### ACTION

Indicates whether the package can be added or replaced.

**ADD** Indicates that the named package does not exist, and that a new package is to be created. If the package already exists, execution stops, and a diagnostic error message is returned.

### REPLACE

Indicates that the existing package is to be replaced by a new one with the same package name and creator. This is the default value for the **ACTION** option.

### RETAIN

Indicates whether EXECUTE authorities are to be preserved when a package is replaced. If ownership of the package changes, the new owner grants the BIND and EXECUTE authority to the previous package owner.

**NO** Does not preserve EXECUTE authorities when a package is replaced. This value is not supported by Db2.

**YES** Preserves EXECUTE authorities when a package is replaced. This is the default value.

### REPLVER *version-id*

Replaces a specific version of a package. The version identifier specifies which version of the package is to be replaced. If the specified version does not exist, an error is returned. If the **REPLVER** option of **REPLACE** is not specified, and a package already exists that matches the package name and version of the package being precompiled, that package will be replaced; if not, a new package will be added.

## **APREUSE**

Specifies whether static SQL access plans are to be reused. When this option is enabled, the query compiler will attempt to reuse the access plans for the statement in any existing packages during the bind and during future implicit and explicit rebinds.

- YES** The query compiler will attempt to reuse the access plans for the statements in the package. If there is an existing package, the query compiler will attempt to reuse the access plan for every statement that can be matched with a statement in the new bind file. For a statement to match, the statement text must be identical and the section number for the statement in the existing package must match what the section number will be for the statement in the new package.
- NO** The query compiler will not attempt to reuse access plans for the statements in the package. This is the default setting.

## **BINDFILE**

Results in the creation of a bind file. A package is not created unless the package option is also specified. If a bind file is requested, but no package is to be created, as in the following example:

```
db2 prep sample.sqc bindfile
```

Object existence and authorization SQLCODEs will be treated as warnings instead of errors. This will allow a bind file to be successfully created, even if the database being used for precompilation does not have all of the objects referred to in static SQL statements within the application. The bind file can be successfully bound, creating a package, once the required objects have been created.

## **USING *bind-file***

The name of the bind file that is to be generated by the precompiler. The file name must have an extension of .bnd. If a file name is not entered, the precompiler uses the name of the program (entered as the *filename* parameter), and adds the .bnd extension. If a path is not provided, the bind file is created in the current directory.

## **BLOCKING**

Specifies the type of row blocking for cursors. The blocking of row data that contains references to LOB column data types is also supported in partitioned database environments.

- ALL** For cursors that are specified with the FOR READ ONLY clause or cursors not specified as FOR UPDATE, blocking occurs.  
Ambiguous cursors are treated as read-only.
- NO** Blocking does not occur for any cursor.  
For the definition of a read-only cursor and an ambiguous cursor, refer to *DECLARE CURSOR statement*.  
Ambiguous cursors are treated as updatable.

## **UNAMBIG**

For cursors that are specified with the FOR READ ONLY clause, blocking occurs.

Cursors that are not declared with the FOR READ ONLY or FOR UPDATE clause which are not ambiguous and are read-only will be blocked. Ambiguous cursors will not be blocked.

Ambiguous cursors are treated as updatable.

#### **CALL\_RESOLUTION**

If set, the **CALL\_RESOLUTION DEFERRED** option indicates that the CALL statement will be executed as an invocation of the deprecated sqleproc() API. If not set or if IMMEDIATE is set, the CALL statement will be executed as a normal SQL statement. SQL0204 will be issued if the precompiler fails to resolve the procedure on a CALL statement with **CALL\_RESOLUTION IMMEDIATE**.

#### **CCSIDG double-ccsid**

An integer specifying the coded character set identifier (CCSID) to be used for double byte characters in character column definitions (without a specific CCSID clause) in CREATE and ALTER TABLE SQL statements. This option is not supported by the server for Db2. The DRDA server will use a built-in default value if this option is not specified.

#### **CCSIDM mixed-ccsid**

An integer specifying the coded character set identifier (CCSID) to be used for mixed byte characters in character column definitions (without a specific CCSID clause) in CREATE and ALTER TABLE SQL statements. This option is not supported by the server for Db2. The DRDA server will use a built-in default value if this option is not specified.

#### **CCSIDS sbsc-ccsid**

An integer specifying the coded character set identifier (CCSID) to be used for single byte characters in character column definitions (without a specific CCSID clause) in CREATE and ALTER TABLE SQL statements. This option is not supported by the server for Db2. The DRDA server will use a built-in default value if this option is not specified.

#### **CHARSUB**

Designates the default character sub-type that is to be used for column definitions in CREATE and ALTER TABLE SQL statements. This precompile/bind option is not supported by the server for Db2.

**BIT** Use the FOR BIT DATA SQL character sub-type in all new character columns for which an explicit sub-type is not specified.

#### **DEFAULT**

Use the target built-in default in all new character columns for which an explicit sub-type is not specified.

#### **MIXED**

Use the FOR MIXED DATA SQL character sub-type in all new character columns for which an explicit sub-type is not specified.

**SBCS** Use the FOR SBCS DATA SQL character sub-type in all new character columns for which an explicit sub-type is not specified.

#### **CNULREQD**

This option is related to the **LANGLEVEL** precompile option. It is valid only if the bind file is created from a C or a C++ application. This bind option is not supported by the server for Db2.

**NO** The application was coded on the basis of the **LANGLEVEL SAA1** precompile option with respect to the null terminator in C string host variables.

- YES** The application was coded on the basis of the **LANGLEVEL MIA** precompile option with respect to the null terminator in C string host variables.

#### **COLLECTION** *schema-name*

Specifies a 128-byte collection identifier for the package. If not specified, the authorization identifier for the user processing the package is used.

#### **COMPATIBILITY\_MODE**

- ORA** The Db2 database manager provides features that facilitate the migration of embedded SQL C applications from other database systems. You can enable these compatibility features by setting the **COMPATIBILITY\_MODE** to ORA. For example, the following command enables the compatibility features when you compile the tbsel.sqc file:

```
$ db2 PRECOMPILE tbsel.sqc BINDFILE COMPATIBILITY_MODE ORA
```

#### **CONCURRENTACCESSRESOLUTION**

Specifies the concurrent access resolution to use for statements in the package.

#### **USE CURRENTLY COMMITTED**

Specifies that the database manager can use the currently committed version of the data for applicable scans when it is in the process of being updated or deleted. Rows in the process of being inserted can be skipped. This clause applies when the isolation level in effect is Cursor Stability or Read Stability (for Read Stability it skips uncommitted inserts only) and is ignored otherwise. Applicable scans include read-only scans that can be part of a read-only statement as well as a non read-only statement. The settings for the registry variables **DB2\_EVALUNCOMMITTED**, **DB2\_SKIPDELETED**, and **DB2\_SKIPINSERTED** no longer apply.

#### **WAIT FOR OUTCOME**

Specifies Cursor Stability and higher scans wait for the commit or rollback when encountering data in the process of being updated or deleted. Rows in the process of being inserted are not skipped. The settings for the registry variables **DB2\_EVALUNCOMMITTED**, **DB2\_SKIPDELETED**, and **DB2\_SKIPINSERTED** no longer apply.

#### **CONNECT**

- 1** Specifies that a CONNECT statement is to be processed as a type 1 CONNECT.
- 2** Specifies that a CONNECT statement is to be processed as a type 2 CONNECT.

#### **DATETIME**

Specifies the date and time format to be used.

- DEF** Use a date and time format associated with the territory code of the database.
- EUR** Use the IBM standard for Europe date and time format.
- ISO** Use the date and time format of the International Standards Organization.
- JIS** Use the date and time format of the Japanese Industrial Standard.

**LOC** Use the date and time format in local form associated with the territory code of the database.

**USA** Use the IBM standard for U.S. date and time format.

#### **DBPROTOCOL**

Specifies what protocol to use when connecting to a remote site that is identified by a three-part name statement. Supported by Db2 for z/OS only. For a list of supported option values, refer to the documentation for Db2 for z/OS.

**DEC** Specifies the maximum precision to be used in decimal arithmetic operations. This precompile or bind option is not supported by the server for Db2. The DRDA server will use a built-in default value if this option is not specified.

**15** 15-digit precision is used in decimal arithmetic operations.

**31** 31-digit precision is used in decimal arithmetic operations.

#### **DECDEL**

Designates whether a period (.) or a comma (,) will be used as the decimal point indicator in decimal and floating point literals. This precompile/bind option is not supported by the server for Db2. The DRDA server will use a built-in default value if this option is not specified.

#### **COMMA**

Use a comma (,) as the decimal point indicator.

#### **PERIOD**

Use a period (.) as the decimal point indicator.

#### **DEFERRED\_PREPARE**

Provides a performance enhancement when accessing Db2 common server databases or DRDA databases. This option combines the SQL PREPARE statement flow with the associated OPEN, DESCRIBE, or EXECUTE statement flow to minimize inter-process or network flow.

**NO** The PREPARE statement will be executed at the time it is issued.

**YES** Execution of the PREPARE statement will be deferred until the corresponding OPEN, DESCRIBE, or EXECUTE statement is issued.

The PREPARE statement will not be deferred if it uses the INTO clause, which requires an SQLDA to be returned immediately. However, if the PREPARE INTO statement is issued for a cursor that does not use any parameter markers, the processing will be optimized by pre-OPENing the cursor when the PREPARE is executed.

**ALL** Same as YES, except that a PREPARE INTO statement is also deferred. If the PREPARE statement uses the INTO clause to return an SQLDA, the application must not reference the content of this SQLDA until the OPEN, DESCRIBE, or EXECUTE statement is issued and returned.

#### **DEGREE**

Specifies the degree of parallelism for the execution of static SQL statements in an SMP system. This option does not affect CREATE INDEX parallelism.

**1** The execution of the statement will not use parallelism.

*degree-of-parallelism*

Specifies the degree of parallelism with which the statement can be executed, a value between 2 and 32 767 (inclusive).

**ANY** Specifies that the execution of the statement can involve parallelism using a degree determined by the database manager.

**DISCONNECT**

**AUTOMATIC**

Specifies that all database connections are to be disconnected at commit.

**CONDITIONAL**

Specifies that the database connections that have been marked RELEASE or have no open WITH HOLD cursors are to be disconnected at commit.

**EXPLICIT**

Specifies that only database connections that have been explicitly marked for release by the RELEASE statement are to be disconnected at commit.

**DYNAMICRULES**

Defines which rules apply to dynamic SQL at run time for the initial setting of the values used for authorization ID and for the implicit qualification of unqualified object references.

**RUN** Specifies that the authorization ID of the user executing the package is to be used for authorization checking of dynamic SQL statements. The authorization ID will also be used as the default package qualifier for implicit qualification of unqualified object references within dynamic SQL statements. This is the default value.

**BIND** Specifies that all of the rules that apply to static SQL for authorization and qualification are to be used at run time. That is, the authorization ID of the package owner is to be used for authorization checking of dynamic SQL statements, and the default package qualifier is to be used for implicit qualification of unqualified object references within dynamic SQL statements.

**DEFINERUN**

If the package is used within a routine context, the authorization ID of the routine definer is to be used for authorization checking and for implicit qualification of unqualified object references within dynamic SQL statements within the routine.

If the package is used as a stand-alone application, dynamic SQL statements are processed as if the package were bound with **DYNAMICRULES RUN**.

**DEFINEBIND**

If the package is used within a routine context, the authorization ID of the routine definer is to be used for authorization checking and for implicit qualification of unqualified object references within dynamic SQL statements within the routine.

If the package is used as a stand-alone application, dynamic SQL statements are processed as if the package were bound with **DYNAMICRULES BIND**.

## **INVOKERUN**

If the package is used within a routine context, the current statement authorization ID in effect when the routine is invoked is to be used for authorization checking of dynamic SQL statements and for implicit qualification of unqualified object references within dynamic SQL statements within that routine.

If the package is used as a stand-alone application, dynamic SQL statements are processed as if the package were bound with **DYNAMICRULES RUN**.

## **INVOKEBIND**

If the package is used within a routine context, the current statement authorization ID in effect when the routine is invoked is to be used for authorization checking of dynamic SQL statements and for implicit qualification of unqualified object references within dynamic SQL statements within that routine.

If the package is used as a stand-alone application, dynamic SQL statements are processed as if the package were bound with **DYNAMICRULES BIND**.

Because dynamic SQL statements will be using the authorization ID of the package owner in a package exhibiting bind behavior, the binder of the package should not have any authorities granted to them that the user of the package should not receive. Similarly, when defining a routine that will exhibit define behavior, the definer of the routine should not have any authorities granted to them that the user of the package should not receive since a dynamic statement will be using the authorization ID of the routine's definer.

The following dynamically prepared SQL statements cannot be used within a package that was not bound with **DYNAMICRULES RUN**: GRANT, REVOKE, ALTER, CREATE, DROP, COMMENT ON, RENAME, SET INTEGRITY, and SET EVENT MONITOR STATE.

## **ENCODING**

Specifies the encoding for all host variables in static statements in the plan or package. Supported by Db2 for z/OS only. For a list of supported option values, refer to the documentation for Db2 for z/OS.

## **EXPLAIN**

Stores information in the Explain tables about the access plans chosen for each SQL statement in the package.

**NO** Explain information will not be captured.

**YES** Explain tables will be populated with information about the chosen access plan at prep/bind time for static statements and at run time for incremental bind statements.

If the package is to be used for a routine and the package contains incremental bind statements, then the routine must be defined as MODIFIES SQL DATA. If this is not done, incremental bind statements in the package will cause a run time error (SQLSTATE 42985).

## **REOPT**

Explain information for each reoptimizable incremental bind SQL statement will be placed in the Explain tables at run time. In addition, Explain information will be gathered for reoptimizable

dynamic SQL statements at run time, even if the CURRENT EXPLAIN MODE special register is set to NO.

If the package is to be used for a routine, then the routine must be defined as MODIFIES SQL DATA, otherwise incremental bind and dynamic statements in the package will cause a run time error (SQLSTATE 42985).

- ONLY** The **ONLY** option allows you to explain statements without having the privilege to execute them. The explain tables are populated but no persistent package is created. If an existing package with the same name and version is encountered during the bind process, the existing package is neither dropped nor replaced even if you specified **ACTION REPLACE**. If an error occurs during population of the explain tables, explain information is not added for the statement that returned the error and for any statements that follow it.
- ALL** Explain information for each eligible static SQL statement will be placed in the Explain tables at prep/bind time. Explain information for each eligible incremental bind SQL statement will be placed in the Explain tables at run time. In addition, Explain information will be gathered for eligible dynamic SQL statements at run time, even if the CURRENT EXPLAIN MODE special register is set to NO.

If the package is to be used for a routine, then the routine must be defined as MODIFIES SQL DATA, otherwise incremental bind and dynamic statements in the package will cause a run time error (SQLSTATE 42985).

#### **EXPLSNAP**

Stores Explain Snapshot information in the Explain tables.

- NO** An Explain Snapshot will not be captured.
- YES** An Explain Snapshot for each eligible static SQL statement will be placed in the Explain tables at prep/bind time for static statements and at run time for incremental bind statements.

If the package is to be used for a routine and the package contains incremental bind statements, then the routine must be defined as MODIFIES SQL DATA or incremental bind statements in the package will cause a run time error (SQLSTATE 42985).

#### **REOPT**

Explain Snapshot information for each reoptimizable incremental bind SQL statement will be placed in the Explain tables at run time. In addition, Explain Snapshot information will be gathered for reoptimizable dynamic SQL statements at run time, even if the CURRENT EXPLAIN SNAPSHOT special register is set to NO.

If the package is to be used for a routine, then the routine must be defined as MODIFIES SQL DATA, otherwise incremental bind and dynamic statements in the package will cause a run time error (SQLSTATE 42985).

- ALL** An Explain Snapshot for each eligible static SQL statement will be placed in the Explain tables at prep or bind time. Explain Snapshot information for each eligible incremental bind SQL statement will be placed in the Explain tables at run time. In addition, Explain

Snapshot information will be gathered for eligible dynamic SQL statements at run time, even if the CURRENT EXPLAIN SNAPSHOT special register is set to NO.

If the package is to be used for a routine, then the routine must be defined as MODIFIES SQL DATA, or incremental bind and dynamic statements in the package will cause a run time error (SQLSTATE 42985).

#### FEDERATED

Specifies whether a static SQL statement in a package references a nickname or a federated view. If this option is not specified and a static SQL statement in the package references a nickname or a federated view, a warning is returned and the package is created.

- NO** A nickname or federated view is not referenced in the static SQL statements of the package. If a nickname or federated view is encountered in a static SQL statement during the prepare or bind phase of this package, an error is returned and the package is *not* created.
- YES** A nickname or federated view can be referenced in the static SQL statements of the package. If no nicknames or federated views are encountered in static SQL statements during the prepare or bind of the package, no errors or warnings are returned and the package is created.

#### FEDERATED\_ASYNCRONY

Specifies the maximum number of asynchrony table queues (ATQs) that the federated server supports in the access plan for programs that use embedded SQL.

- ANY** The optimizer determines the number of ATQs for the access plan. The optimizer assigns an ATQ to all eligible SHIP or remote pushdown operators in the plan. The value that is specified for **DB2\_MAX\_ASYNC\_REQUESTS\_PER\_QUERY** server option limits the number of asynchronous requests.

#### *number\_of\_atqs\_in\_the\_plan*

The number of ATQs in the plan. You specify a number in the range 0 to 32767.

#### FUNC PATH

Specifies the function path to be used in resolving user-defined distinct types and functions in static SQL. If this option is not specified, the default function path is "SYSIBM","SYSFUN",USER where USER is the value of the USER special register.

#### *schema-name*

An SQL identifier, either ordinary or delimited, which identifies a schema that exists at the application server. No validation that the schema exists is made at precompile or at bind time. The same schema cannot appear more than once in the function path. The schema name SYSPUBLIC cannot be specified for the function path. The number of schemas that can be specified is limited by the length of the resulting function path, which cannot exceed 2048 bytes. The schema SYSIBM does not need to be explicitly specified; it is implicitly assumed to be the first schema if it is not included in the function path.

## **INSERT**

Allows a program being precompiled or bound against a server to request that data inserts be buffered to increase performance.

**BUF** Specifies that inserts from an application should be buffered.

**DEF** Specifies that inserts from an application should not be buffered.

## **GENERIC "string"**

Supports the binding of new options that are defined in the target database. Do not use this option to pass bind options that *are* defined in BIND or PRECOMPILE. The syntax is as follows:

```
generic "option1 value1 option2 value2 ..."
```

Each option and value must be separated by one or more blank spaces. For example, one could use the following to bind each of the OPT1, OPT2, and OPT3 options:

```
generic "opt1 value1 opt2 value2 opt3 value3"
```

The maximum length of the string is 4096 bytes. The maximum length of each option name in the string is 255 bytes.

## **IMMEDWRITE**

Indicates whether immediate writes will be done for updates made to group buffer pool dependent pagesets or database partitions. Supported by Db2 for z/OS only. For a list of supported option values, refer to the documentation for Db2 for z/OS.

## **ISOLATION**

Determines how far a program bound to this package can be isolated from the effect of other executing programs.

**CS** Specifies Cursor Stability as the isolation level.

**NC** No Commit. Specifies that commitment control is not to be used. This isolation level is not supported by Db2.

**RR** Specifies Repeatable Read as the isolation level.

**RS** Specifies Read Stability as the isolation level. Read Stability ensures that the execution of SQL statements in the package is isolated from other application processes for rows read and changed by the application.

**UR** Specifies Uncommitted Read as the isolation level.

## **KEEPDYNAMIC**

This parameter specifies whether dynamic SQL statements are to be kept across transactions.

For details about the Db2 for z/OS supported option, see documentation in the *Db2 for z/OS Information Center*.

Starting with Db2 Version 9.8 Fix Pack 2, dynamic SQL statements prepared in a package bound with the **KEEPDYNAMIC YES** option are kept in the SQL context after a COMMIT or ROLLBACK operation. This is the default behavior.

## **YES**

Instructs the SQL context to keep the statement text and section associated with prepared statements indefinitely. Dynamic SQL

statements are kept across transactions. All packages bound with **KEEPDYNAMIC YES** are by default compatible with the existing package cache behavior.

#### No

Instructs the SQL context to remove the statement text and section associated with prepared statements at the end of each unit of work. Inactive dynamic SQL statements prepared in a package bound with **KEEPDYNAMIC NO** are removed from the SQL context during a COMMIT or ROLLBACK operation. The statements must be prepared again in a new transaction. The client, driver, or application needs to prepare any dynamic SQL statement it wants to reuse in a new unit of work again.

Dynamic SQL statements can remain active beyond the end of a transaction under the following circumstances:

- Cursors declared using the WITH HOLD option are open at a commit point.
- A dynamic SQL statement is executing a COMMIT or ROLLBACK operation.
- A dynamic SQL statement invokes a stored procedure or a user defined function that is executing COMMIT or ROLLBACK operation.

#### LANGUAGELEVEL

Specifies the SQL rules that apply for both the syntax and the semantics for both static and dynamic SQL in the application.

**MIA** Select the ISO/ANS SQL92 rules as follows:

- To support error SQLCODE or SQLSTATE checking, an SQLCA must be declared in the application code.
- C null-terminated strings are padded with blanks and always include a null-terminating character, even if truncation occurs.
- The FOR UPDATE clause is optional for all columns to be updated in a positioned UPDATE.
- A searched UPDATE or DELETE requires SELECT privilege on the object table of the UPDATE or DELETE statement if a column of the object table is referenced in the search condition or on the right side of the assignment clause.
- A column function that can be resolved using an index (for example MIN or MAX) will also check for nulls and return warning SQLSTATE 01003 if there were any nulls.
- An error is returned when a duplicate unique constraint is included in a CREATE or ALTER TABLE statement.
- An error is returned when no privilege is granted and the grantor has no privileges on the object (otherwise a warning is returned).

**SAA1** Select the common IBM Db2 rules as follows:

- To support error SQLCODE or SQLSTATE checking, an SQLCA must be declared in the application code.
- C null-terminated strings are not terminated with a null character if truncation occurs.
- The FOR UPDATE clause is required for all columns to be updated in a positioned UPDATE.

- A searched UPDATE or DELETE will not require SELECT privilege on the object table of the UPDATE or DELETE statement unless a fullselect in the statement references the object table.
- A column function that can be resolved using an index (for example MIN or MAX) will not check for nulls and warning SQLSTATE 01003 is not returned.
- A warning is returned and the duplicate unique constraint is ignored.
- An error is returned when no privilege is granted.

#### **SQL92E**

Defines the ISO/ANS SQL92 rules as follows:

- To support checking of SQLCODE or SQLSTATE values, variables by this name can be declared in the host variable declare section (if neither is declared, SQLCODE is assumed during precompilation).
- C null-terminated strings are padded with blanks and always include a null-terminating character, even if truncation occurs.
- The FOR UPDATE clause is optional for all columns to be updated in a positioned UPDATE.
- A searched UPDATE or DELETE requires SELECT privilege on the object table of the UPDATE or DELETE statement if a column of the object table is referenced in the search condition or on the right side of the assignment clause.
- A column function that can be resolved using an index (for example MIN or MAX) will also check for nulls and return warning SQLSTATE 01003 if there were any nulls.
- An error is returned when a duplicate unique constraint is included in a CREATE or ALTER TABLE statement.
- An error is returned when no privilege is granted and the grantor has no privileges on the object (otherwise a warning is returned).

#### **LEVEL *consistency-token***

Defines the level of a module using the consistency token. The consistency token is any alphanumeric value up to 8 characters in length. The RDB package consistency token verifies that the requester's application and the relational database package are synchronized. This option is not recommended for general use.

#### **LONGERROR**

Indicates whether long host variable declarations will be treated as an error. For portability, sqlint32 can be used as a declaration for an INTEGER column in precompiled C and C++ code.

**NO** Does not generate errors for the use of long host variable declarations. This is the default for 32 bit systems and for 64 bit Windows systems where long host variables can be used as declarations for INTEGER columns. The use of this option on 64 bit UNIX platforms will allow long host variables to be used as declarations for BIGINT columns.

**YES** Generates errors for the use of long host variable declarations. This is the default for 64 bit UNIX systems.

**MESSAGES** *message-file*

Specifies the destination for warning, error, and completion status messages. A message file is created whether the bind is successful or not. If a message file name is not specified, the messages are written to standard output. If the complete path to the file is not specified, the current directory is used. If the name of an existing file is specified, the contents of the file are overwritten.

**NOLINEMACRO**

Suppresses the generation of the #line macros in the output .c file. Useful when the file is used with development tools which require source line information such as profiles, cross-reference utilities, and debuggers. This precompile option is used for the C/C<sup>++</sup> programming languages only.

**OPTHINT**

Controls whether query optimization hints are used for static SQL. Supported by Db2 for z/OS only. For a list of supported option values, refer to the documentation for Db2 for z/OS.

**OPTLEVEL**

Indicates whether the C/C<sup>++</sup> precompiler is to optimize initialization of internal SQLDAs when host variables are used in SQL statements. Such optimization can increase performance when a single SQL statement (such as FETCH) is used inside a tight loop.

- 0      Instructs the precompiler not to optimize SQLDA initialization.
- 1      Instructs the precompiler to optimize SQLDA initialization. This value should not be specified if the application uses:
  - pointer host variables, as in the following example:

```
exec sql begin declare section;
char (*name)[20];
short *id;
exec sql end declare section;
```
  - C++ data members directly in SQL statements.

**OPTPROFILE** *optimization-profile-name*

Specifies the name of an existing optimization profile to be used for all static statements in the package. The default value of the option is an empty string. The value also applies as the default for dynamic preparation of DML statements for which the CURRENT OPTIMIZATION PROFILE special register is null. If the specified name is unqualified, it is an SQL identifier, which is implicitly qualified by the QUALIFIER bind option.

The **BIND** command does not process the optimization file, but only validates that the name is syntactically valid. Therefore if the optimization profile does not exist or is invalid, an SQL0437W warning with reason code 13 will not occur until a DML statement is optimized using that optimization profile.

**OUTPUT** *filename*

Overrides the default name of the modified source file produced by the compiler. It can include a path.

**OS400NAMING**

Specifies which naming option is to be used when accessing Db2 for IBM i data. Supported by Db2 for IBM i only. For a list of supported option values, refer to the documentation for Db2 for System i.

Because of the slashes used as separators, a Db2 utility can still report a syntax error at execution time on certain SQL statements which use the

System i system naming convention, even though the utility might have been precompiled or bound with the **OS400NAMING** SYSTEM option. For example, the Command Line Processor will report a syntax error on an SQL CALL statement if the System i system naming convention is used, whether or not it has been precompiled or bound using the **OS400NAMING** SYSTEM option.

#### **OWNER** *authorization-id*

Designates a 128-byte authorization identifier for the package owner. The owner must have the privileges required to execute the SQL statements contained in the package. Only a user with DBADM authority can specify an authorization identifier other than the user ID. The default value is the primary authorization ID of the precompile/bind process. SYSIBM, SYSCAT, and SYSSTAT are not valid values for this option. The *authorization-id* can only be a user (cannot be a role or a group).

#### **PACKAGE**

Creates a package. If neither **PACKAGE**, **BINDFILE**, nor **SYNTAX** is specified, a package is created in the database by default.

#### **USING** *package-name*

The name of the package that is to be generated by the precompiler. If a name is not entered, the name of the application program source file (minus extension and folded to uppercase) is used. Maximum length is 128 bytes.

#### **PREPROCESSOR** "preprocessor-command"

Specifies the preprocessor command that can be executed by the precompiler before it processes embedded SQL statements. The preprocessor command string (maximum length 1024 bytes) must be enclosed either by double or by single quotation marks.

This option enables the use of macros within the declare section. A valid preprocessor command is one that can be issued from the command line to invoke the preprocessor without specifying a source file. For example,

```
xlc -P -DMYMACRO=0
```

#### **QUALIFIER** *qualifier-name*

Provides an 128-byte implicit qualifier for unqualified objects contained in the package. The default is the owner's authorization ID, whether or not owner is explicitly specified.

#### **QUERYOPT** *optimization-level*

Indicates the required level of optimization for all static SQL statements contained in the package. The default value is 5. The SET CURRENT QUERY OPTIMIZATION statement describes the complete range of optimization levels available.

#### **RELEASE**

Indicates whether resources are released at each COMMIT point, or when the application terminates. This precompile/bind option is not supported by the server for Db2.

#### **COMMIT**

Release resources at each COMMIT point. Used for dynamic SQL statements.

#### **DEALLOCATE**

Release resources only when the application terminates.

**REOPT**

Specifies whether to have Db2 optimize an access path using values for host variables, parameter markers, global variables, and special registers. Valid values are:

**NONE**

The access path for a given SQL statement containing host variables, parameter markers, global variables, or special registers will not be optimized using real values for these variables. The default estimates for these variables will be used instead, and this plan is cached and used subsequently. This is the default behavior.

**ONCE** The access path for a given SQL statement will be optimized using the real values of the host variables, parameter markers, global variables, or special registers when the query is first executed. This plan is cached and used subsequently.

**ALWAYS**

The access path for a given SQL statement will always be compiled and reoptimized using the values of the host variables, parameter markers, global variables, or special registers known at each execution time.

**REOPT | NOREOPT VARS**

These options have been replaced by **REOPT ALWAYS** and **REOPT NONE**; however, they are still supported for compatibility with previous releases. Specifies whether to have Db2 determine an access path at run time using values for host variables, global variables, parameter markers, and special registers. Supported by Db2 for z/OS only. For a list of supported option values, refer to the documentation for Db2 for z/OS.

**SQLCA**

For FORTRAN applications only. This option is ignored if it is used with other languages.

**NONE**

Specifies that the modified source code is not consistent with the SAA definition.

**SAA** Specifies that the modified source code is consistent with the SAA definition.

**SQLERROR**

Indicates whether to create a package or a bind file if an error is encountered.

**CHECK**

Specifies that the target system performs all syntax and semantic checks on the SQL statements being bound. A package will not be created as part of this process. If, while binding, an existing package with the same name and version is encountered, the existing package is neither dropped nor replaced even if **ACTION REPLACE** was specified.

**CONTINUE**

Creates a package, even if errors occur when binding SQL statements. Those statements that failed to bind for authorization or existence reasons can be incrementally bound at execution time if **VALIDATE RUN** is also specified. Any attempt to execute them at run time generates an error (SQLCODE -525, SQLSTATE 51015).

**NOPACKAGE**

A package or a bind file is not created if an error is encountered.

**SQLFLAG**

Identifies and reports on deviations from the SQL language syntax specified in this option.

A bind file or a package is created only if the **BINDFILE** or the **PACKAGE** option is specified, in addition to the **SQLFLAG** option.

Local syntax checking is performed only if one of the following options is specified:

- **BINDFILE**
- **PACKAGE**
- **SQLERROR CHECK**
- **SYNTAX**

If **SQLFLAG** is not specified, the flagger function is not invoked, and the bind file or the package is not affected.

**SQL92E SYNTAX**

The SQL statements will be checked against ANSI or ISO SQL92 Entry level SQL language format and syntax with the exception of syntax rules that would require access to the database catalog. Any deviation is reported in the precompiler listing.

**MVSDB2V23 SYNTAX**

The SQL statements will be checked against MVS Db2 Version 2.3 SQL language syntax. Any deviation from the syntax is reported in the precompiler listing.

**MVSDB2V31 SYNTAX**

The SQL statements will be checked against MVS Db2 Version 3.1 SQL language syntax. Any deviation from the syntax is reported in the precompiler listing.

**MVSDB2V41 SYNTAX**

The SQL statements will be checked against MVS Db2 Version 4.1 SQL language syntax. Any deviation from the syntax is reported in the precompiler listing.

**SORTSEQ**

Specifies which sort sequence table to use on the System i system.

Supported by Db2 for IBM i only. For a list of supported option values, refer to the documentation for Db2 for IBM i.

**SQLRULES**

Specifies:

- Whether type 2 CONNECTs are to be processed according to the Db2 rules or the Standard (STD) rules based on ISO/ANS SQL92.
- How an application specifies the format of LOB columns in the result set.

**Db2**

- Permits the SQL CONNECT statement to switch the current connection to another established (*dormant*) connection.

- This default setting allows an application to specify whether LOB values or LOB locators are retrieved only during the first fetch request. Subsequent fetch requests must use the same format for the LOB columns.

#### **STD**

- Permits the SQL CONNECT statement to establish a *new* connection only. The SQL SET CONNECTION statement must be used to switch to a dormant connection.
- The application can change between retrieving LOB values and LOB locators with each fetch request. This means that cursors with one or more LOB columns cannot be blocked, regardless of the BLOCKING bind option setting.

#### **SQLWARN**

Indicates whether warnings will be returned from the compilation of dynamic SQL statements (via PREPARE or EXECUTE IMMEDIATE), or from describe processing (via PREPARE...INTO or DESCRIBE).

**NO** Warnings will not be returned from the SQL compiler.

**YES** Warnings will be returned from the SQL compiler.

SQLCODE +238 is an exception. It is returned regardless of the **SQLWARN** option value.

#### **STATICREADONLY**

Determines whether static cursors will be treated as being READ ONLY.

**NO** All static cursors will take on the attributes as would normally be generated given the statement text and the setting of the **LANGLEVEL** precompile option. This is the default value.

**YES** Any static cursor that does not contain the FOR UPDATE or FOR READ ONLY clause will be considered READ ONLY.

#### **STRDEL**

Designates whether an apostrophe ('') or double quotation marks ("") will be used as the string delimiter within SQL statements. This precompile/bind option is not supported by the server for Db2. The DRDA server will use a built-in default value if this option is not specified.

#### **APOSTROPHE**

Use an apostrophe (') as the string delimiter.

#### **QUOTE**

Use double quotation marks ("") as the string delimiter.

#### **STRING\_UNITS**

Specifies the string units when character and graphic data types are used without explicit string units in static SQL statements. The default is based on the *string\_units* database configuration parameter setting for the database.

#### **SYSTEM**

In a Unicode database, the setting has the following effect:

- CHAR, VARCHAR, and CLOB data types defined without specifying the CODEUNITS32 keyword will default to OCTETS.
- GRAPHIC, VARGRAPHIC, and DBCLOB data types defined without specifying the CODEUNITS32 keyword will default to CODEUNITS16.

In a non-Unicode database, the setting has the following effect:

- CHAR, VARCHAR, and CLOB data types defined without specifying the CODEUNITS32 keyword will default to OCTETS.
- GRAPHIC, VARGRAPHIC, and DBCLOB data types have implicit string units of double bytes.

#### **CODEUNITS32**

This setting is only valid for a Unicode database and has the following effect:

- CHAR, VARCHAR, and CLOB data types defined without specifying the BYTE or OCTETS keywords will default to CODEUNITS32.
- GRAPHIC, VARGRAPHIC, and DBCLOB data types defined without specifying the CODEUNITS16 keyword will default to CODEUNITS32.

#### **SYNCPOINT**

Specifies how commits or rollbacks are to be coordinated among multiple database connections. This command parameter is ignored and is only included here for backward compatibility.

#### **NONE**

Specifies that no Transaction Manager (TM) is to be used to perform a two-phase commit, and does not enforce single updater, multiple reader. A COMMIT is sent to each participating database. The application is responsible for recovery if any of the commits fail.

#### **ONEPHASE**

Specifies that no TM is to be used to perform a two-phase commit. A one-phase commit is to be used to commit the work done by each database in multiple database transactions.

#### **TWOPHASE**

Specifies that the TM is required to coordinate two-phase commits among those databases that support this protocol.

#### **SYNTAX**

Suppresses the creation of a package or a bind file during precompilation. This option can be used to check the validity of the source file without modifying or altering existing packages or bind files. **SYNTAX** is a synonym for **SQLERROR CHECK**.

If **SYNTAX** is used together with the **PACKAGE** option, **PACKAGE** is ignored.

#### **TARGET**

Instructs the precompiler to produce modified code tailored to one of the supported compilers on the current platform.

#### **IBMCOB**

On AIX, code is generated for the IBM COBOL Set for AIX compiler.

#### **MFCOB**

Code is generated for the Micro Focus COBOL compiler. This is the default if a **TARGET** value is not specified with the COBOL precompiler on all Linux, UNIX and Windows operating systems.

#### **ANSI\_COBOL**

Code compatible with the ANS X3.23-1985 standard is generated.

**C** Code compatible with the C compilers supported by Db2 on the current platform is generated.

#### **CPLUSPLUS**

Code compatible with the C++ compilers supported by Db2 on the current platform is generated.

#### **FORTRAN**

Code compatible with the FORTRAN compilers supported by Db2 on the current platform is generated.

#### **TEXT *label***

The description of a package. Maximum length is 255 characters. The default value is blanks. This precompile/bind option is not supported by the server for Db2.

#### **TRANSFORM GROUP**

Specifies the transform group name to be used by static SQL statements for exchanging user-defined structured type values with host programs. This transform group is not used for dynamic SQL statements or for the exchange of parameters and results with external functions or methods.

#### ***groupname***

An SQL identifier of up to 128 bytes in length. A group name cannot include a qualifier prefix and cannot begin with the prefix SYS since this is reserved for database use. In a static SQL statement that interacts with host variables, the name of the transform group to be used for exchanging values of a structured type is as follows:

- The group name in the **TRANSFORM GROUP** bind option, if any
- The group name in the **TRANSFORM GROUP** prep option as specified at the original precompilation time, if any
- The DB2\_PROGRAM group, if a transform exists for the given type whose group name is DB2\_PROGRAM
- No transform group is used if none of the previously listed conditions exist.

The following errors are possible during the bind of a static SQL statement:

- SQLCODE *yyy*, SQLSTATE *xxxxx*: A transform is needed, but no static transform group has been selected.
- SQLCODE *yyy*, SQLSTATE *xxxxx*: The selected transform group does not include a necessary transform (TO SQL for input variables, FROM SQL for output variables) for the data type that needs to be exchanged.
- SQLCODE *yyy*, SQLSTATE *xxxxx*: The result type of the FROM SQL transform is not compatible with the type of the output variable, or the parameter type of the TO SQL transform is not compatible with the type of the input variable.

In these error messages, *yyyyy* is replaced by the SQL error code, and *xxxxx* by the SQL state code.

#### **UNSAFENULL**

Avoids the unspecified indicator variable error, even when null indicator is not specified, when you use the precompile options UNSAFENULL YES and COMPATIBILITY\_MODE ORA.

**NO** By default **UNSAFENULL** functionality will be set to NO.

If the data type can handle nulls, the application must provide a null indicator. If a null indicator is not used and while fetching the result-set, it is found that one or more of the column data is NULL, unspecified indicator variable error will be returned to the application.

- YES** Provides compatibility to suppress unspecified indicator variable error (generated when NULL value exists while the application has not specified NULL indicator in the program) while running Db2 applications which are primarily migrated from other database vendors.

#### **VALIDATE**

Determines when the database manager checks for authorization errors and object not found errors. The package owner authorization ID is used for validity checking.

- BIND** Validation is performed at precompile or bind time. If all objects do not exist, or all authority is not held, error messages are produced. If **SQLERROR CONTINUE** is specified, a package or bind file is produced despite the error message, but the statements in error are not executable.

- RUN** Validation is attempted at bind time. If all objects exist, and all authority is held, no further checking is performed at execution time.

If all objects do not exist, or all authority is not held at precompile/bind time, warning messages are produced, and the package is successfully bound, regardless of the **SQLERROR CONTINUE** option setting. However, authority checking and existence checking for SQL statements that failed these checks during the precompile/bind process can be redone at execution time.

#### **VERSION**

Defines the version identifier for a package. If this option is not specified, the package version will be "" (the empty string).

##### *version-id*

Specifies a version identifier that is any alphanumeric value, \$, #, @, \_, -, or ., up to 64 characters in length.

#### **AUTO**

The version identifier will be generated from the consistency token. If the consistency token is a timestamp (it will be if the **LEVEL** option is not specified), the timestamp is converted into ISO character format and is used as the version identifier.

#### **WCHARTYPE**

Specifies the format for graphic data.

#### **CONVERT**

Host variables declared using the wchar\_t base type will be treated as containing data in wchar\_t format. Since this format is not directly compatible with the format of graphic data stored in the database (DBCS format), input data in wchar\_t host variables is implicitly converted to DBCS format on behalf of the application, using the ANSI C function `wctombs()`. Similarly, output DBCS data is implicitly converted to wchar\_t format, using `mbstowcs()`, before being stored in host variables.

## **NOCONVERT**

Host variables declared using the wchar\_t base type will be treated as containing data in DBCS format. This is the format used within the database for graphic data; it is, however, different from the native wchar\_t format implemented in the C language. Using **NOCONVERT** means that graphic data will not undergo conversion between the application and the database, which can improve efficiency. The application is, however, responsible for ensuring that data in wchar\_t format is not passed to the database manager. When this option is used, wchar\_t host variables should not be manipulated with the C wide character string functions, and should not be initialized with wide character literals (*L-literals*).

## **WITH / WITHOUT TEMPORAL HISTORY**

Specifies whether changes to data in system-period temporal tables made by static or dynamic SQL statements causes changes to the corresponding history table.

**WITH** Specifies that changes to data in system-period temporal tables causes changes to the corresponding history table.

This is the default option.

## **WITHOUT**

Specifies that changes to data in system-period temporal tables do not cause changes to the corresponding history table. The database manager can provide values to override the row-begin, row-end, and transaction-start-ID columns even though they are defined as GENERATED ALWAYS.

DBADM authority is required for this option.

## **Usage notes**

A modified source file is produced, which contains host language equivalents to the SQL statements. By default, a package is created in the database to which a connection has been established. The name of the package is the same as the file name (minus the extension and folded to uppercase), up to a maximum of 8 characters. Although the maximum length of a package name is 128 bytes, unless the **PACKAGE USING** option is specified, only the first 8 characters of the file name are used to maintain compatibility with previous versions of Db2.

Following connection to a database, **PREP** executes under the transaction that was started. **PREP** then issues a COMMIT or a ROLLBACK to terminate the current transaction and start another one.

Creating a package with a schema name that does not already exist results in the implicit creation of that schema. The schema owner is SYSIBM. The CREATEIN privilege on the schema is granted to PUBLIC.

During precompilation, an Explain Snapshot is not taken unless a package is created and **EXPLSNAP** has been specified. The snapshot is put into the Explain tables of the user creating the package. Similarly, Explain table information is only captured when **EXPLAIN** is specified, and a package is created.

Precompiling stops if a fatal error or more than 100 errors occur. If a fatal error occurs, the utility stops precompiling, attempts to close all files, and discards the package.

When a package exhibits bind behavior, the following will be true:

1. The implicit or explicit value of the **BIND** option **OWNER** will be used for authorization checking of dynamic SQL statements.
2. The implicit or explicit value of the **BIND** option **QUALIFIER** will be used as the implicit qualifier for qualification of unqualified objects within dynamic SQL statements.
3. The value of the special register CURRENT SCHEMA has no effect on qualification.

In the event that multiple packages are referenced during a single connection, all dynamic SQL statements prepared by those packages will exhibit the behavior as specified by the **DYNAMICRULES** option for that specific package and the environment they are used in.

If an SQL statement was found to be in error and the **PRECOMPILE** option **SQLERROR CONTINUE** was specified, the statement will be marked as invalid and another **PRECOMPILE** must be issued in order to change the state of the SQL statement. Implicit and explicit rebind will not change the state of an invalid statement in a package bound with **VALIDATE RUN**. A statement can change from static to incremental bind or incremental bind to static across implicit and explicit rebinds depending on whether or not object existence or authority problems exist during the rebind.

Binding a package with **REOPT ONCE** or **REOPT ALWAYS** might change static and dynamic statement compilation and performance.

For an embedded SQL program, if the **FEDERATED\_ASYNCNCHRONY** precompile option is not explicitly specified the static statements in the package are bound using the **federated\_async** configuration parameter. If the **FEDERATED\_ASYNCNCHRONY** option is specified explicitly, that value is used for binding the packages and is also the initial value of the special register. Otherwise, the value of the database manager configuration parameter is used as the initial value of the special register. The **FEDERATED\_ASYNCNCHRONY** precompile option influences dynamic SQL only when it is explicitly set.

## PRUNE HISTORY/LOGFILE

Used to delete entries from the recovery history file or to delete log files from the active log file path. Deleting entries from the recovery history file might be necessary if the file becomes excessively large and the retention period is high.

In a partitioned environment, the **PRUNE HISTORY** command only performs on the database partition it is issued on. To prune the history on multiple partitions, you can either issue the **PRUNE HISTORY** command from each individual database partition, or use the db2\_all prefix to run the **PRUNE HISTORY** command on all database partitions.

**Important:** The **PRUNE LOGFILE** command is deprecated and might be removed in a future release. Use the **PRUNE HISTORY** command instead.

## Authorization

One of the following authorities:

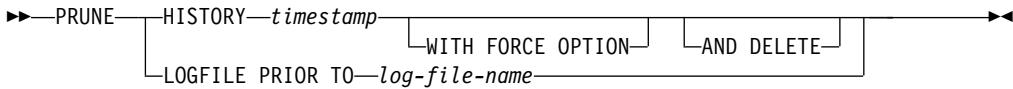
- SYSADM
- SYSCTRL

- SYSMAINT
- DBADM

## Required connection

Database

## Command syntax



## Command parameters

### HISTORY *timestamp*

Identifies a range of entries in the recovery history file that will be deleted. A complete time stamp (in the form *yyyymmddhhmmss*), or an initial prefix (minimum *yyyy*) can be specified. All entries with time stamps equal to or less than the time stamp provided are deleted from the recovery history file. When an initial prefix is specified, the unspecified components of the time stamp are interpreted as *yyyy0101000000*.

### WITH FORCE OPTION

Specifies that the entries will be pruned according to the time stamp specified, even if some entries from the most recent restore set are deleted from the file. A restore set is the most recent full database backup including any restores of that backup image. If this parameter is not specified, all entries from the backup image forward will be maintained in the history.

### AND DELETE

Specifies that the associated log archives will be physically deleted (based on the location information) when the history file entry is removed. This option is especially useful for ensuring that archive storage space is recovered when log archives are no longer needed. If you are archiving logs via a user exit program, the logs cannot be deleted using this option.

If you set the **auto\_del\_rec\_obj** database configuration parameter to ON, calling **PRUNE HISTORY** with the **AND DELETE** parameter will also physically delete backup images and load copy images if their history file entry is pruned.

### LOGFILE PRIOR TO *log-file-name*

Specifies a string for a log file name, for example S0000100.LOG. All log files before (but not including) the specified log file will be deleted. The **logarchmeth1** database configuration parameter must be set to a value other than OFF.

**Note:** This value is not supported in Db2 pureScale environments.

## Examples

To remove the entries for all restores, loads, table space backups, and full database backups taken before and including December 1, 1994 from the recovery history file, enter:

```
db2 prune history 199412
```

199412 is interpreted as 19941201000000.

## Usage notes

If the **WITH FORCE OPTION** is used, you might delete entries that are required for automatic restoration of databases. Manual restores will still work correctly. Use of this command can also prevent the **db2ckrst** utility from being able to correctly analyze the complete chain of required backup images. Using the **PRUNE HISTORY** command without the **WITH FORCE OPTION** prevents required entries from being deleted.

Those entries with status DB2HISTORY\_STATUS\_DO\_NOT\_DELETE will not be pruned. If the **WITH FORCE OPTION** is used, then objects marked as DB2HISTORY\_STATUS\_DO\_NOT\_DELETE will still be pruned or deleted. You can set the status of recovery history file entries to DB2HISTORY\_STATUS\_DO\_NOT\_DELETE using the **UPDATE HISTORY** command, the **ADMIN\_CMD** with **UPDATE\_HISTORY**, or the db2HistoryUpdate API. You can use the DB2HISTORY\_STATUS\_DO\_NOT\_DELETE status to prevent key recovery history file entries from being pruned and to prevent associated recovery objects from being deleted.

You can prune snapshot backup database history file entries using the **PRUNE HISTORY** command, but you cannot delete the related physical recovery objects using the **AND DELETE** parameter. The only way to delete snapshot backup object is to use the **db2acsutil** command.

## PUT ROUTINE

Uses the specified routine SQL Archive (SAR) file to define a routine in the database.

**Important:** The PUT ROUTINE command is deprecated, use CREATE PROCEDURE to copy a procedure to another database.

### Authorization

DBADM. This authority must be granted directly to the user and not inherited via a role.

### Required connection

Database. If implicit connect is enabled, a connection to the default database is established.

### Command syntax

```
►—PUT ROUTINE—FROM—file-name—►
 ↓
 OWNER—new-owner—►
 ↓
 USE REGISTERS—►
```

### Command parameters

#### FROM *file-name*

Names the file where routine SQL archive (SAR) is stored.

#### OWNER *new-owner*

Specifies a new authorization name that will be used for authorization

checking of the routine. The new owner must have the necessary privileges for the routine to be defined. If the **OWNER** clause is not specified, the authorization name that was originally defined for the routine is used.

#### **USE REGISTERS**

Indicates that the CURRENT SCHEMA and CURRENT PATH special registers are used to define the routine. If this clause is not specified, the settings for the default schema and SQL path are the settings used when the routine is defined. CURRENT SCHEMA is used as the schema name for unqualified object names in the routine definition (including the name of the routine) and CURRENT PATH is used to resolve unqualified routines and data types in the routine definition.

#### **Examples**

```
PUT ROUTINE FROM procs/proc1.sar;
```

#### **Usage notes**

No more than one procedure can be concurrently installed under a given schema.

If a **GET ROUTINE** or a **PUT ROUTINE** operation (or their corresponding procedure) fails to execute successfully, it will always return an error (SQLSTATE 38000), along with diagnostic text providing information about the cause of the failure. For example, if the procedure name provided to **GET ROUTINE** does not identify an SQL procedure, diagnostic "-204, 42704" text will be returned, where "-204, 42704" text will be returned, where "-204" is SQLCODE and "42704" is SQLSTATE, that identify the cause of the problem. The SQLCODE and SQLSTATE in this example indicate that the procedure name provided in the **GET ROUTINE** command is undefined.

## **QUERY CLIENT**

Returns current connection settings for an application process.

#### **Authorization**

None

#### **Required connection**

None

#### **Command syntax**

```
►►QUERY CLIENT—————►►
```

#### **Command parameters**

None

#### **Examples**

The following example is sample output from **QUERY CLIENT**:

The current connection settings of the application process are:

CONNECT	= 1
DISCONNECT	= EXPLICIT
MAX_NETBIOS_CONNECTIONS	= 1

SQLRULES	= DB2
SYNCPOINT	= ONEPHASE
CONNECT_MEMBER	= 0
ATTACH_MEMBER	= -1

If **CONNECT\_MEMBER** and **ATTACH\_MEMBER** are not set using the **SET CLIENT** command, these parameters have values identical to that of the environment variable **DB2NODE**. If the displayed value of the **CONNECT\_MEMBER** or the **ATTACH\_MEMBER** parameter is -1, the parameter has not been set; that is, either the environment variable **DB2NODE** has not been set, or the parameter was not specified in a previously issued **SET CLIENT** command.

### **Usage notes**

The connection settings for an application process can be queried at any time during execution.

## **QUIESCE**

Forces all users off either the specified instance or database across all members and puts them into a quiesced mode.

While the instance or database is in quiesced mode, you can perform administrative tasks on it. After administrative tasks are complete, use the **UNQUIESCE** command to activate the instance or database and allow other users to connect to the database.

In this mode, only users with authority in this restricted mode are allowed to attach or connect to the instance or database. Users with SYSADM, SYSMAINT, and SYSCTRL authority always have access to an instance while it is quiesced, and users with SYSADM and DBADM authority always have access to a database while it is quiesced.

### **Scope**

**QUIESCE DATABASE** results in all objects in the database being in the quiesced mode. Only the allowed user or group and SYSADM, SYSMAINT, DBADM, or SYSCTRL will be able to access the database or its objects.

**QUIESCE INSTANCE** *instance-name* means the instance and the databases in the instance *instance-name* will be in quiesced mode. The instance will be accessible just for SYSADM, SYSMAINT, and SYSCTRL and allowed user or group.

If an instance is in quiesced mode, a database in the instance cannot be put in quiesced mode.

If a database is in the SUSPEND\_WRITE state, it cannot be put in quiesced mode.

### **Authorization**

One of the following authorities:

For database level quiesce:

- SYSADM
- DBADM

For instance level quiesce:

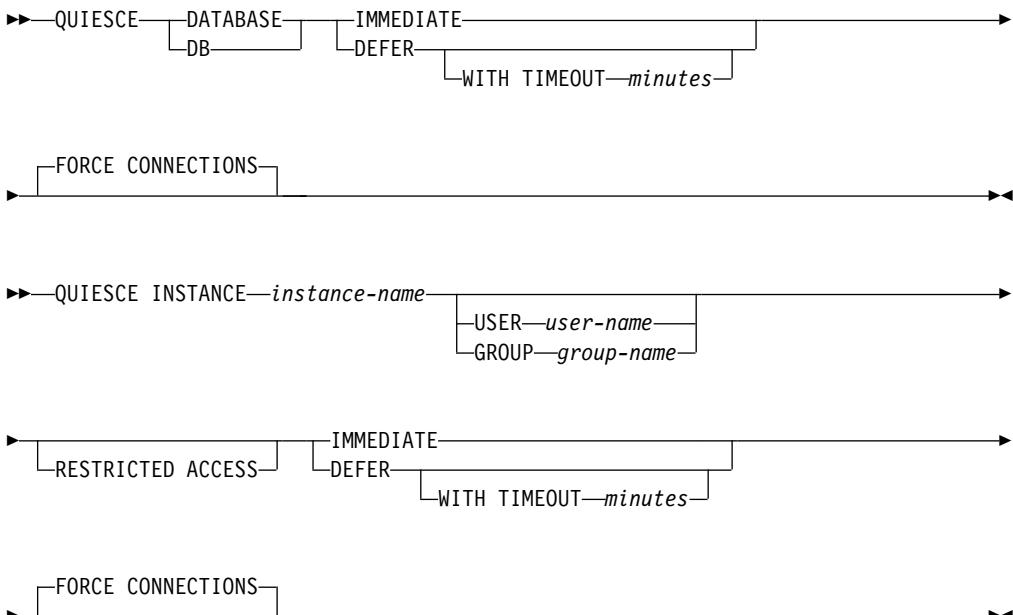
- SYSADM
- SYSCTRL

## Required connection

Database

(Database connection is not required for an instance quiesce.)

## Command syntax



## Command parameters

**DEFER** Wait for applications until they commit the current unit of work.

**WITH TIMEOUT *minutes***

Specifies a time, in minutes, to wait for applications to commit the current unit of work. If no value is specified, in a single-partition database environment, the default value is 10 minutes. In a partitioned database environment the value specified by the **start\_stop\_time** database manager configuration parameter will be used.

**IMMEDIATE**

Do not wait for the transactions to be committed, immediately roll back the transactions.

**FORCE CONNECTIONS**

Force the connections off.

**DATABASE**

Quiesce the database. All objects in the database will be placed in quiesced mode. Only specified users in specified groups and users with SYSADM, SYSMAINT, and SYSCTRL authority will be able to access to the database or its objects.

**INSTANCE** *instance-name*

The instance *instance-name* and the databases in the instance will be placed in quiesced mode. The instance will be accessible only to users with SYSADM, SYSMAINT, and SYSCTRL authority and specified users in specified groups.

The databases within the quiesced instance will be activated to do authorization checking for all connect attempts to the database. This is necessary to determine if the connecting user ID has DBADM authority; this authority is stored in the database catalog and the database must be activated to determine if the user ID has it. To prevent this authorization checking from happening, specify the **RESTRICTED ACCESS** option.

**USER** *user-name*

Specifies the name of a user who will be allowed access to the instance while it is quiesced.

**GROUP** *group-name*

Specifies the name of a group that will be allowed access to the instance while the instance is quiesced.

**RESTRICTED ACCESS**

Specify this option to prevent authorization checking for all connect attempts to the databases of a quiesced instance to determine if the user ID has DBADM authority. Instance-level authorization checking can still occur; checking a user ID for SYSADM, SYSCTRL, or SYSMAINT authority does not require a database to be activated.

**Note:** This command option is available in Db2 Version 9.7 Fix Pack 2 and later fix packs.

## Examples

In the following example, the default behavior is to force connections, so it does not need to be explicitly stated and can be removed from this example.

```
db2 quiesce instance crankarm user frank immediate force connections
```

The following example forces off all users with connections to the database.

```
db2 quiesce db immediate
```

- The first example will quiesce the instance `crankarm`, while allowing user `frank` to continue using the database.

The second example will quiesce the database you are attached to, preventing access by all users except those with one of the following authorities: SYSADM, SYSMAINT, SYSCTRL, or DBADM.

- This command will force all users off the database or instance if **FORCE CONNECTIONS** option is supplied. **FORCE CONNECTIONS** is the default behavior; the parameter is allowed in the command for compatibility reasons.
- The command will be synchronized with the **FORCE CONNECTIONS** and will only complete once the **FORCE CONNECTIONS** has completed.

## Usage notes

- After **QUIESCE INSTANCE**, only users with SYSADM, SYSMAINT, or SYSCTRL authority or a user name and group name provided as parameters to the command can connect to the instance.
- The **RESTRICTED ACCESS** option will prevent the databases within the quiesced instance from being activated to do authorization checking. Any user ID trying

to connect to a database, which has DBADM authority or QUIESCE\_CONNECT privilege on the database, will not be allowed to connect. Only user IDs which have SYSADM, SYSCTRL, or SYSMAINT authority and the user or group specified with the command will be allowed to connect to the database.

- The **RESTRICTED ACCESS** option should be used when there is a need to have exclusive connections to a database within the quiesced instance. Such cases can include making an offline backup or performing other maintenance activities.
- After **QUIESCE DATABASE**, users with SYSADM, SYSMAINT, SYSCTRL, or DBADM authority, and GRANT or REVOKE privileges can designate who will be able to connect. This information will be stored permanently in the database catalog tables.

For example,

```
grant quiesce_connect on database to username/groupname
revoke quiesce_connect on database from username/groupname
```

- In a Db2 pureScale environment, after quiescing a database and restarting the instance, the database will remain quiesced across all members. An explicit **UNQUIESCE DATABASE** command is required to remove the quiesce state.

## QUIESCE TABLESPACES FOR TABLE

Quiesces table spaces for a table. There are three valid quiesce modes: share, intent to update, and exclusive.

There are three possible states resulting from the quiesce function:

- Quiesced: SHARE
- Quiesced: UPDATE
- Quiesced: EXCLUSIVE

### Scope

In a single-partition environment, this command quiesces all table spaces involved in a load operation in exclusive mode for the duration of the load operation. In a partitioned database environment, this command acts locally on a database partition. It quiesces only that portion of table spaces belonging to the database partition on which the load operation is performed. For partitioned tables, all of the table spaces listed in SYSDATAPARTITIONS.TBSPACEID and SYSDATAPARTITIONS.LONG\_TBSPACEID associated with a table and with a status of normal, attached or detached, (for example, SYSDATAPARTITIONS.STATUS of "", 'A' or 'D') are quiesced.

### Authorization

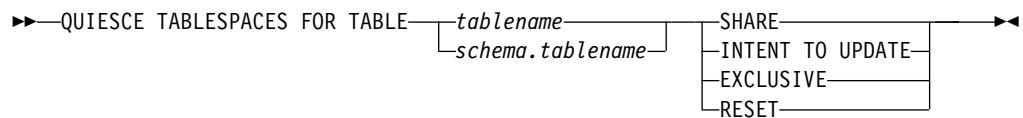
One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT
- DBADM
- LOAD

### Required connection

Database

## Command syntax



## Command parameters

## TABLE

*tablename*

Specifies the unqualified table name. The table cannot be a system catalog table.

*schema.tablename*

Specifies the qualified table name. If *schema* is not provided, the CURRENT SCHEMA will be used. The table cannot be a system catalog table.

**SHARE** Specifies that the quiesce is to be in share mode.

When a "quiesce share" request is made, the transaction requests intent share locks for the table spaces and a share lock for the table. When the transaction obtains the locks, the state of the table spaces is changed to QUIESCED SHARE. The state is granted to the quiescer only if there is no conflicting state held by other users. The state of the table spaces, along with the authorization ID and the database agent ID of the quiescer, are recorded in the table space table, so that the state is persistent. The table cannot be changed while the table spaces for the table are in QUIESCED SHARE state. Other share mode requests to the table and table spaces are allowed. When the transaction commits or rolls back, the locks are released, but the table spaces for the table remain in QUIESCED SHARE state until the state is explicitly reset.

## **INTENT TO UPDATE**

Specifies that the quiesce is to be in intent to update mode.

When a "quiesce intent to update" request is made, the table spaces are locked in intent exclusive (IX) mode, and the table is locked in update (U) mode. The state of the table spaces is recorded in the table space table.

EXCLUSIVE

Specifies that the quiesce is to be in exclusive mode.

When a "quiesce exclusive" request is made, the transaction requests super exclusive locks on the table spaces, and a super exclusive lock on the table. When the transaction obtains the locks, the state of the table spaces changes to QUIESCED EXCLUSIVE. The state of the table spaces, along with the authorization ID and the database agent ID of the quiescer, are recorded in the table space table. Since the table spaces are held in super exclusive mode, no other access to the table spaces is allowed. The user who invokes the quiesce function (the quiescer) has exclusive access to the table and the table spaces.

**RESET** Specifies that the state of the table spaces is to be reset to normal. A quiesce state cannot be reset if the connection that issued the quiesce request is still active.

When a quiescer issues a reset, only the quiesce mode for that quiescer is reset. If there are multiple quiescers, then the state of the table space will appear unchanged.

When working with a system-period temporal table and its associated history table, the reset operation must be performed on the same table that was used to originally set the quiesce mode.

## Example

```
db2 quiesce tablespaces for table staff share
db2 quiesce tablespaces for table boss.org intent to update
```

## Usage notes

This command is not supported in Db2 pureScale environments.

A quiesce is a persistent lock. Its benefit is that it persists across transaction failures, connection failures, and even across system failures (such as power failure, or reboot).

A quiesce is owned by a connection. If the connection is lost, the quiesce remains, but it has no owner, and is called a *phantom quiesce*. For example, if a power outage caused a load operation to be interrupted during the delete phase, the table spaces for the loaded table would be left in quiesce exclusive state. Upon database restart, this quiesce would be an unowned (or phantom) quiesce. The removal of a phantom quiesce requires a connection with the same user ID used when the quiesce mode was set.

To remove a phantom quiesce:

1. Connect to the database with the same user ID used when the quiesce mode was set.
2. Use the **LIST TABLESPACES** command to determine which table space is quiesced.
3. Re-quiesce the table space using the current quiesce state. For example:  
`db2 quiesce tablespaces for table mytable exclusive`

Once completed, the new connection owns the quiesce, and the load operation can be restarted.

There is a limit of five quiescers on a table space at any given time.

A quiescer can alter the state of a table space from a less restrictive state to a more restrictive one (for example, S to U, or U to X). If a user requests a state lower than one that is already held, the original state is returned. States are not downgraded.

When quiescing against a system-period temporal table, all the tables paces associated with the system-period temporal table and the history table are quiesced. When quiescing against a history table, all the tables paces associated with the history table, and the associated system-period temporal table are quiesced.

## QUIT

Exits the command line processor interactive input mode and returns to the operating system command prompt.

If a batch file is being used to input commands to the command line processor, commands are processed until **QUIT**, **TERMINATE**, or the end-of-file is encountered.

## Authorization

None

## Required connection

None

## Command syntax

►—QUIT—

## Command parameters

None

## Usage notes

**QUIT** does not terminate the command line processor backend process or break a database connection. **CONNECT RESET** breaks a connection, but does not terminate the backend process. The **TERMINATE** command does both.

## REBIND

Allows the user to re-create a package stored in the database without the need for a bind file.

## **Authorization**

One of the following authorities:

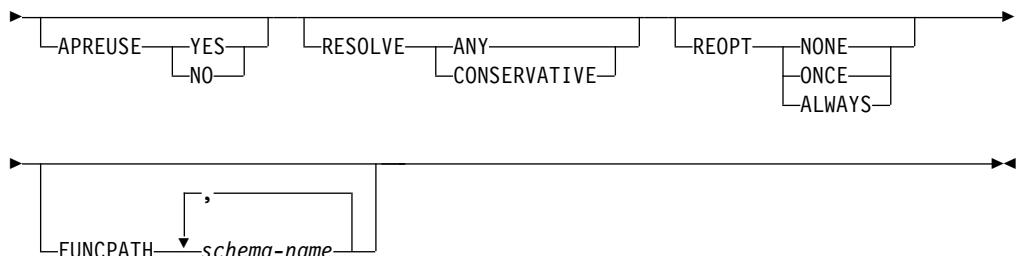
- DBADM authority
  - ALTERIN privilege on the schema
  - BIND privilege on the package.

The authorization ID logged in the BOUNDBY column of the SYSCAT.PACKAGES system catalog table, which is the ID of the most recent binder of the package, is used as the binder authorization ID for the rebinding, and for the default schema for table references in the package. This default qualifier can be different from the authorization ID of the user executing the rebinding request. **REBIND** will use the same bind options that were specified when the package was created.

## Required connection

Database. If no database connection exists, and if implicit connect is enabled, a connection to the default database is made.

## Command syntax



## Command parameters

### PACKAGE *package-name*

The qualified or unqualified name that designates the package to be rebound.

### VERSION *version-name*

The specific version of the package to be rebound. When the version is not specified, it is taken to be "" (the empty string).

### APREUSE

Specifies whether static SQL access plans are to be reused. When this option is enabled, the query compiler will attempt to reuse the access plans for static SQL statements in the existing package during the rebind and during future implicit and explicit rebinds. The default is the value used during the previous invocation of the **BIND** or **REBIND** command or the **ALTER PACKAGE** statement. To determine the value, query the APREUSE column for the package in SYSCAT.PACKAGES.

**YES** The query compiler will attempt to reuse the access plans for the statements in the package.

**NO** The query compiler will not attempt to reuse access plans for the statements in the package.

### RESOLVE

Specifies whether rebinding of the package is to be performed with or without conservative binding semantics. This affects whether new objects that use the SQL path for resolution are considered during resolution on static DML statements in the package. This option is not supported by DRDA. Valid values are:

**ANY** All possible matches in the SQL path are considered for resolving references to any objects that use the SQL path for object resolution. Conservative binding semantics are not used. This is the default.

### CONSERVATIVE

Only those objects in the SQL path that were defined before the last explicit bind time stamp are considered for resolving references to any objects that use the SQL path for object resolution. Conservative binding semantics are used. This option is not supported for an inoperative package.

### REOPT

Specifies whether to have Db2 optimize an access path using values for host variables, parameter markers, global variables, and special registers.

### NONE

The access path for a given SQL statement containing host variables, parameter markers, global variables, or special registers

will not be optimized using real values for these variables. The default estimates for these variables will be used instead, and this plan is cached and used subsequently. This is the default behavior.

**ONCE** The access path for a given SQL statement will be optimized using the real values of the host variables, parameter markers, global variables, or special registers when the query is first executed. This plan is cached and used subsequently.

**ALWAYS**

The access path for a given SQL statement will always be compiled and re-optimized using the values of the host variables, parameter markers, global variables, or special registers known at each execution time.

**FUNC PATH**

Specifies the function path to use in resolving user-defined distinct types and functions in static SQL. The default is the value that was used during the previous invocation of the **BIND** or **REBIND** command for the package. To determine the value, query the FUNC\_PATH column for the package in SYSCAT.PACKAGES view.

*schema-name*

An SQL identifier, either ordinary or delimited, that identifies a schema that exists at the application server. No validation that the schema exists is made at precompile or at bind time. You cannot use the same schema more than once in the function path. You cannot specify the SYSPUBLIC schema name for the function path. The number of schemas that you can specify is limited by the length of the resulting function path, which cannot exceed 2048 bytes. You do not have to specify the SYSIBM schema: if you do not include it in the function path, the SYSIBM schema is assumed to be the first schema.

## Usage notes

**REBIND** does not automatically commit the transaction following a successful rebind. The user must explicitly commit the transaction. This enables "what if" analysis, in which the user updates certain statistics, and then tries to rebind the package to see what changes. It also permits multiple rebinds within a unit of work.

The **REBIND** command *will* commit the transaction if auto-commit is enabled.

This command:

- Provides a quick way to re-create a package. This enables the user to take advantage of a change in the system without a need for the original bind file. For example, if it is likely that a particular SQL statement can take advantage of a newly created index, the **REBIND** command can be used to re-create the package. **REBIND** can also be used to re-create packages after **RUNSTATS** has been executed, thereby taking advantage of the new statistics.
- Provides a method to re-create inoperative packages. Inoperative packages must be explicitly rebound by invoking either the bind utility or the rebind utility. A package will be marked inoperative (the VALID column of the SYSCAT.PACKAGES system catalog will be set to X) if a function instance on which the package depends is dropped.

- Gives users control over the rebinding of invalid packages. Invalid packages will be automatically, or implicitly, rebound by the database manager when they are executed. This is done in an autonomous transaction which commits if the rebind is successful and allows all users immediate access to the package. The implicit rebinding of an invalid package might result in a noticeable delay in the execution of the first SQL request for the invalid package.

If multiple versions of a package (many versions with the same package name and creator) exist, only one version can be rebound at once. If not specified in the **VERSION** option, the package version defaults to be "". Even if there exists only one package with a name that matches, it will not be rebound unless its version matches the one specified or the default.

The choice of whether to use **BIND** or **REBIND** to explicitly rebind a package depends on the circumstances. It is recommended that **REBIND** be used whenever the situation does not specifically require the use of **BIND**, since the performance of **REBIND** is significantly better than that of **BIND**. **BIND** must be used, however:

- When there have been modifications to the program (for example, when SQL statements have been added or deleted, or when the package does not match the executable for the program).
- When you want to modify any of the bind options as part of the rebind that **REBIND** command does not support. The **REBIND** command does not support all bind options. For example, if you want to have privileges on the package granted as part of the bind process, you must use the **BIND** command, because it has a **GRANT** option.
- When the package does not currently exist in the database.
- When detection of *all* bind errors is required. **REBIND** only returns the first error it detects, whereas the **BIND** command returns the first 100 errors that occur during binding.

**REBIND** is supported by Db2 Connect.

If **REBIND** is executed on a package that is in use by another user, the rebind will not occur until the other user's logical unit of work ends, because an exclusive lock is held on the package's record in the SYSCAT.PACKAGES system catalog table during the rebind.

When **REBIND** is executed, the database manager re-creates the package from the SQL statements stored in the SYSCAT.STATEMENTS system catalog table.

If **REBIND** encounters an error, processing stops, and an error message is returned.

**REBIND** will re-explain packages that were created with the **EXPLSNAP** bind option set to YES or ALL (indicated in the EXPLAIN\_SNAPSHOT column in the SYSCAT.PACKAGES catalog table entry for the package) or with the **EXPLAIN** bind option set to YES or ALL (indicated in the EXPLAIN\_MODE column in the SYSCAT.PACKAGES catalog table entry for the package). The Explain tables used are those of the **REBIND** requester, not the original binder.

If an SQL statement was found to be in error and the **BIND** option **SQLERROR** **CONTINUE** was specified, the statement will be marked as invalid even if the problem has been corrected. **REBIND** will not change the state of an invalid statement. In a package bound with **VALIDATE RUN**, a statement can change from static to incremental bind or incremental bind to static across a **REBIND** depending on whether or not object existence or authority problems exist during the **REBIND**.

Rebinding a package with **REOPT** ONCE or ALWAYS might change static and dynamic statement compilation and performance.

If **REOPT** is not specified, **REBIND** will preserve the existing **REOPT** value used at **PRECOMPILE** or **BIND** time.

Every compiled SQL object has a dependent package. The package can be rebound at any time by using the REBIND\_ROUTINE\_PACKAGE procedure. Explicitly rebinding the dependent package does not revalidate an invalid object. Revalidate an invalid object with automatic revalidation or explicitly by using the ADMIN\_REVALIDATE\_DB\_OBJECTS procedure. Object revalidation automatically rebinds the dependent package.

## RECOVER DATABASE

Restores and rolls forward a database to a particular point in time or to the end of the logs.

### Scope

In a partitioned database environment, this command can only be invoked from the catalog partition. A database recover operation to a specified point in time affects all database partitions that are listed in the db2nodes.cfg file. A database recover operation to the end of logs affects the database partitions that are specified. If no partitions are specified, it affects all database partitions that are listed in the db2nodes.cfg file.

In a Db2 pureScale environment, the **RECOVER DATABASE** command can be issued from any member.

### Authorization

To recover an existing database, one of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT

To recover to a new database, one of the following authorities:

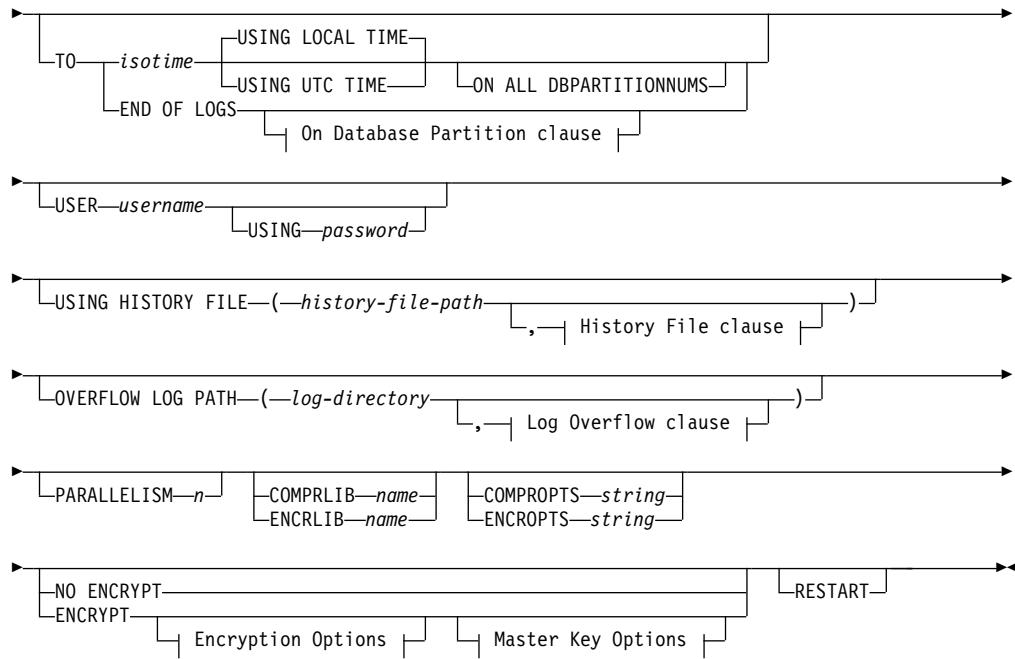
- SYSADM
- SYSCTRL

### Required connection

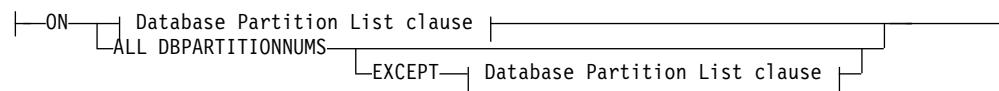
To recover an existing database, a database connection is required. This command automatically establishes a connection to the specified database and will release the connection when the recover operation finishes. To recover to a new database, an instance attachment and a database connection are required. The instance attachment is required to create the database.

### Command syntax

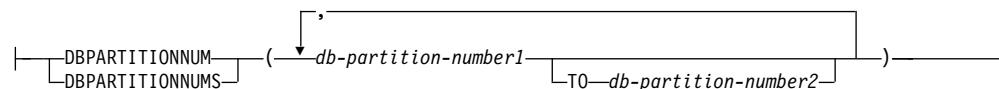
```
►►—RECOVER—[DATABASE—]source-database-alias—►
```



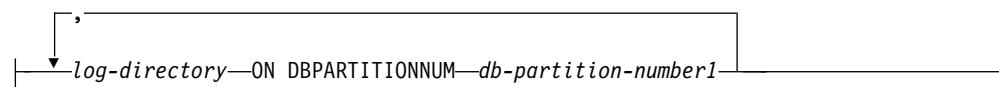
#### **On Database Partition clause:**



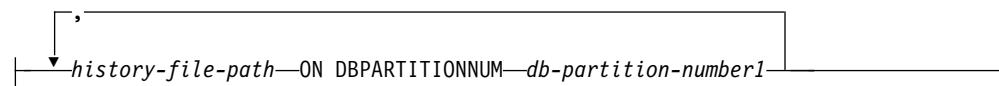
#### **Database Partition List clause:**



#### **Log Overflow clause:**



#### **History File clause:**



#### **Encryption Options:**



## **Master Key Options:**

—MASTER KEY LABEL—*label-name*—

## **Command parameters**

### **DATABASE *database-alias***

The alias of the database that is to be recovered.

### **TO**

#### *isotime*

The point in time to which all committed transactions are to be recovered (including the transaction committed precisely at that time, as well as all transactions committed previously). A recover operation to a point in time returns a success message only if there is a transaction with a larger timestamp value in the log files. Even if there is no transaction with a larger timestamp, you can still issue a rollforward operation with the **COMPLETE** option.

This value is specified as a time stamp, a 7-part character string that identifies a combined date and time. The format is *yyyy-mm-dd-hh.mm.ss.nnnnnn* (year, month, day, hour, minutes, seconds, microseconds). The time stamp in a backup image is based on the local time at which the backup operation started. The CURRENT TIMEZONE special register specifies the difference between UTC and local time at the application server. The difference is represented by a time duration (a decimal number in which the first two digits represent the number of hours, the next two digits represent the number of minutes, and the last two digits represent the number of seconds). Subtracting CURRENT TIMEZONE from a local time converts that local time to UTC.

### **USING LOCAL TIME**

Specifies the point in time to which to recover. This option allows the user to recover to a point in time that is the server's local time rather than UTC time. This is the default option.

#### **Note:**

1. If the user specifies a local time for recovery, all messages returned to the user will also be in local time. All times are converted on the server, and in partitioned database environments, on the catalog database partition.
2. The timestamp string is converted to UTC on the server, so the time is local to the server's time zone, not the client's. If the client is in one time zone and the server in another, the server's local time should be used.
3. If the timestamp string is close to the time change of the clock due to daylight saving time, it is important to know if the stop time is before or after the clock change, and specify it correctly.
4. It is important to specify a valid timestamp when recovering a database. A valid timestamp would be the time that the last backup in the partitioned database system was completed.

5. When issuing multiple **RECOVER DATABASE** commands, the timestamp you specify for each subsequent command must be greater than the timestamp you specified in the previous command.

#### **USING UTC TIME**

Specifies the point in time to which to recover.

#### **END OF LOGS**

Specifies that all committed transactions from all logs in the path specified by **logpath**, plus logs on the highest-numbered log chain that can be retrieved from the locations specified by the **logarchmeth1** and **logarchmeth2** database configuration parameters, are to be rolled forward.

#### **ON ALL DBPARTITIONNUMS**

Specifies that transactions are to be rolled forward on all database partitions specified in the db2nodes.cfg file. This is the default if a database partition clause is not specified.

#### **EXCEPT**

Specifies that transactions are to be rolled forward on all database partitions specified in the db2nodes.cfg file, except those specified in the database partition list.

#### **ON DBPARTITIONNUM | ON DBPARTITIONNUMS**

Roll the database forward on a set of database partitions.

##### *db-partition-number1*

Specifies a database partition number in the database partition list.

##### **TO** *db-partition-number2*

Specifies the second database partition number, so that all database partitions from *db-partition-number1* up to and including *db-partition-number2* are included in the database partition list.

#### **USER** *username*

The user name under which the database is to be recovered.

#### **USING** *password*

The password used to authenticate the user name. If the password is omitted, the user is prompted to enter it.

#### **USING HISTORY FILE** *history-file-path*

Path to the history file for the database partition. The path must end with a path separator, such as a slash ("/").

#### ***history-file-path* ON DBPARTITIONNUM**

In a partitioned database environment, specifies a different history file.

#### **OVERFLOW LOG PATH** *log-directory*

Specifies an alternate log path to be searched for archived logs during recovery. Use this parameter if log files were moved to a location other than that specified by the **logpath** database configuration parameter. In a partitioned database environment, this is the (fully qualified) default overflow log path for all database partitions. A relative overflow log path can be specified for single-partition databases.

The **OVERFLOW LOG PATH** command parameter will overwrite the value (if any) of the database configuration parameter **overflowlogpath**.

*log-directory* ON DBPARTITIONNUM

In a partitioned database environment, allows a different log path to override the default overflow log path for a specific database partition.

**PARALLELISM** *n*

Specifies the number of buffer manipulators that are to be created during the restore operation. The Db2 database system will automatically choose an optimal value for this parameter unless you explicitly enter a value.

**COMPRLIB** | **ENCRLIB** *lib-name*

Indicates the name of the library that is used to decompress or decrypt a backup image. The path to the following libraries is \$HOME/sql1ib/lib. Encryption libraries: libdb2encr.so (for Linux or UNIX based operating systems); libdb2encr.so.a (for AIX); and libdb2encr.dll (for Windows operating systems). Encryption and compression libraries: libdb2compr\_encr.so (for Linux or UNIX based operating systems); libdb2compr\_encr.a (for AIX); and libdb2compr\_encr.dll (for Windows operating systems). The name must be a fully qualified path that refers to a file on the server. If this parameter is not specified, the Db2 database system attempts to use the library that is stored in the image. If the backup image is not compressed or encrypted, the value of this parameter is ignored. If the specified library cannot be loaded, the recovery operation fails.

**COMPROPTS** | **ENCROPTS** *options-string*

Describes a block of binary data that is passed to the initialization routine in the decompression or decryption library. The Db2 database system passes this string directly from the client to the server. Any byte reversal or code page conversion issues are handled by the library. If the first character of the data block is "@", the remainder of the data is interpreted by the Db2 database system as the name of a file that is found on the server. The Db2 database system then replaces the contents of *options-string* with the contents of this file and passes the new value to the initialization routine instead. The maximum length for the string is 1024 bytes.

For the default Db2 libraries libdb2compr\_encr.so (compression and encryption) or libdb2encr.so (encryption only), the format of the **ENCROPTS** string is as follows:

Master Key Label=*label-name*

The master key label is optional. If no master key label is specified, the database manager looks in the keystore for a master key label that was used to create the backup image. If you are using other libraries, the format of the **ENCROPTS** string depends on those libraries.

**NO ENCRYPT**

Specifies that an encrypted database is to be recovered into a non-encrypted new or existing database.

**ENCRYPT**

Specifies that the recovered database is to be encrypted. Encryption includes all system, user, and temporary table spaces, indexes, and all transaction log data. All data types within those table spaces are encrypted, including long field data, LOBs, and XML data.

**CIPHER**

Specifies the encryption algorithm that is to be used for encrypting the database. You can choose one of the following FIPS 140-2 approved options:

**AES** Advanced Encryption Standard (AES) algorithm. This is the default.

**3DES** Triple Data Encryption Standard (3DES) algorithm

#### **MODE CBC**

Specifies the encryption algorithm mode that is to be used for encrypting the database. CBC (Cipher Block Chaining) is the default mode.

#### **KEY LENGTH *key-length***

Specifies the length of the key that is to be used for encrypting the database. The length can be one of the following values, specified in bits:

**128** Available with AES only

**168** Available with 3DES only

**192** Available with AES only

**256** Available with AES only

#### **MASTER KEY LABEL**

Specifies a label for the master key that is used to protect the key that is used to encrypt the database. The encryption algorithm that is used for encrypting with the master key is always AES. If the master key is automatically generated by the Db2 data server, it is always a 256-bit key.

#### *label-name*

Uniquely identifies the master key within the keystore that is identified by the value of the **keystore\_type** database manager configuration parameter. The maximum length of *label-name* is 255 bytes.

#### **RESTART**

The **RESTART** keyword can be used if a prior recover operation was interrupted or otherwise did not complete. A subsequent **RECOVER DATABASE** command attempts to continue the previous recover operation, if possible. Using the **RESTART** keyword forces the recover operation to start with a fresh restore and then rollforward to the point in time specified.

### **Examples**

The following examples apply to a single-partition database environment or a Db2 pureScale environment, where the database being recovered currently exists, and the most recent version of the history file is available on the default database path specified in the database manager configuration file (**dftdbpath** parameter):

1. To use the latest backup image and rollforward to the end of logs using all default values:

```
RECOVER DB SAMPLE
```

2. To recover the database to a point in time, issue the following. The most recent image that can be used will be restored, and logs applied until the point in time is reached.

```
RECOVER DB SAMPLE TO 2001-12-31-04.00.00
```

3. To recover the database using a saved version of the history file, issue the following. For example, if the user needs to recover to an extremely old point in time which is no longer contained in the current history file, the user will

have to provide a version of the history file from this time period. If the user has saved a history file from this time period, this version can be used to drive the recover.

```
RECOVER DB SAMPLE TO 1999-12-31-04.00.00
 USING HISTORY FILE (/home/user/old1999files/)
```

In a single-partition database environment, where the database being recovered does not exist, you must use the **USING HISTORY FILE** clause to point to a history file.

1. If you have not made any backups of the history file, so that the only version available is the copy in the backup image, the recommendation is to issue a **RESTORE** followed by a **ROLLFORWARD**. However, to use **RECOVER**, you would first have to extract the history file from the image to some location, for example /home/user/fromimage/, and then issue this command. (This version of the history file does not contain any information about log files that are required for rollforward, so this history file is not useful for **RECOVER**.)

```
RECOVER DB SAMPLE TO END OF LOGS
 USING HISTORY FILE (/home/user/fromimage/)
```

2. If you have been making periodic or frequent backup copies of the history, the **USING HISTORY FILE** clause should be used to point to this version of the history file. If the file is /home/user/myfiles/, issue the command:

```
RECOVER DB SAMPLE TO 2001-12-31-04.00.00
 USING HISTORY FILE (/home/user/myfiles/)
```

(In this case, you can use any copy of the history file, not necessarily the latest, as long as it contains a backup taken before the point-in-time (PIT) requested.)

In a partitioned database environment, where the database exists on all database partitions, and the latest history file is available in the **dftdbpath** on all database partitions:

1. To recover the database to a point in time on all database partitions. Db2 database systems will verify that the PIT is reachable on all database partitions before starting any restore operations.

```
RECOVER DB SAMPLE TO 2001-12-31-04.00.00
```

2. To recover the database to this point in time on all database partitions. Db2 database systems will verify that the specified point in time is reachable on all database partitions before starting any restore operations. The recover operation on each database partition is identical to a single-partition recovery

```
RECOVER DB SAMPLE TO END OF LOGS
```

3. Even though the most recent version of the history file is in the **dftdbpath**, you might want to use several specific history files. Unless otherwise specified, each database partition will use the history file found locally at /home/user/oldfiles/. The exceptions are nodes 2 and 4. Node 2 will use: /home/user/node2files/, and node 4 will use: /home/user/node4files/.

```
RECOVER DB SAMPLE TO 1999-12-31-04.00.00
 USING HISTORY FILE (/home/user/oldfiles/,
 /home/user/node2files/ ON DBPARTITIONNUM 2,
 /home/user/node4files/ ON DBPARTITIONNUM 4)
```

4. It is possible to recover a subset of database partitions instead of all database partitions, however a point-in-time recover operation cannot be done in this case; the recover must be done to the end of logs.

```
RECOVER DB SAMPLE TO END OF LOGS ON DBPARTITIONNUMS(2 TO 4, 7, 9)
```

In a partitioned database environment, where the database does not exist:

- If you have not made any backups of the history file, so that the only version available is the copy in the backup image, the recommendation is to issue a **RESTORE** followed by a **ROLLFORWARD**. However, to use **RECOVER**, you would first have to extract the history file from the image to some location, for example, `/home/user/fromimage/`, and then issue this command. (This version of the history file does not contain any information about log files that are required for rollforward, so this history file is not useful for the recover.)

```
RECOVER DB SAMPLE TO 2001-12-31-04.00.00
 USING HISTORY FILE (/home/user/fromimage/)
```

- If you have been making periodic or frequent backup copies of the history, the **USING HISTORY FILE** clause should be used to point to this version of the history file. If the file is `/home/user/myfiles/`, you can issue the following command:

```
RECOVER DB SAMPLE TO END OF LOGS
 USING HISTORY FILE (/home/user/myfiles/)
```

The following examples show how to specify encryption options.

- Recover into a new encrypted database named CCARDS by using the default encryption options:

```
RECOVER DATABASE ccards ENCRYPT;
```

- Recover into the same database by using explicitly provided encryption options to decrypt the backup image:

```
RECOVER DATABASE ccards
 ENCRLIB 'libdb2encr.dll'
 ENCRYPTS 'Master key Label=mylabel.mydb.myinstance.myserver';
```

## Usage notes

- Recovering a database might require a load recovery using tape devices. If prompted for another tape, the user can respond with one of the following:
  - c** Continue. Continue using the device that generated the warning message (for example, when a new tape has been mounted).
  - d** Device terminate. Stop using the device that generated the warning message (for example, when there are no more tapes).
  - t** Terminate. Terminate all devices.
- If there is a failure during the restore portion of the recover operation, you can reissue the **RECOVER DATABASE** command. If the restore operation was successful, but there was an error during the rollforward operation, you can issue a **ROLLFORWARD DATABASE** command, since it is not necessary (and it is time-consuming) to redo the entire recover operation.
- In a partitioned database environment, if there is an error during the restore portion of the recover operation, it is possible that it is only an error on a single database partition. Instead of reissuing the **RECOVER DATABASE** command, which restores the database on all database partitions, it is more efficient to issue a **RESTORE DATABASE** command for the database partition that failed, followed by a **ROLLFORWARD DATABASE** command.
- In a Db2 pureScale environment, you must specify database partition 0 if you use the **RECOVER DATABASE** command with the **ON DBPARTITIONNUMS** clause or with the **ON DBPARTITIONNUM** clause (either as part of the database partition list clause or the log overflow clause).

## Db2 native encryption

When you recover to an existing database, the encryption settings of the

existing database are always preserved. If you specify the **ENCRYPT** option, an error is returned because the settings on the **RECOVER** command will not be used.

When you recover into a new database in a partitioned database environment, recover the catalog partition first, specifying the encryption options. You can then recover the other partitions without specifying the encryption options, because the database already exists. When you use the **db2\_all** command, target the catalog partitions first.

A backup image that was encrypted with Db2 native encryption must be recovered into a database server that has Db2 native encryption available. If you want to recover into a server that is using a Db2 version that does not include Db2 native encryption, you must use an unencrypted backup image.

## REDISTRIBUTE DATABASE PARTITION GROUP

Redistributes data across the partitions in a database partition group. This command affects all objects present in the database partition group and cannot be restricted to one object alone.

This command can be issued only from the catalog database partition. Use the **LIST DATABASE DIRECTORY** command to determine which database partition is the catalog database partition for each database.

### Scope

This command affects all database partitions in the database partition group.

### Authorization

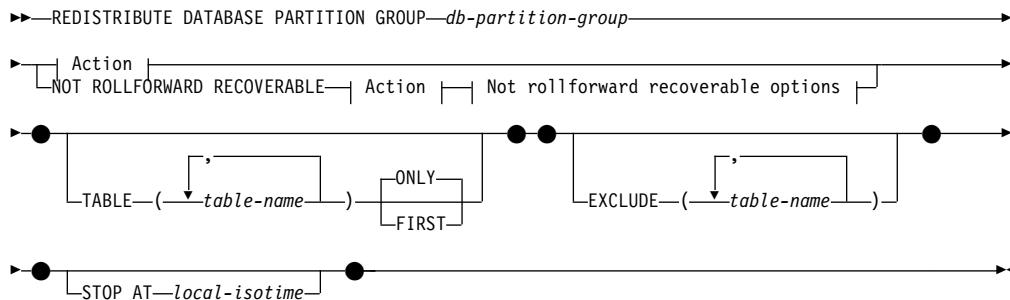
One of the following authorities is required:

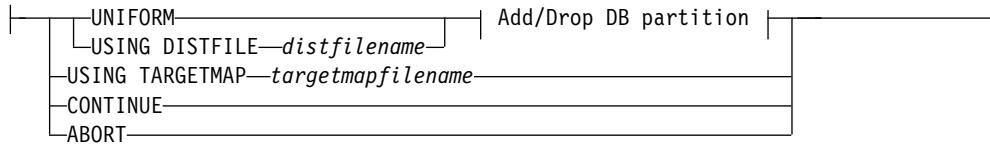
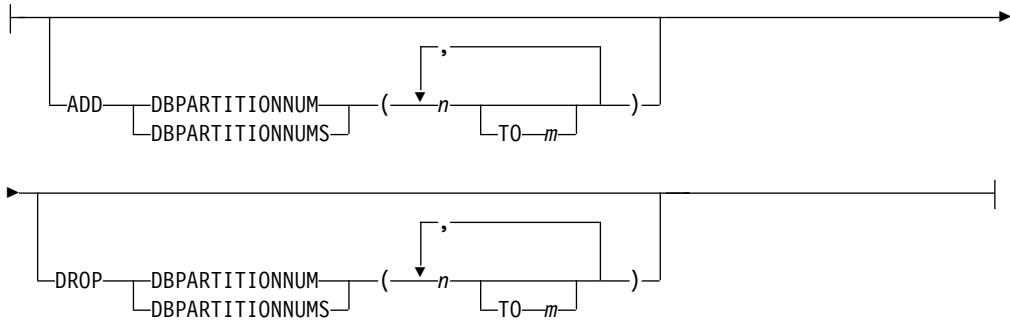
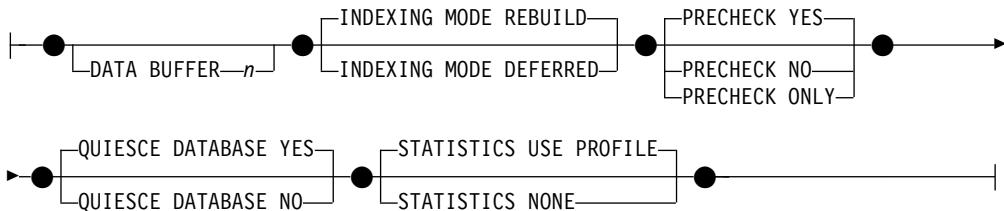
- SYSADM
- SYSCTRL
- DBADM

In addition, one of the following groups of authorizations is also required:

- DELETE, INSERT, and SELECT privileges on all tables in the database partition group being redistributed
- DATAACCESS authority

### Command syntax



**Action:****Add/Drop DB partition:****Not rollforward recoverable options:****Command parameters****DATABASE PARTITION GROUP *db-partition-group***

The name of the database partition group. This one-part name identifies a database partition group described in the SYSCAT.DBPARTITIONGROUPS catalog table. The database partition group cannot currently be undergoing redistribution.

**Note:** Tables in the IBMCATGROUP and the IBMTEMPGROUP database partition groups cannot be redistributed.

**NOT ROLLFORWARD RECOVERABLE**

When this option is used, the **REDISTRIBUTE DATABASE PARTITION GROUP** command is not rollforward recoverable.

- Data is moved in bulk instead of by internal insert and delete operations. This reduces the number of times that a table must be scanned and accessed, which results in better performance.
- Log records are no longer required for each of the insert and delete operations. This means that you no longer need to manage large amounts of active log space and log archiving space in your system when performing data redistribution.
- When using the **REDISTRIBUTE DATABASE PARTITION GROUP** command with the **NOT ROLLFORWARD RECOVERABLE** option, the redistribute operation uses the

**INDEXING MODE DEFERRED** option for tables that contain XML columns. If a table does not contain an XML column, the redistribute operation uses the indexing mode specified when issuing the command.

When this option is *not* used, extensive logging of all row movement is performed such that the database can be recovered later in the event of any interruptions, errors, or other business need.

This option is not supported for column-organized tables.

#### **UNIFORM**

Specifies that the data is uniformly distributed across hash partitions (that is, every hash partition is assumed to have the same number of rows), but the same number of hash partitions do not map to each database partition. After redistribution, all database partitions in the database partition group have approximately the same number of hash partitions.

#### **USING DISTFILE *distfilename***

If the distribution of distribution key values is skewed, use this option to achieve a uniform redistribution of data across the database partitions of a database partition group.

Use the *distfilename* to indicate the current distribution of data across the 32 768 hash partitions.

Use row counts, byte volumes, or any other measure to indicate the amount of data represented by each hash partition. The utility reads the integer value associated with a partition as the weight of that partition. When a *distfilename* is specified, the utility generates a target distribution map that it uses to redistribute the data across the database partitions in the database partition group as uniformly as possible. After the redistribution, the weight of each database partition in the database partition group is approximately the same (the weight of a database partition is the sum of the weights of all hash partitions that map to that database partition).

For example, the input distribution file might contain entries as follows:

```
10223
1345
112000
0
100
...
...
```

In the example, hash partition 2 has a weight of 112000, and partition 3 (with a weight of 0) has no data mapping to it at all.

The *distfilename* should contain 32 768 positive integer values in character format. The sum of the values should be less than or equal to 4 294 967 295.

If the path for *distfilename* is not specified, the current directory is used.

#### **USING TARGETMAP *targetmapfilename***

The file specified in *targetmapfilename* is used as the target distribution map. Data redistribution is done according to this file. If the path is not specified, the current directory is used.

The *targetmapfilename* should contain 32 768 integers, each representing a valid database partition number. The number on any row maps a hash value to a database partition. This means that if row X contains value Y, then every record with HASHEDVALUE() of X is to be located on database partition Y.

If a database partition, included in the target map, is not in the database partition group, an error is returned. Issue ALTER DATABASE PARTITION GROUP ADD DBPARTITIONNUM statement before running **REDISTRIBUTE DATABASE PARTITION GROUP** command.

If a database partition, excluded from the target map, *is* in the database partition group, that database partition will not be included in the partitioning. Such a database partition can be dropped using ALTER DATABASE PARTITION GROUP DROP DBPARTITIONNUM statement either before or after the **REDISTRIBUTE DATABASE PARTITION GROUP** command.

#### **CONTINUE**

Continues a previously failed or stopped **REDISTRIBUTE DATABASE PARTITION GROUP** operation. If none occurred, an error is returned.

#### **ABORT**

Aborts a previously failed or stopped **REDISTRIBUTE DATABASE PARTITION GROUP** operation. If none occurred, an error is returned.

#### **ADD**

##### **DBPARTITIONNUM *n***

##### **TO *m***

*n* or *n TO m* specifies a list or lists of database partition numbers which are to be added into the database partition group. Any specified partition must not already be defined in the database partition group (SQLSTATE 42728). This is equivalent to executing the ALTER DATABASE PARTITION GROUP statement with ADD DBPARTITIONNUM clause specified.

##### **DBPARTITIONNUMS *n***

##### **TO *m***

*n* or *n TO m* specifies a list or lists of database partition numbers which are to be added into the database partition group. Any specified partition must not already be defined in the database partition group (SQLSTATE 42728). This is equivalent to executing the ALTER DATABASE PARTITION GROUP statement with ADD DBPARTITIONNUM clause specified.

#### **Note:**

1. When a database partition is added using this option, containers for table spaces are based on the containers of the corresponding table space on the lowest numbered existing partition in the database partition group. If this would result in a naming conflict among containers, which could happen if the new partitions are on the same physical machine as existing containers, this option should not be used. Instead, the ALTER DATABASE PARTITION GROUP statement should be used with the WITHOUT TABLESPACES option before issuing the **REDISTRIBUTE DATABASE PARTITION GROUP** command. Table space containers can then be created manually specifying appropriate names.
2. Data redistribution might create table spaces for all new database partitions if the **ADD DBPARTITIONNUMS** parameter is specified.

#### **DROP**

##### **DBPARTITIONNUM *n***

##### **TO *m***

*n* or *n TO m* specifies a list or lists of database partition numbers which are to be dropped from the database partition group. Any specified partition must already be defined in the database partition group (SQLSTATE 42729). This is equivalent to executing the ALTER DATABASE PARTITION GROUP statement with the DROP DBPARTITIONNUM clause specified.

**DBPARTITIONNUMS *n***

**TO *m***

*n* or *n TO m* specifies a list or lists of database partition numbers which are to be dropped from the database partition group. Any specified partition must already be defined in the database partition group (SQLSTATE 42729). This is equivalent to executing the ALTER DATABASE PARTITION GROUP statement with the DROP DBPARTITIONNUM clause specified.

**TABLE *tablename***

Specifies a table order for redistribution processing.

**ONLY**

If the table order is followed by the **ONLY** keyword (which is the default), then, only the specified tables will be redistributed. The remaining tables can be later processed by **REDISTRIBUTE CONTINUE** commands. This is the default.

**FIRST**

If the table order is followed by the **FIRST** keyword, then, the specified tables will be redistributed with the given order and the remaining tables in the database partition group will be redistributed with random order.

**EXCLUDE *tablename***

Specifies tables to omit from redistribution processing. For example, you can temporarily omit a table until you can configure it to meet the requirements for data redistribution. The omitted tables can be later processed by **REDISTRIBUTE CONTINUE** commands.

**STOP AT *local-isotime***

When this option is specified, before beginning data redistribution for each table, the *local-isotime* is compared with the current local timestamp. If the specified *local-isotime* is equal to or earlier than the current local timestamp, the utility stops with a warning message. Data redistribution processing of tables in progress at the stop time will complete without interruption. No new data redistribution processing of tables begins. The unprocessed tables can be redistributed using the **CONTINUE** option. This *local-isotime* value is specified as a time stamp, a 7-part character string that identifies a combined date and time. The format is *yyyy-mm-dd-hh.mm.ss.nnnnnn* (year, month, day, hour, minutes, seconds, microseconds) expressed in local time.

**DATA BUFFER *n***

Specifies the number of 4 KB pages to use as buffered space for transferring data within the utility. This command parameter can be used only when the **NOT ROLLFORWARD RECOVERABLE** parameter is also specified.

If the value specified is lower than the minimum supported value, the minimum value is used and no warning is returned. If a **DATA BUFFER** value is not specified, an intelligent default is calculated by the utility at runtime at the beginning of processing each table. Specifically, the default is to use 50% of the memory available in the utility heap at the time redistribution of the table begins and to take into account various table properties as well.

This memory is allocated directly from the utility heap, whose size can be modified through the **util\_heap\_sz** database configuration parameter. The value of the **DATA BUFFER** parameter of the **REDISTRIBUTE DATABASE PARTITION GROUP** command can temporarily exceed **util\_heap\_sz** if more memory is available in the system.

#### **INDEXING MODE**

Specifies how indexes are maintained during redistribution. This command parameter can be used only when the **NOT ROLLFORWARD RECOVERABLE** parameter is also specified.

Valid values are:

#### **REBUILD**

Indexes will be rebuilt from scratch. Indexes do not have to be valid to use this option. As a result of using this option, index pages will be clustered together on disk.

#### **DEFERRED**

Redistribute will not attempt to maintain any indexes. Indexes will be marked as needing a refresh. The first access to such indexes might force a rebuild, or indexes might be rebuilt when the database is restarted.

**Note:** For non-MDC and non-ITC tables, if there are invalid indexes on the tables, the **REDISTRIBUTE DATABASE PARTITION GROUP** command automatically rebuilds them if you do not specify **INDEXING MODE DEFERRED**. For an MDC or ITC table, even if you specify **INDEXING MODE DEFERRED**, a composite index that is invalid is rebuilt before table redistribution begins because the utility needs the composite index to process an MDC or ITC table.

#### **PRECHECK**

Verifies that the database partition group can be redistributed. This command parameter can be used only when the **NOT ROLLFORWARD RECOVERABLE** parameter is also specified.

#### **YES**

This is the default value. The redistribution operation begins only if the verification completes successfully. If the verification fails, the command terminates and returns an error message related to the first check that failed.

**NO** The redistribution operation begins immediately; no verification occurs.

#### **ONLY**

The command terminates after performing the verification; no redistribution occurs. By default it will not quiesce the database. If the **QUIESCE DATABASE** command parameter was set to YES or defaulted to a value of YES, the database remains quiesced. To restore connectivity to the database, perform the redistribution operation or issue **UNQUIESCE DATABASE** command.

#### **QUIESCE DATABASE**

Specifies to force all users off the database and put it into a quiesced mode. This command parameter can be used only when the **NOT ROLLFORWARD RECOVERABLE** parameter is also specified.

#### **YES**

This is the default value. Only users with SYSADM, SYSMAINT, or SYSCTRL authority or users who have been granted QUIESCE\_CONNECT

authority will be able to access the database or its objects. Once the redistribution completes successfully, the database is unquiesced.

- NO** The redistribution operation does not quiesce the database; no users are forced off the database.

For more information, refer to the **QUIESCE DATABASE** command.

#### **STATISTICS**

Specifies that the utility should collect statistics for the tables that have a statistics profile. This command parameter can be used only when the **NOT ROLLFORWARD RECOVERABLE** parameter is also specified.

Specifying this option is more efficient than separately issuing the **RUNSTATS** command after the data redistribution is completed.

#### **USE PROFILE**

Statistics will be collected for the tables with a statistics profile. For tables without a statistics profile, nothing will be done. This is the default.

#### **NONE**

Statistics will not be collected for tables.

### **Examples**

Redistribute database partition group DBPG\_1 by providing the current data distribution through a data distribution file, distfile\_for\_dbpg\_1. Move the data onto two new database partitions, 6 and 7.

```
REDISTRIBUTE DATABASE PARTITION GROUP DBPG_1
 USING DISTFILE /home/user1/data/distfile_for_dbpg_1
 ADD DATABASE PARTITION (6 TO 7)
```

Redistribute database partition group DBPG\_2 such that:

- The redistribution is not rollforward recoverable;
- Data is uniformly distributed across hash partitions;
- Indexes are rebuilt from scratch;
- Statistics are not collected;
- 180,000 4 KB pages are used as buffered space for transferring the data.

```
REDISTRIBUTE DATABASE PARTITION GROUP DBPG_2
 NOT ROLLFORWARD RECOVERABLE
 UNIFORM
 INDEXING MODE REBUILD
 DATA BUFFER 180000
 STATISTICS NONE
```

This redistribution operation also quiesces the database and performs a precheck due to the default values for the **QUIESCE DATABASE** and **PRECHECK** command parameters.

### **Usage notes**

- Before starting a redistribute operation, ensure that the tables are in normal state and not in "load pending" state or "reorg pending" state. Table states can be checked by using the **LOAD QUERY** command.
- When the **NOT ROLLFORWARD RECOVERABLE** option is specified and the database is a recoverable database, the first time the utility accesses a table space, it is put into the BACKUP PENDING state. All the tables in that table space will become read-only until the table space is backed-up, which can only be done when all tables in the table space have finished being redistributed.

- When a redistribution operation is running, it produces an event log file containing general information about the redistribution operation and information such as the starting and ending time of each table processed. This event log file is written to:
  - The `homeinst/sql1ib/redist` directory on Linux and UNIX operating systems, using the following format for subdirectories and file name: `database-name.database-partition-group-name.timestamp.log`.
  - The `DB2INSTPROF\instance\redist` directory on Windows operating systems (where `DB2INSTPROF` is the value of the `DB2INSTPROF` registry variable), using the following format for subdirectories and file name: `database-name.database-partition-group-name.timestamp.log`.
  - The time stamp value is the time when the command was issued.
- This utility performs intermittent COMMITs during processing.
- All packages having a dependency on a table that has undergone redistribution are invalidated. It is recommended to explicitly rebind such packages after the redistribute database partition group operation has completed. Explicit rebinding eliminates the initial delay in the execution of the first SQL request for the invalid package. The redistribute message file contains a list of all the tables that have undergone redistribution.
- By default, the redistribute utility will update the statistics for those tables that have a statistics profile. For the tables without a statistics profile, it is recommended that you separately update the table and index statistics for these tables by calling the `db2Runstats` API or by issuing the `RUNSTATS` command after the redistribute operation has completed.
- Database partition groups containing replicated materialized query tables or tables defined with DATA CAPTURE CHANGES cannot be redistributed.
- Redistribution is not allowed if there are user temporary table spaces with existing declared temporary tables or created temporary tables in the database partition group.
- Options such as `INDEXING MODE` are ignored on tables, on which they do not apply, without warning. For example, `INDEXING MODE` will be ignored on tables without indexes.
- The `REDISTRIBUTE DATABASE PARTITION GROUP` command might fail (SQLSTATE 55071) if an add database partition server request is either pending or in progress. This command might also fail (SQLSTATE 55077) if a new database partition server is added online to the instance and not all applications are aware of the new database partition server.
- The `REDISTRIBUTE DATABASE PARTITION GROUP` command is not allowed if there is an outstanding asynchronous background process to create a column compression dictionary (SQL6056N).

## Compatibilities

Tables containing XML columns that use the Db2 Version 9.5 or earlier XML record format cannot be redistributed. Use the `ADMIN_MOVE_TABLE` stored procedure to migrate the table to the new format.

## REFRESH LDAP

Refreshes the cache on a local machine with updated information when the information in Lightweight Directory Access Protocol (LDAP) has been changed.

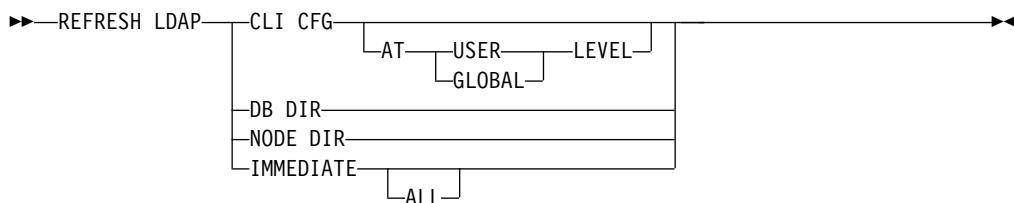
## Authorization

None

## Required connection

None

## Command syntax



## Command parameters

### CLI CFG

Specifies that the CLI configuration is to be refreshed. This parameter is not supported on AIX or the Solaris operating system.

On Windows operating system, the **REFRESH LDAP CLI CFG** command writes the CLI configuration parameters that are stored in LDAP into the user-level db2cli.ini initialization file. When the **REFRESH LDAP CLI CFG** command is run on a Windows operating system, the user-level db2cli.ini initialization file is re-created and updated with the CLI configuration parameters that are stored in LDAP server. Depending on the version of Windows operating system, the user-level db2cli.ini initialization file is stored in the Documents and Settings\UserName or the \Users\UserName directory, where *UserName* represents the name of the logged in user.

### AT USER LEVEL

The default behavior. The **REFRESH LDAP CLI CFG AT USER LEVEL** command writes the CLI configuration parameters that are stored in LDAP into the user-level db2cli.ini initialization file.

### AT GLOBAL LEVEL

Updates and appends all configuration information in the db2cli.ini initialization file with the global configuration information, which is specified for all the user IDs, on the LDAP server.

### DB DIR

Specifies that the database directory is to be refreshed.

### NODE DIR

Specifies that the node directory is to be refreshed.

### IMMEDIATE

Specifies that the local database and node directories are to be refreshed immediately.

**ALL** Specifies that all database and node entries contained within the LDAP server are to be added into the local database and node directories.

## Usage notes

If the object in LDAP is removed during refresh, the corresponding LDAP entry on the local machine is also removed. If the information in LDAP is changed, the corresponding LDAP entry is modified accordingly. If the DB2CLI.INI file is manually updated, the **REFRESH LDAP CLI CFG** command must be run to update the cache for the current user.

The **REFRESH LDAP DB DIR** and **REFRESH LDAP NODE DIR** commands remove the LDAP database or node entries found in the local database or node directories. The database or node entries will be added to the local database or node directories again when the user connects to a database or attaches to an instance found in LDAP, and **DB2LDAPCACHE** is either not set or set to YES.

The **REFRESH LDAP IMMEDIATE** command updates entries from the local database and node directories using the latest information found in LDAP. This update occurs immediately and regardless if **DB2LDAPCACHE** is enabled or not. Only database and node entries that originated from LDAP will be updated. Entries that were added manually remain unchanged.

The **REFRESH LDAP IMMEDIATE ALL** command immediately populates the local database and node directories with all the information found in LDAP. If an entry found in LDAP matches an existing local entry, the command will update the entry. This update will only occur if the local entry originated from LDAP. Entries that were added manually remain unchanged. This update is performed regardless if **DB2LDAPCACHE** is enabled or not.

When LDAP is disabled, performing either **REFRESH LDAP IMMEDIATE** or **REFRESH LDAP IMMEDIATE ALL** will result in SQLCODE -3279 (The command did not complete successfully because LDAP is disabled).

## REGISTER

Registers the Db2 server in the network directory server.

### Authorization

None

### Required connection

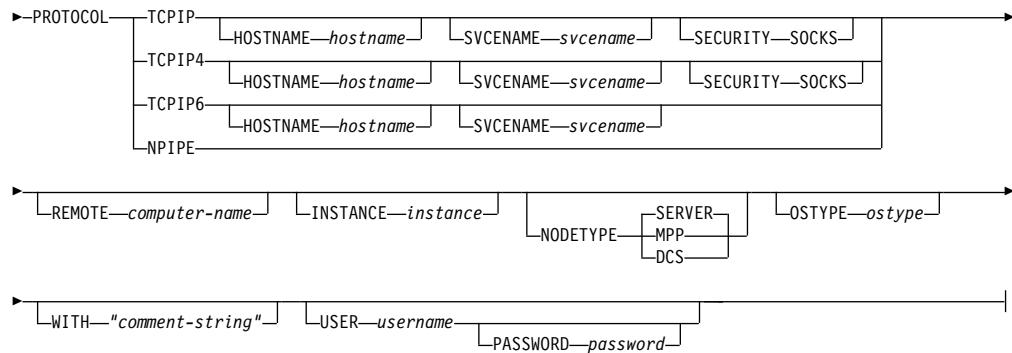
None

### Command syntax

```
>>>REGISTER [DB2 SERVER] [IN] [ADMIN] LDAP path >>>
```

#### LDAP path:

```
|--LDAP--[NODE]--nodename-->
```



## Command parameters

**IN** Specifies the network directory server on which to register the Db2 server. The valid value is: LDAP for an LDAP (Lightweight Directory Access Protocol) directory server.

### ADMIN

Specifies that an administration server node is to be registered.

### NODE | AS *nodename*

Specify a short name to represent the Db2 server in LDAP. A node entry will be cataloged in LDAP using this node name. The client can attach to the server using this node name. The protocol associated with this LDAP node entry is specified through the **PROTOCOL** parameter.

### PROTOCOL

Specifies the protocol type associated with the LDAP node entry. Since the database server can support more than one protocol type, this value specifies the protocol type used by the client applications. The Db2 server must be registered once per protocol. Valid values are: TCPIP, TCPIP4, TCPIP6, and NPIPE. Specify NPIPE to use Windows Named Pipes. NPIPE is only supported on Windows operating systems.

### HOSTNAME *hostname*

Specifies the TCP/IP host name (or IP address). IP address can be an IPv4 or IPv6 address when using protocol, TCPIP. IP address must be an IPv4 address when using protocol, TCPIP4. IP address must be an IPv6 address when using protocol, TCPIP6.

### SVCENAME *svcname*

Specifies the TCP/IP service name or port number.

### SECURITY SOCKS

Specifies that TCP/IP SOCKS is to be used. This parameter is only supported with IPv4. When protocol TCPIP is specified, the underlying protocol used will be IPv4.

### REMOTE *computer-name*

Specifies the computer name of the machine on which the Db2 server resides. Specify this parameter only if registering a remote Db2 server in LDAP. The value must be the same as the value specified when adding the server machine to LDAP. For Windows operating systems, this is the computer name. For UNIX based systems, this is the TCP/IP host name.

### INSTANCE *instance*

Specifies the instance name of the Db2 server. The instance name must be specified for a remote instance (that is, when a value for the **REMOTE** parameter has been specified).

**NODETYPE**

Specifies the node type for the database server. Valid values are:

**SERVER**

Specify the SERVER node type for a Db2 Enterprise Server Edition.  
This is the default.

**MPP** Specify the MPP node type for a Db2 Enterprise Server Edition - Extended (partitioned database) server.

**DCS** Specify the DCS node type when registering a host database server.

**OSTYPE** *ostype*

Specifies the operating system type of the server machine. Valid values are: AIX, NT, HPUX, SUN, MVS, OS400, VM, VSE and LINUX. If an operating system type is not specified, the local operating system type will be used for a local server and no operating system type will be used for a remote server.

**WITH** "*comment-string*"

Describes the Db2 server. Any comment that helps to describe the server registered in the network directory can be entered. Maximum length is 30 characters. A carriage return or a line feed character is not permitted. The comment text must be enclosed by double quotation marks.

**Usage notes**

Register the Db2 server once for each protocol that the server supports.

The **REGISTER** command should be issued once for each Db2 server instance to publish the server in the directory server. If the communication parameter fields are reconfigured, or the server network address changes, update the Db2 server on the network directory server.

To update the Db2 server in LDAP, use the **UPDATE LDAP NODE** command after the changes have been made.

If any protocol configuration parameter is specified when registering a Db2 server locally, it will override the value specified in the database manager configuration file.

If the **REGISTER** command is used to register a local Db2 instance in LDAP, and one or both of **NODETYPE** and **OSTYPE** are specified, they will be replaced with the values retrieved from the local system. If the **REGISTER** command is used to register a remote Db2 instance in LDAP, and one or both of **NODETYPE** and **OSTYPE** are not specified, the default value of SERVER and Unknown will be used.

If the **REGISTER** command is used to register a remote Db2 server in LDAP, the computer name and the instance name of the remote server must be specified along with the communication protocol for the remote server.

When registering a host database server, a value of DCS must be specified for the **NODETYPE** parameter.

**REGISTER XMLSCHEMA**

Registers an XML schema with the XML schema repository (XSR).

## Authorization

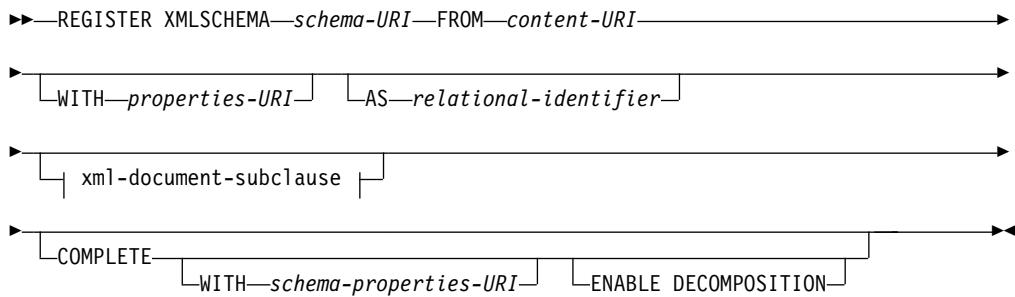
One of the following authorities:

- DBADM
- IMPLICIT\_SCHEMA database authority if the SQL schema does not exist
- CREATEIN privilege if the SQL schema exists

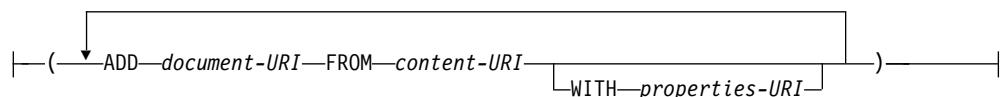
## Required connection

Database

## Command syntax



### xml-document-subclause:



## Command parameters

### *schema-URI*

Specifies the URI, as referenced by XML instance documents, of the XML schema being registered.

### **FROM** *content-URI*

Specifies the URI where the XML schema document is located. Only a local file specified by a file scheme URI is supported.

### **WITH** *properties-URI*

Specifies the URI of a properties document for the XML schema. Only a local file specified by a file scheme URI is supported.

### **AS** *relational-identifier*

Specifies a name that can be used to refer to the XML schema being registered. The relational name can be specified as a two-part SQL identifier, consisting of the SQL schema and the XML schema name, having the following format: SQLschema.name. The default relational schema, as defined in the CURRENT SCHEMA special register, is used if no schema is specified. If no name is provided, a unique value is generated.

### **COMPLETE**

Indicates that there are no more XML schema documents to be added. If specified, the schema is validated and marked as usable if no errors are found.

**WITH *schema-properties-URI***

Specifies the URI of a properties document for the XML schema. Only a local file specified by a file scheme URI is supported.

**ENABLE DECOMPOSITION**

Specifies that this schema is to be used for decomposing XML documents.

**ADD *document-URI***

Specifies the URI of an XML schema document to be added to this schema, as the document would be referenced from another XML document.

**FROM *content-URI***

Specifies the URI where the XML schema document is located. Only a local file specified by a file scheme URI is supported.

**WITH *properties-URI***

Specifies the URI of a properties document for the XML schema. Only a local file specified by a file scheme URI is supported.

## Examples

```
REGISTER XMLSCHEMA 'http://myP0schema/P0.xsd'
FROM 'file:///c:/TEMP/P0.xsd'
WITH 'file:///c:/TEMP/schemaProp.xml'
AS user1.P0schema
```

## Usage notes

- Before an XML schema document can be referenced and be available for validation and annotation, it must first be registered with the XSR. This command performs the first step of the XML schema registration process, by registering the primary XML schema document. The final step of the XML schema registration process requires that the **COMPLETE XMLSCHEMA** command run successfully for the XML schema. Alternatively, if there are no other XML schema documents to be included, issue the **REGISTER XMLSCHEMA** command with the **COMPLETE** keyword to complete registration in one step.
- When registering an XML schema in the database, a larger application heap (**app1heapsz**) may be required depending on the size of the XML schema. The recommended size is 1024 but larger schemas will require additional memory.

## REGISTER XSROBJECT

Registers an XML object in the database catalogs. Supported objects are DTDs and external entities.

### Authorization

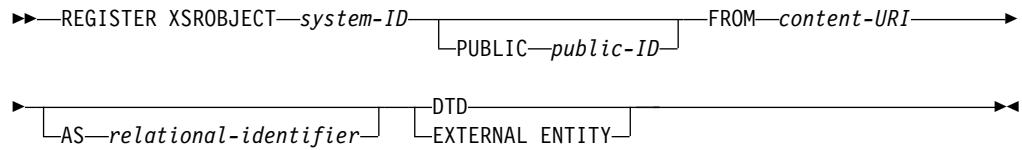
One of the following authorities:

- DBADM
- IMPLICIT\_SCHEMA database authority if the SQL schema does not exist
- CREATEIN privilege if the SQL schema exists

### Required connection

Database

### Command syntax



## Command parameters

### ***system-ID***

Specifies the system ID that is specified in the XML object declaration.

### **PUBLIC *public-ID***

Specifies an optional PUBLIC ID in the XML object declaration.

### **FROM *content-URI***

Specifies the URI where the content of an XML schema document is located. Only a local file specified by a file scheme URI is supported.

### **AS *relational-identifier***

Specifies a name that can be used to refer to the XML object being registered. The relational name can be specified as a two-part SQL identifier consisting of the relational schema and name separated by a period, for example "JOHNDOE.EMPLOYEEDTD". If no relational schema is specified, the default relational schema defined in the special register CURRENT SCHEMA is used. If no name is specified, one is generated automatically.

**DTD** Specifies that the object being registered is a Data Type Definition document (DTD).

### **EXTERNAL ENTITY**

Specifies that the object being registered is an external entity.

## Examples

- Given this sample XML document which references an external entity:

```

<?xml version="1.0" standalone="no" ?>
<!DOCTYPE copyright [
 <!ELEMENT copyright (#PCDATA)>
]>
<copyright>c</copyright>

```

Before this document can be successfully inserted into an XML column, the external entity needs to be registered. The following command registers an entity where the entity content is stored locally in C:\TEMP:

```

REGISTER XSROBJECT 'http://www.xmlwriter.net/copyright.xml'
 FROM 'c:\temp\copyright.xml' EXTERNAL ENTITY

```

- Given this XML document fragment which references a DTD:

```

<!--inform the XML processor
 that an external DTD is referenced-->
<?xml version="1.0" standalone="no" ?>

<!--define the location of the
 external DTD using a relative URL address-->
<!DOCTYPE document SYSTEM "http://www.xmlwriter.net/subjects.dtd">

<document>

```

```

<title>Subjects available in Mechanical Engineering.</title>
<subjectID>2.303</subjectID>
<subjectname>Fluid Mechanics</subjectname>
...

```

Before this document can be successfully inserted into an XML column, the DTD needs to be registered. The following command registers a DTD where the DTD definition is stored locally in C:\TEMP and the relational identifier to be associated with the DTD is "TEST.SUBJECTS":

```
REGISTER XSROBJECT 'http://www.xmlwriter.net/subjects.dtd'
 FROM 'file:///c:/temp/subjects.dtd' AS TEST.SUBJECTS DTD
```

3. Given this sample XML document which references a public external entity:

```

<?xml version="1.0" standalone="no" ?>
<!DOCTYPE copyright [
 <!ELEMENT copyright (#PCDATA)>
]>
<copyright>c</copyright>
```

Before this document can be successfully inserted into an XML column, the public external entity needs to be registered. The following command registers an entity where the entity content is stored locally in C:\TEMP:

```
REGISTER XSROBJECT 'http://www.w3.org/xmlspec/copyright.xml'
 PUBLIC '-//W3C//TEXT copyright//EN' FROM 'file:///c:/temp/copyright.xml'
 EXTERNAL ENTITY
```

## REORG INDEXES/TABLE

Reorganizes an index or a table.

You can reorganize all indexes that are defined on a table by rebuilding the index data into unfragmented, physically contiguous pages. On a data partitioned table, you can reorganize a specific nonpartitioned index on a partitioned table, or you can reorganize all the partitioned indexes on a specific data partition.

If you specify the **CLEANUP** option of the index clause, cleanup is performed without rebuilding the indexes. You can cleanup a specific index on a table, or you can cleanup all of the indexes on the table.

This command cannot be used against indexes on declared temporary tables or created temporary tables (SQLSTATE 42995).

The table option reorganizes a table by reconstructing the rows to eliminate fragmented data, and by compacting information. On a partitioned table, you can reorganize a single partition.

### Scope

This command affects all database partitions in the database partition group.

### Authorization

One of the following authorities:

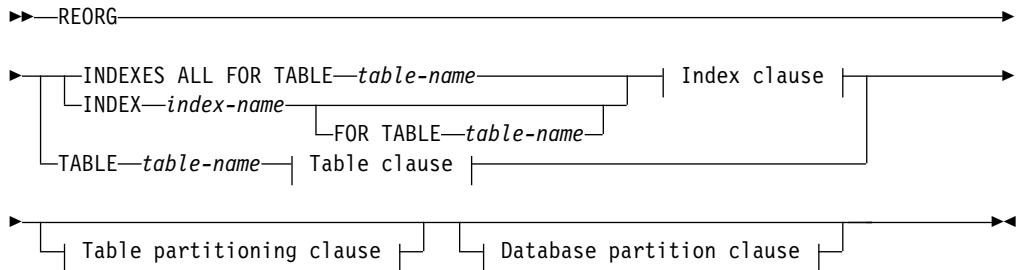
- SYSADM
- SYSCTRL
- SYSMAINT
- DBADM

- SQLADM
- CONTROL privilege on the table.

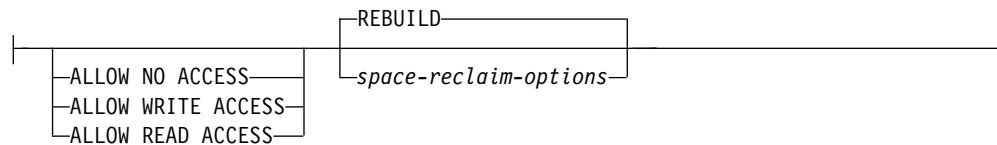
## Required connection

Database

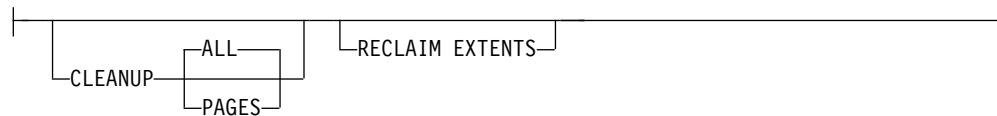
## Command syntax



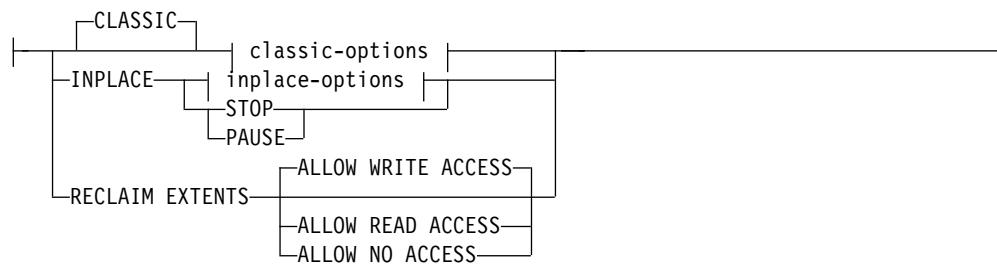
### Index clause:



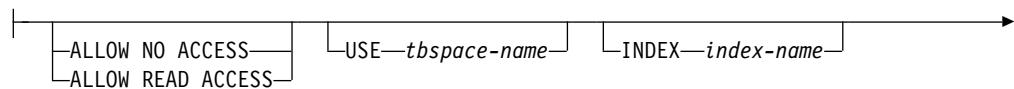
### space-reclaim-options:

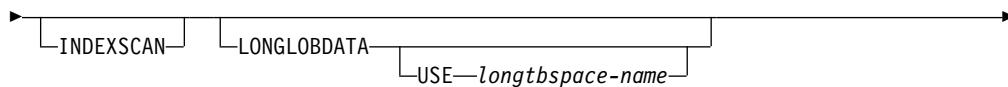


### Table clause:

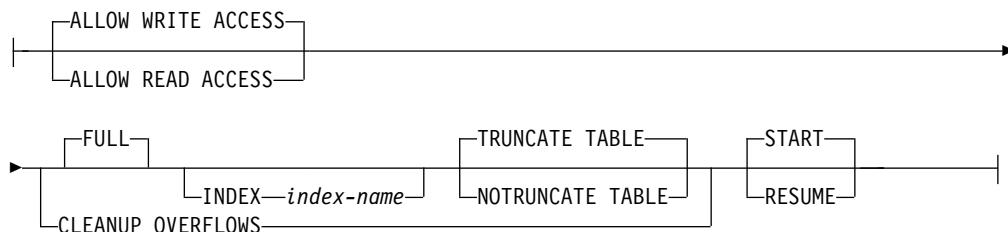


### classic-options:





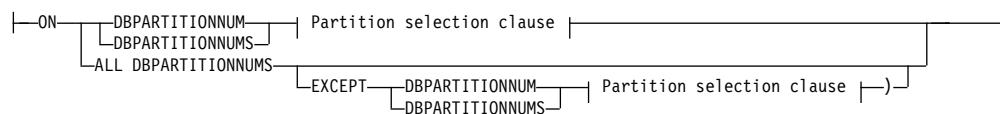
#### **inplace-options:**



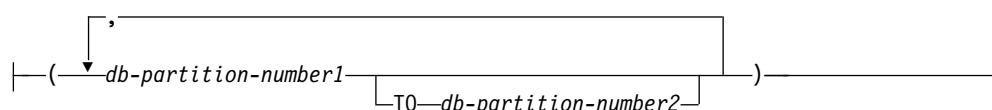
#### **Table partitioning clause:**



#### **Database partition clause:**



#### **Partition selection clause:**



### **Command parameters**

#### **INDEXES ALL FOR TABLE *table-name***

Specifies the table whose indexes are to be reorganized. The table can be in a local or a remote database.

#### **INDEX *index-name***

Specifies an individual index to be reorganized.

Reorganization of individual indexes is supported in the following scenarios:

- Nonpartitioned indexes on a data partitioned table that are not block indexes
- Any index on any permanent table if CLEANUP ALL is specified and RECLAIM EXTENTS is not specified

**FOR TABLE** *table-name*

Specifies the name of the table on which the index *index-name* is created. This parameter is optional, given that index names are unique across the database.

**TABLE** *table-name*

Specifies the table to reorganize. The table can be in a local or a remote database. The name or alias in the form: *schema.table-name* can be used. The *schema* is the user name under which the table was created. If you omit the schema name, the default schema is assumed.

The **RECLAIM EXTENTS** parameter is the only parameter that is supported for column-organized tables.

For typed tables, the specified table name must be the name of the hierarchy's root table.

You cannot specify an index for the reorganization of a multidimensional clustering (MDC) or insert time clustering (ITC) table. Reorganization of tables cannot be used in place for MDC or ITC tables.

When the **ON DATA PARTITION** clause is specified for a table reorganization of a data partitioned table, only the specified data partition is reorganized:

- If there are no nonpartitioned indexes (except system-generated XML path indexes) defined on the table, the access mode applies only to the specified partition. Users are allowed to read from and write to the other partitions of the table.
- If there are nonpartitioned indexes that are defined on the table (excluding system-generated XML path indexes), the **ALLOW NO ACCESS** mode is the default and only supported access mode. In this case, the table is placed in **ALLOW NO ACCESS** mode. If **ALLOW READ ACCESS** is specified, SQL1548N is returned (SQLSTATE 5U047).

*Table 37. Supported access mode for CLASSIC table reorganization on nonpartitioned and partitioned table*

Command	Table type	Table partitioning clause	Supported access mode
<b>REORG TABLE</b>	Nonpartitioned table	Not applicable	<b>ALLOW NO ACCESS</b> , <b>ALLOW READ ACCESS</b> <sup>1</sup>
<b>REORG TABLE</b>	Partitioned table	Not specified	<b>ALLOW NO ACCESS</b> <sup>1</sup>
<b>REORG TABLE</b> (There are no indexes or only partitioned indexes that are defined on the table)	Partitioned table	<b>ON DATA PARTITION</b>	<b>ALLOW NO ACCESS</b> , <b>ALLOW READ ACCESS</b> <sup>1</sup>
<b>REORG TABLE</b> (there are nonpartitioned indexes that are defined on the table, excluding system-generated XML path indexes)	Partitioned table	<b>ON DATA PARTITION</b>	<b>ALLOW NO ACCESS</b> <sup>1</sup>

**Note:**

1. Default mode when an access clause is not specified.

For a data partitioned table, a table reorganization rebuilds the nonpartitioned indexes and partitioned indexes on the table after the table is reorganized. If the **ON DATA PARTITION** clause is used to reorganize a specific data partition of a data partitioned table, a table reorganization rebuilds the nonpartitioned indexes and partitioned indexes only for the specified partition.

## Index clause

### ALLOW NO ACCESS

For **REORG INDEXES**, specifies that no other users can access the table while the indexes are being reorganized. If the **ON DATA PARTITION** clause is specified for a partitioned table, only the specified partition is restricted to the access mode level.

For **REORG INDEX**, specifies that no other users can access the table while the index is being reorganized.

### ALLOW READ ACCESS

For **REORG INDEXES**, specifies that other users can have read-only access to the table while the indexes are being reorganized. **ALLOW READ ACCESS** mode is not supported for **REORG INDEXES** of a partitioned table unless the **CLEANUP** or **RECLAIM EXTENTS** option or the **ON DATA PARTITION** clause is specified. If the **ON DATA PARTITION** clause is specified for a partitioned table, only the specified partition is restricted to the access mode level.

For **REORG INDEX**, specifies that can have read-only access to the table while the index is being reorganized.

### ALLOW WRITE ACCESS

For **REORG INDEXES**, specifies that other users can read from and write to the table while the indexes are being reorganized. **ALLOW WRITE ACCESS** mode is not supported for a partitioned table unless the **CLEANUP** or **RECLAIM EXTENTS** option or the **ON DATA PARTITION** clause is specified. If the **ON DATA PARTITION** clause is specified for a partitioned table, only the specified partition is restricted to the access mode level.

For **REORG INDEX**, specifies that can read from and write to the table while the index is being reorganized.

**ALLOW WRITE ACCESS** mode is not supported for multidimensional clustering (MDC) or insert time clustering (ITC) tables or extended indexes unless the **CLEANUP** or **RECLAIM EXTENTS** option is specified.

The **ALLOW WRITE ACCESS** parameter is not supported for column-organized tables if you specify the **REBUILD** parameter.

The following items apply for a data partitioned table when the **ON DATA PARTITION** clause is specified with the **REORG INDEXES ALL** command:

- Only the specified data partition is restricted to the access mode level. Users are allowed to read from and write to the other partitions of the table while the partitioned indexes of a specified partition are being reorganized.

The following table lists the access modes that are supported and the concurrent access that is allowed on other partitions of the table when the **ON DATA PARTITION** clause is specified:

*Table 38. Access modes supported and concurrent access allowed when the ON DATA PARTITION clause is specified with REORG INDEXES ALL*

Access mode	Concurrent access that is allowed on the specified partition	Concurrent access that is allowed on other partitions
ALLOW NO ACCESS	No access	Read and write access
ALLOW READ ACCESS	Read on the partition up until index is updated	Read and write access

*Table 38. Access modes supported and concurrent access allowed when the ON DATA PARTITION clause is specified with REORG INDEXES ALL (continued)*

Access mode	Concurrent access that is allowed on the specified partition	Concurrent access that is allowed on other partitions
<b>ALLOW WRITE ACCESS</b>	Read and write access on the partition up until index is updated	Read and write access

- Only the partitioned indexes for the specified partition are reorganized. The nonpartitioned indexes on the partitioned table are not reorganized. If there are any nonpartitioned indexes on the table marked "invalid" or "for rebuild", these indexes are rebuilt before reorganization. If not, only the partitioned indexes on the specified partition are reorganized or rebuilt if the index object is marked "invalid" or "for rebuild".
- Only partitioned indexes for the specified partition are cleaned when the **CLEANUP** or **RECLAIM EXTENTS** option is also specified.

The following table lists the supported access modes for index reorganization of partitioned and nonpartitioned tables:

*Table 39. Supported access modes for index reorganization on partitioned and nonpartitioned table*

Command	Table type	Table partitioning clause	Additional parameters that are specified for index clause	Supported access mode
<b>REORG INDEXES</b>	Nonpartitioned table	Not applicable	Any	<b>ALLOW NO ACCESS</b> , <b>ALLOW READ ACCESS</b> <sup>1</sup> , <b>ALLOW WRITE ACCESS</b> <sup>2</sup>
<b>REORG INDEX</b>	Nonpartitioned table	Not applicable	<b>CLEANUP ALL</b>	<b>ALLOW NO ACCESS</b> , <b>ALLOW READ ACCESS</b> <sup>1</sup> , <b>ALLOW WRITE ACCESS</b>
<b>REORG INDEX</b>	Partitioned table	Not applicable	Any	<b>ALLOW NO ACCESS</b> , <b>ALLOW READ ACCESS</b> <sup>1</sup> , <b>ALLOW WRITE ACCESS</b>
<b>REORG INDEX</b>	Partitioned table	With or without the <b>ON DATA PARTITION</b> clause	<b>CLEANUP ALL</b>	<b>ALLOW NO ACCESS</b> , <b>ALLOW READ ACCESS</b> <sup>1</sup> , <b>ALLOW WRITE ACCESS</b>
<b>REORG INDEXES</b>	Partitioned table	None	<b>REBUILD</b> (this is the default if none specified)	<b>ALLOW NO ACCESS</b> <sup>1</sup>
<b>REORG INDEXES</b>	Partitioned table	<b>ON DATA PARTITION</b>	<b>REBUILD</b> (this is the default if none specified)	<b>ALLOW NO ACCESS</b> , <b>ALLOW READ ACCESS</b> <sup>1</sup> , <b>ALLOW WRITE ACCESS</b>
<b>REORG INDEXES</b>	Partitioned table	With or without the <b>ON DATA PARTITION</b> clause	<b>CLEANUP</b> or <b>RECLAIM EXTENTS</b> specified	<b>ALLOW NO ACCESS</b> , <b>ALLOW READ ACCESS</b> <sup>1</sup> , <b>ALLOW WRITE ACCESS</b>

**Note:**

- Default mode when an access clause is not specified.
- ALLOW WRITE ACCESS** is not supported for column-organized tables if you specify the **REBUILD** parameter.

Use the **ALLOW READ ACCESS** or **ALLOW WRITE ACCESS** option to allow other transactions either read-only or read-write access to the table while the indexes are being reorganized. No access to the table is allowed when you rebuild an index during the period in which the reorganized copies of the indexes are made available.

#### **REBUILD**

The REBUILD option is the default and represents the same functionality that is provided by index reorganization in previous releases when the **CLEANUP** and **CONVERT** clauses were not specified. The REBUILD option of index reorganization rebuilds the index data into physically contiguous pages. The default access mode depends on the table type.

### **Space-reclaim-options**

#### **CLEANUP**

When **CLEANUP** is requested, a cleanup rather than a **REBUILD** is done. The indexes are not rebuilt and any pages that are freed up are available for reuse by indexes that are defined on this table only.

**ALL** Specifies that indexes must be cleaned up by removing committed pseudo deleted keys and committed pseudo empty pages.

The **CLEANUP ALL** option frees committed pseudo empty pages, as well as remove committed pseudo deleted keys from pages that are not pseudo empty. This option also attempts to merge adjacent leaf pages if it results in a merged leaf page that has at least PCTFREE free space on the merged leaf page. PCTFREE is the percent free space that is defined for the index at index creation time. The default PCTFREE is 10 percent. If two pages can be merged, one of the pages are freed. The number of pseudo deleted keys in an index, except for the keys on pseudo empty pages, can be determined by running **RUNSTATS** and then selecting the NUMRIDS DELETED from SYSCAT.INDEXES. The **ALL** option cleans the NUMRIDS DELETED and the NUM EMPTY LEAFS if they are determined to be committed.

**PAGES** Specifies that committed pseudo empty pages must be removed from the index tree. This step does not clean up pseudo deleted keys on pages that are not pseudo empty. Since it is checking only the pseudo empty leaf pages, it is considerably faster than using the **ALL** option in most cases.

The **CLEANUP PAGES** option searches for and free committed pseudo empty pages. A committed pseudo empty page is one where all the keys on the page are marked as deleted and all these deletions are known to be committed. The number of pseudo empty pages in an index can be determined by running **RUNSTATS** and looking at the NUM EMPTY LEAFS column in SYSCAT.INDEXES. The **PAGES** option cleans up the NUM EMPTY LEAFS if they are determined to be committed.

#### **RECLAIM EXTENTS**

Specifies the index to reorganize and reclaim extents that are not being used. This action moves index pages around within the index object to create empty extents. Then, this step frees these empty extents from exclusive use by the index object and makes the space available for use by other database objects within the table space. Extents are reclaimed from the index object back to the table space. **ALLOW READ ACCESS** is the default, but all access modes are supported.

## Table clause

### CLASSIC

Reorganizes the table by creating a new copy of the table and then replaces the original table with the reorganized copy. Any indexes on the table are recreated after the replacement. The original table might be available for queries until the replace operation starts, depending on the access clause, described next.

### INPLACE

Reorganizes the table while it permits user access.

INPLACE table reorganization is allowed only on nonpartitioned, non-MDC, and non-ITC tables without extended indexes and with no indexes defined over XML columns in the table. Additionally, for a partitioned table, INPLACE table reorganization is allowed only if there are no nonpartitioned indexes (except system-generated XML path indexes) defined on the table and ON DATA PARTITION is specified. Only one data partition can be reorganized at a time. INPLACE table reorganization can be run only on tables that are at least three pages in size.

Before START can be issued for an INPLACE reorganization on a table, any paused or running in place reorganization must be completed or stopped on that table. For a partitioned table, if there is a paused or running in place reorganization on some partition, then before START can be issued for an INPLACE reorganization on another partition, the paused reorganization must be completed or stopped on that table.

In place table reorganization takes place asynchronously, and might not be effective immediately.

**STOP** Stop the in place **REORG** processing at its current point.

**PAUSE** Suspend or pause in place **REORG** at its current point.

### RECLAIM EXTENTS

Specifies the table to reorganize and reclaim extents that are not being used. The *table-name* variable must specify a multidimensional clustering (MDC), insert time clustering (ITC) table, or column-organized tables. The name or alias in the form: *schema.table-name* can be used. The *schema* is the user name under which the table was created. If you omit the schema name, the default schema is assumed.

For **REORG TABLE RECLAIM EXTENTS** when the **ON DATA PARTITION** clause is specified, the access clause applies only to the named partition. Users can read from and write to the rest of the table while the extents on the specified partition are being reclaimed. This situation also applies to the default access levels.

#### ALLOW NO ACCESS

For **REORG TABLE RECLAIM EXTENTS**, specifies that no other users can access the table while the extents are being reclaimed.

#### ALLOW READ ACCESS

For **REORG TABLE RECLAIM EXTENTS**, specifies that other users can have read-only access to the table while the extents are being reclaimed.

#### ALLOW WRITE ACCESS

For **REORG TABLE RECLAIM EXTENTS**, specifies that other users can read from and write to the table while the extents are being reclaimed. This value is the default option.

## classic options

### ALLOW NO ACCESS

Specifies that no other users can access the table while the table is being reorganized.

The **ALLOW NO ACCESS** mode is the default and only supported access mode when you reorganize a partitioned table without the **ON DATA PARTITION** clause.

If the **ON DATA PARTITION** clause is specified for a data partitioned table, only the specified data partition is reorganized:

- If there are no nonpartitioned indexes that are defined on the table (except system-generated XML path indexes), only the specified partition is restricted to the **ALLOW NO ACCESS** mode. Users are allowed to read from and write to the other partitions of the table.
- If there are nonpartitioned indexes that are defined on the table (except system-generated XML path indexes), the **ALLOW NO ACCESS** mode is the default and only supported access mode. In this case, the table is placed in **ALLOW NO ACCESS** mode.

### ALLOW READ ACCESS

Allow only read access to the table during reorganization.

The **ALLOW READ ACCESS** mode is the default mode for a nonpartitioned table.

If the **ON DATA PARTITION** clause is specified for a data partitioned table, only the specified data partition is reorganized:

- If there are no nonpartitioned indexes that are defined on the table (except system-generated XML path indexes), the **ALLOW READ ACCESS** mode is the default mode. Only the specified partition is restricted to the access mode level. Users are allowed to read from and write to the other partitions of the table.
- If there are nonpartitioned indexes that are defined on the table (except system-generated XML path indexes), the **ALLOW READ ACCESS** mode is not supported. If **ALLOW READ ACCESS** is specified in this case, SQL1548N is returned (SQLSTATE 5U047).

### USE *tbspace-name*

Specifies the name of a system temporary table space in which to store a temporary copy of the table that is reorganized. If you do not provide a table space name, the database manager stores a working copy of the table in the table spaces that contain the table that is reorganized.

For an 8 KB, 16 KB, or 32 KB table object, if the page size of the system temporary table space that you specify does not match the page size of the table spaces in which the table data resides, the Db2 database product will try to find a temporary table space of the correct size of the LONG/LOB objects. Such a table space must exist for the reorganization to succeed.

For partitioned tables, the temporary table space is used as temporary storage for the reorganization of data partitions in the table. Reorganization of the entire partitioned table reorganizes a single data partition at a time. The temporary table space must be able to hold the largest data partition in the table, and not the entire table. When the **ON DATA PARTITION** clause is specified, the temporary table space must be able to hold the specified partition.

If you do not supply a table space name for a partitioned table, the table space where each data partition is located is used for temporary storage of that data partition. There must be enough free space in each data partition's table space to hold a copy of the data partition.

#### **INDEX** *index-name*

Specifies the index to use when you reorganize the table. If you do not specify the fully qualified name in the form: *schema.index-name*, the default schema is assumed. The *schema* is the user name under which the index was created. The database manager uses the index to physically reorder the records in the table it is reorganizing.

For an in place table reorganization, if a clustering index is defined on the table and an index is specified, it must be the clustering index. If the in place option is not specified, any index that is specified is used. If you do not specify the name of an index, the records are reorganized without regard to order. However, if the table has a clustering index defined and no index is specified, then the clustering index is used to cluster the table. You cannot specify an index if you are reorganizing an MDC or ITC table.

If a table reorganization uses both the **INDEX** and **ON DATA PARTITION** clauses, only the specified partition is reorganized by using the index *index-name*.

#### **INDEXSCAN**

For a clustering **REORG**, an index scan is used to reorder table records. Reorganize table rows by accessing the table through an index. The default method is to scan the table and sort the result to reorganize the table by using temporary table spaces as necessary. Even though the index keys are in sort order, scanning and sorting is typically faster than fetching rows by first reading the row identifier from an index.

For tables with extended row size, the default method of scanning and sorting the result to reorganize the table is not supported.

For indexes that are expression-based, the default method of scanning and sorting the result to reorganize the table is not supported.

#### **LONGLOBDATA**

Long field and LOB data are to be reorganized.

This step is not required even if the table contains long or LOB columns. The default is to avoid reorganizing these objects because it is time consuming and does not improve clustering. However, running a reorganization with the **LONGLOBDATA** option on tables with XML columns reclaim unused space and reduce the size of the XML storage object.

This parameter is required when you convert existing LOB data into inlined LOB data.

For tables with extended row size, the first offline REORG after a table is altered enforces LONGLOBDATA.

#### **USE** *longtbspace-name*

This parameter is optional and can be used to specify the name of a temporary table space to be used for rebuilding long data. If no temporary table space is specified for either the table object or for the long objects, the objects are constructed in the table space they currently reside. If a temporary table space is specified for the table but this parameter is not specified, then the table space that is used for base reorg data is used,

However, if the page sizes differ, the Db2 database system attempts to choose a temporary container of the appropriate page size to create the long objects in.

If **USE longtbspace-name** is specified, **USE tbspace-name** must also be specified. If it is not, the **longtbspace-name** argument is ignored.

#### **KEEPDICTIONARY**

If the **COMPRESS** attribute for the table is YES and the table has a compression dictionary then no new dictionary is built. All the rows that are processed during reorganization are subject to compression by using the existing dictionary. If the **COMPRESS** attribute is YES and a compression dictionary does not exist for the table, a dictionary is created (and the table compressed) in this scenario only if the table is of a certain size (approximately 1 - 2 MB) and sufficient data exists within this table. If, instead, you explicitly state **REORG RESETDICTIONARY**, then a dictionary is built as long as there is at least one row in the table. If the **COMPRESS** attribute for the table is NO and the table has a compression dictionary, then reorg processing preserves the dictionary. All the rows in the newly reorganized table are in non-compressed format. It is not possible to compress some data such as LOB data not stored in the base table row.

When the **LONGLOBDATA** option is not specified, only the table row data is reorganized. The following table describes the behavior of **KEEPDICTIONARY** syntax in **REORG** command when the **LONGLOBDATA** option is not specified.

*Table 40. REORG KEEPDICTIONARY*

Compress	Dictionary Exists	Result; outcome
Y	Y	Preserve dictionary; rows compressed.
Y	N	Build dictionary; rows compressed
N	Y	Preserve dictionary; all rows uncompressed
N	N	No effect; all rows uncompressed

The following table describes the behavior of **KEEPDICTIONARY** syntax in **REORG** command when the **LONGLOBDATA** option is specified.

*Table 41. REORG KEEPDICTIONARY when LONGLOBDATA option is specified.*

Compress	Table row data dictionary exists	XML storage object dictionary exists <sup>1</sup>	Compression dictionary	Data compression
Y	Y	Y	Preserve dictionaries.	Existing data is compressed. New data will be compressed.
Y	Y	N	Preserve table row dictionary and create an XML storage object dictionary.	Existing data is compressed. New data will be compressed.
Y	N	Y	Create table row dictionary and preserve the XML dictionary.	Existing data is compressed. New data will be compressed.
Y	N	N	Create table row and XML dictionaries.	Existing data is compressed. New data will be compressed.

*Table 41. REORG KEEPDICTIONARY when LONGLOBDATA option is specified. (continued)*

Compress	Table row data dictionary exists	XML storage object dictionary exists <sup>1</sup>	Compression dictionary	Data compression
N	Y	Y	Preserve table row and XML dictionaries.	Table data is uncompressed. New data will be not be compressed.
N	Y	N	Preserve table row dictionary.	Table data is uncompressed. New data will be not be compressed.
N	N	Y	Preserve XML dictionary.	Table data is uncompressed. New data will be not be compressed.
N	N	N	No effect.	Table data is uncompressed. New data will be not be compressed.

**Note:**

1. A compression dictionary can be created for the XML storage object of a table only if the XML columns are added to the table in Db2 V9.7 or later, or if the table is migrated by using the ADMIN\_MOVE\_TABLE stored procedure.

For any reinitialization or truncation of a table (such as for a replace operation), if the compress attribute for the table is NO, the dictionary is discarded if one exists. Conversely, if a dictionary exists and the compress attribute for the table is YES then a truncation saves the dictionary and not discard it. The dictionary is logged in its entirety for recovery purposes and for future support with data capture changes (that is, replication).

#### **RESETDICTIONARY**

If the COMPRESS attribute for the table is YES then a new row compression dictionary is built. All the rows that are processed during reorganization are subject to compression by using this new dictionary. This dictionary replaces any previous dictionary. If the COMPRESS attribute for the table is NO and the table does have an existing compression dictionary then reorg processing removes the dictionary and all rows in the newly reorganized table will be in noncompressed format. It is not possible to compress some data such as LOB data not stored in the base table row.

If the **LONGLOBDATA** option is not specified, only the table row data is reorganized. The following table describes the behavior of **RESETDICTIONARY** syntax in **REORG** command when the **LONGLOBDATA** option is not specified.

Table 42. REORG RESETDICTIONARY

Compress	Dictionary Exists	Result; outcome
Y	Y	Build new dictionary*; rows compressed. If DATA CAPTURE CHANGES option is specified on the CREATE TABLE or ALTER TABLE statements, the current dictionary is kept (referred to as the <i>historical compression dictionary</i> ).
Y	N	Build new dictionary; rows compressed
N	Y	Remove dictionary; all rows uncompressed. If the DATA CAPTURE NONE option is specified on the CREATE TABLE or ALTER TABLE statements, the <i>historical compression dictionary</i> is also removed for the specified table.
N	N	No effect; all rows uncompressed

\* If a dictionary exists and the compression attribute is enabled but there currently isn't any data in the table, the **RESETDICTIONARY** operation keeps the existing dictionary. Rows that are smaller in size than the internal minimum record length and rows that do not demonstrate a savings in record length when an attempt is made to compress them are considered "insufficient" in this case.

The following table describes the behavior of **RESETDICTIONARY** syntax in **REORG** command when the **LONGLOBDATA** option is specified.

Table 43. REORG RESETDICTIONARY when LONGLOBDATA option is specified.

Compress	Table row data dictionary exists	XML storage object dictionary exists <sup>1</sup>	Data dictionary	Data compression
Y	Y	Y	Build dictionaries <sup>2 3</sup> .	Existing data is compressed. New data will be compressed.
Y	Y	N	Build new table row dictionary and create a new XML dictionary <sup>3</sup> .	Existing data is compressed. New data will be compressed.
Y	N	Y	Create table row data dictionary and build a new XML dictionary.	Existing data is compressed. New data will be compressed.
Y	N	N	Create dictionaries.	Existing data is compressed. New data will be compressed.
N	Y	Y	Remove dictionaries. Existing and new data is not compressed.	Existing table data is uncompressed. New data will be not be compressed.
N	Y	N	Remove table row dictionary. All data is uncompressed.	Existing table data is uncompressed. New data will be not be compressed.

*Table 43. REORG RESETDICTIONARY when LONGLOBDATA option is specified. (continued)*

Compress	Table row data dictionary exists	XML storage object dictionary exists <sup>1</sup>	Data dictionary	Data compression
N	N	Y	Remove XML storage object dictionary.	Existing table data is uncompressed. New data will not be compressed.
N	N	N	No effect.	Existing table data is uncompressed. New data will not be compressed.

**Note:**

1. A compression dictionary can be created for the XML storage object of a table only if the XML columns are added to the table in Db2 V9.7 or later, or if the table is migrated by using an online table move.
2. If a dictionary exists and the compression attribute is enabled but there currently isn't any data in the table, the **RESETDICTIONARY** operation keeps the existing dictionary. Rows that are smaller in size than the internal minimum record length and rows that do not demonstrate a savings in record length when an attempt is made to compress them are considered insufficient in this case.
3. If DATA CAPTURE CHANGES option is specified on the CREATE TABLE or ALTER TABLE statements, the current data dictionary is kept (referred to as the *historical compression dictionary*).

## inplace-options

### ALLOW READ ACCESS

Allow only read access to the table during reorganization.

### ALLOW WRITE ACCESS

Allow write access to the table during reorganization. This is the default behavior.

### FULL

The table is reorganized to fill pages while respecting PCTFREE for the table. Optionally, when the INDEX clause is specified, row data is moved within the table to recluster the data. Overflow records are also converted to normal records as part of this process. This behavior is the default behavior.

### INDEX *index-name*

Specifies the index to use when you reorganize the table. If you do not specify the fully qualified name in the form: *schema.index-name*, the default schema is assumed. The *schema* is the user name under which the index was created. The database manager uses the index to physically reorder the records in the table it is reorganizing.

For an in place table reorganization, if a clustering index is defined on the table and an index is specified, it must be the clustering index. If the in place option is not specified, any index that is specified is used. If you do not specify the name of an index, the records are reorganized without regard to order. However, if the table has a clustering index defined and

no index is specified, then the clustering index is used to cluster the table. You cannot specify an index if you are reorganizing an MDC or ITC table.

If a table reorganization uses both the **INDEX** and **ON DATA PARTITION** clauses, only the specified partition is reorganized by using the index *index-name*.

#### **TRUNCATE TABLE**

Reclaim all extents that are empty at the end of the table and return them to the table space. Space reclamation is run at the end of the in place reorganization. During truncation, the table is S-locked, preventing updates to the table. Updates are not possible even if ALLOW WRITE ACCESS is specified. This behavior is the default behavior.

#### **NOTRUNCATE TABLE**

This operation allows for write access through the entire reorganization when ALLOW WRITE ACCESS is specified. There is no attempt to reclaim space that is used by the table. Do not truncate the table after in place reorganization. During truncation, the table is S-locked.

**START** Start the in place **REORG** processing. Because this option is the default, this keyword is optional.

**RESUME** Continue or resume a previously paused in place table reorganization. When an online reorganization is resumed and you want the same options as when the reorganization was paused, you must specify those options again when you resume.

#### **CLEANUP OVERFLOWS**

An INPLACE CLEANUP OVERFLOWS reorganization traverses the table and searches for pointer or overflow records. Any record found is converted to a normal record by the operation. This operation improves performance for tables that have a significant number of pointer or overflow records. The operation does not result in a reduction of the size of the table.

### **Table partitioning clause**

#### **ON DATA PARTITION *partition-name***

For data partitioned tables, specifies the data partition for the reorganization.

For Db2 V9.7 Fix Pack 1 and later releases, the clause can be used with the **REORG INDEXES ALL** command to reorganize the partitioned indexes on a specific partition and the **REORG TABLE** command to reorganize data of a specific partition.

When you use the clause with a **REORG TABLE** or **REORG INDEXES ALL** command on a partitioned table, the reorganization fails and returns SQL2222N with reason code 1 if the partition *partition-name* does not exist for the specified table. The reorganization fails and returns SQL2222N with reason code 3 if the partition *partition-name* is in the attached or detached state.

If the **REORG INDEX** command is run with the **ON DATA PARTITION** clause for a nonpartitioned index, the reorganization fails and returns SQL2222N with reason code 2. If the **REORG INDEX** command is run for a nonpartitioned index without the **CLEANUP ALL** clause, or if the **RECLAIM** clause is also specified, then the reorganization fails and returns SQL0270N with reason code 89.

The **REORG TABLE** command fails and returns SQL1549N (SQLSTATE 5U047) if the partitioned table is in the reorg pending state and there are nonpartitioned indexes that are defined on the table.

## Database partition

### ON DBPARTITIONNUM | ON DBPARTITIONNUMS

Perform operation on a set of database partitions.

### ALL DBPARTITIONNUMS

Specifies that operation is to be done on all database partitions that are specified in the db2nodes.cfg file. This option is the default if a database partition clause is not specified.

**EXCEPT** Specifies that operation is to be done on all database partitions that are specified in the db2nodes.cfg file, except those partitions specified in the database partition list.

## Partition selection clause

### *db-partition-number1*

Specifies a database partition number in the database partition list.

### *db-partition-number2*

Specifies the second database partition number so that all database partitions from *db-partition-number1* up to and including *db-partition-number2* are included in the database partition list.

## Examples

To reorganize a table to reclaim space and use the temporary table space mytemp1, enter the following command:

```
db2 reorg table homer.employee use mytemp1
```

To reorganize tables in a partition group that consists of database partitions 1, 2, 3, and 4 of a four-partition system, you can enter either of the following commands:

```
db2 reorg table employee index empid on dbpartitionnum (1,3,4)
```

```
db2 reorg table homer.employee index homer.empid on all
dbpartitionnums except dbpartitionnum (2)
```

To clean up the pseudo deleted keys and pseudo empty pages in all the indexes on the EMPLOYEE table while you allow other transactions to read and update the table, enter:

```
db2 reorg indexes all for table homer.employee allow write
access cleanup
```

To clean up the pseudo empty pages in all the indexes on the EMPLOYEE table while you allow other transactions to read and update the table, enter:

```
db2 reorg indexes all for table homer.employee allow write
access cleanup pages
```

To reorganize the EMPLOYEE table by using the system temporary table space TEMPSPACE1 as a work area, enter:

```
db2 reorg table homer.employee use tempspace1
```

To start, pause, and resume an in place reorg of the EMPLOYEE table with the default schema HOMER, which is specified explicitly in previous examples, enter the following commands:

```
db2 reorg table employee index empid inplace start
db2 reorg table employee inplace pause
db2 reorg table homer.employee inplace allow read access
nottruncate table resume
```

The command to resume the reorg contains extra keywords to specify read access only and to skip the truncation step, which share-locks the table.

To clean up the pseudo-deleted keys and pseudo-empty pages in index EMPID on data partition PART1 of the data partitioned EMPLOYEE table, while allowing other transactions to read and update the table, enter:

```
db2 reorg index EMPID on table HOMER.EMPLOYEE
cleanup only all on data partition PART1
```

## Usage notes

Restrictions:

- The **REORG** utility does not support the use of nicknames.
- The **REORG TABLE** command is not supported for declared temporary tables or created temporary tables.
- The **REORG TABLE** command cannot be used on views.
- Reorganization of a table is not compatible with range-clustered tables because the range area of the table always remains clustered.
- **REORG TABLE** cannot be used on a partitioned table in a DMS table space while an online backup of ANY table space in which the table resides, including LOBs and indexes, is being performed.
- **REORG TABLE** cannot use an index that is based on an index extension.
- If a table is in reorg pending state, an in-place reorg is not allowed on the table.
- Concurrent table reorganization that share temporary DMS table space is not supported.
- If a table has an index with an expression-based key that is defined on it, in-place table reorganization is not supported.
- Before you run a reorganization operation against a table to which event monitors write, you need to deactivate the event monitors on that table.
- For data partitioned tables:
  - The table must have an ACCESS\_MODE in SYSCAT.TABLES of Full Access.
  - Reorganization skips data partitions that are in a restricted state due to an attach or detach operation. If the **ON DATA PARTITION** clause is specified, that partition must be fully accessible.
  - If an error occurs during table reorganization, some indexes or index partitions might be left invalid. The nonpartitioned indexes of the table is marked invalid if the reorganization has reached or passed the replace phase for the first data partition. The index partitions for any data partition that has already reached or passed the replace phase is marked invalid. Indexes will be rebuilt on the next access to the table or data partition.
  - If an error occurs during index reorganization when the **ALLOW NO ACCESS** mode is used, some indexes on the table might be left invalid. For nonpartitioned RID indexes on the table, only the index that is being reorganized at the time of the failure is left invalid. For MDC tables with nonpartitioned block indexes, one or more of the block indexes might be left

invalid if an error occurs. For MDC or ITC tables with partitioned indexes, only the index object on the data partition that is reorganized is left invalid. Any indexes marked invalid will be rebuilt on the next access to the table or data partition.

- When a data partitioned table with only partitioned indexes that are defined on the table is in the reorg pending state, issuing a **REORG TABLE** command with the **ON DATA PARTITION** clause brings only the specified data partition out of the reorg pending state. To bring the remaining partitions of the table out of the reorg pending state, either issue **REORG TABLE** command on the entire table (without the **ON DATA PARTITION** clause). You can also issue a **REORG TABLE** command with the **ON DATA PARTITION** clause for each of the remaining partitions.

Information about the current progress of table reorganization is written to the history file for database activity. The history file contains a record for each reorganization event. To view this file, execute the **LIST HISTORY** command for the database that contains the table you are reorganizing.

You can also use table snapshots to monitor the progress of table reorganization. Table reorganization monitoring data is recorded regardless of the Database Monitor Table Switch setting.

If an error occurs, an SQLCA dump is written to the history file. For an in-place table reorganization, the status is recorded as PAUSED.

When you modify an index table too many times, the data in the indexes might become fragmented. If the table is clustered with respect to an index, the table and index can get out of cluster order. Both of these factors can adversely affect the performance of scans that use the index, and can impact the effectiveness of index page prefetching. **REORG INDEX** or **REORG INDEXES** with the REBUILD option can be used to reorganize one or all of the indexes on a table. Index reorganization rebuild removes any fragmentation and restore physical clustering to the leaf pages. Use the **REORGCHK** command to help determine whether an index needs reorganizing. Be sure to complete all database operations and release all locks before you invoke index reorganization. This step can be done by issuing a COMMIT after you close all cursors opened WITH HOLD, or by issuing a ROLLBACK.

A classic table reorganization (offline reorganization) rebuilds the indexes during the last phase of the reorganization. When more than one temporary table space exists, it is possible that a temporary table space in addition to the one specified on the **REORG TABLE** command can be utilized for additional sorts that can accompany the table reorg process. However, the in-place table reorganization (online reorganization) does not rebuild the indexes. It is recommended that you issue a **REORG INDEXES** command after the completion of an in-place table reorganization. An in-place table reorganization is asynchronous. Therefore, care must be taken to ensure that the in-place table reorganization is complete before you issue the **REORG INDEXES** command. Issuing the **REORG INDEXES** command before the in-place table reorganization is complete, might cause the reorganization to fail (SQLCODE -2219).

When the REORG rebuilds the indexes on an MDC table, the **Full\_Block** hint bits are not set. Because the **Full\_Block** hint is not set, you might experience degraded insert performance if you insert rows from existing dimension values after the REORG completes and the DB2\_TRUST\_MDC\_BLOCK\_FULL\_HINT registry variable is turned on. The insert performance automatically improves for each

dimension value after an insert of that dimension value completes. For more information, see, DB2\_TRUST\_MDC\_BLOCK\_FULL\_HINT performance variable.

Tables that are modified so many times that data is fragmented and access performance is noticeably slow are candidates for the **REORG TABLE** command. You must also invoke this utility after you alter the inline length of a structured type column in order to benefit from the altered inline length. Use the **REORGCHK** command to determine whether a table needs reorganizing. Be sure to complete all database operations and release all locks before you invoke **REORG TABLE**. This step can be done by issuing a COMMIT after you close all cursors opened WITH HOLD, or by issuing a ROLLBACK. After you reorganize a table, use **RUNSTATS** to update the table statistics, and **REBIND** to rebinding the packages that use this table. The reorganize utility implicitly closes all the cursors.

With Db2 V9.7 Fix Pack 1 and later, **REORG TABLE** commands that use the CLASSIC option and **REORG INDEXES ALL** commands can be issued on a data partitioned table to concurrently reorganize different data partitions or partitioned indexes on a partition. When concurrently reorganizing data partitions or the partitioned indexes on a partition, users can access the unaffected partitions but cannot access the affected partitions. All the following criteria must be met to issue **REORG** commands that operate concurrently on the same table:

- Each **REORG** command must specify a different partition with the **ON DATA PARTITION** clause.
- Each **REORG** command must use the **ALLOW NO ACCESS** mode restrict access to the data partitions.
- The partitioned table must have only partitioned indexes if you issue **REORG TABLE** commands. No nonpartitioned indexes (except system-generated XML path indexes) can be defined on the table.

For a partitioned table T1 with no nonpartitioned indexes (except system-generated XML path indexes) and with partitions P1, P2, P3, and P4, the following REORG commands can run concurrently:

```
REORG INDEXES ALL FOR TABLE T1 ALLOW NO ACCESS ON DATA PARTITION P1
REORG TABLE T1 ALLOW NO ACCESS ON DATA PARTITION P2
REORG INDEXES ALL FOR TABLE T1 ALLOW NO ACCESS ON DATA PARTITION P3
```

Operations such as the following are not supported when you use concurrent **REORG** commands:

- Using a **REORG** command without the **ON DATA PARTITION** clause on the table.
- Using an ALTER TABLE statement on the table to add, attach, or detach a data partition.
- Loading data into the table.
- Performing an online backup that includes the table.

If the table contains mixed row format because the table value compression is activated or deactivated, an offline table reorganization can convert all the existing rows into the target row format.

If the table is distributed across several database partitions, and the table or index reorganization fails on any of the affected database partitions, only the failing database partitions have the table or index reorganization rolled back.

If the reorganization is not successful, temporary files must not be deleted. The database manager uses these files to recover the database.

If the name of an index is specified, the database manager reorganizes the data according to the order in the index. To maximize performance, specify an index that is often used in SQL queries. If the name of an index is *not* specified, and if a clustering index exists, the data is ordered according to the clustering index.

The PCTFREE value of a table determines the amount of free space that is designated per page. If the value is not set, the utility fills up as much space as possible on each page.

To complete a table space rollforward recovery after a table reorganization, both regular and large table spaces must be enabled for rollforward recovery.

If the table contains LOB columns that do not use the **COMPACT** option, the LOB DATA storage object can be significantly larger following table reorganization. This step can be a result of the order in which the rows were reorganized, and the types of table spaces used (SMS or DMS).

Indexes over XML data might be recreated by the **REORG INDEXES/TABLE** command. For more information, see Recreation of indexes over XML data.

An in-place **REORG** operation might not be able to fully reclaim space in a table because it cannot move internal records.

An index is used internally to track pages within column-organized tables, and a modification state index might be created during index scans on these tables. Part of space management for column-organized tables is managing the space that is used by indexes, including the page map and modification state indexes.

Reorganizing the table generates pseudo-deleted keys in the page map indexes. Update operations result in pseudo-deleted keys in the modification state index. Update and delete operations result in pseudo-deleted keys in regular indexes. Consider running a **REORG INDEXES** command, specifying the **CLEANUP** and **RECLAIM EXTENTS** parameters, or a **REORG INDEXES** command with the **CLEANUP** parameter, to clean up pseudo-deleted keys. Automatic table maintenance, if enabled, manages the cleanup and space reclamation process for indexes.

## **REORGCHK**

Provides table or index statistics that indicate whether reorganization might be required.

### **Scope**

This command can be issued from any database partition in the db2nodes.cfg file. It can be used to update table and index statistics in the catalogs.

### **Authorization**

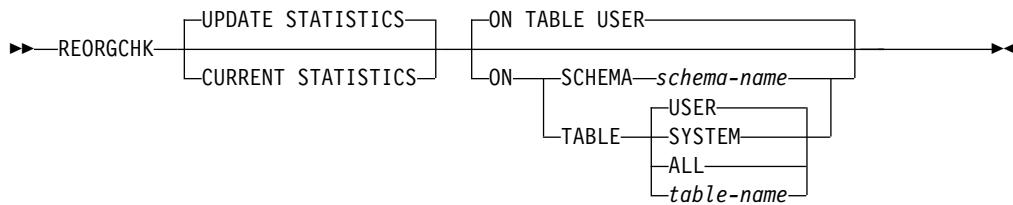
One of the following authorities:

- SYSADM or DBADM authority
- CONTROL privilege on the table.

### **Required connection**

Database

## Command syntax



## Command parameters

### UPDATE STATISTICS

Calls the **RUNSTATS** routine to update table and index statistics, and then uses the updated statistics to determine if table or index reorganization is required.

If a portion of the table resides on the database partition where **REORGCHK** has been issued, the utility executes on this database partition. If the table does not exist on this database partition, the request is sent to the first database partition in the database partition group that holds a portion of the table. **RUNSTATS** then executes on this database partition.

### CURRENT STATISTICS

Uses the current table statistics to determine if table reorganization may be required.

### ON SCHEMA *schema-name*

Checks all the tables created under the specified schema.

### ON TABLE

**USER** Checks the tables that are owned by the run time authorization ID.

**SYSTEM** Checks the system tables.

**ALL** Checks all user and system tables.

### *table-name*

Specifies the table to check. The name or alias in the form: *schema.table-name* can be used. The *schema* is the user name under which the table was created. If you omit the schema name, the current schema is assumed. If the table specified is a system catalog table, the *schema* is SYSIBM. For typed tables, the specified table name must be the name of the hierarchy's root table.

## Examples

Issue the following command against the SAMPLE database:

```
db2 reorgchk update statistics on table system
```

In the resulting output, the terms for the table statistics (formulas 1-3) mean:

### CARD

(CARDINALITY) Number of rows in base table.

**OV** (OVERFLOW) Number of overflow rows.

**NP** (NPAGES) Number of pages that contain data.

**FP** (FPAGES) Total number of pages.

**ACTBLK**

Total number of active blocks for a multidimensional clustering (MDC) or insert time clustering (ITC) table. This field is only applicable to tables defined using the ORGANIZE BY clause. It indicates the number of blocks of the table that contain data.

**TSIZE** Table size in bytes. Calculated as the product of the number of rows in the table (CARD) and the average row length. For long fields and LOBs only the approximate length of the descriptor is used. The actual long field or LOB data is not counted in TSIZE.

**TABLEPAGESIZE**

Page size of the table space in which the table data resides.

**NPARTITIONS**

Number of partitions if this is a partitioned table, otherwise 1.

**F1** Results of Formula 1.

**F2** Results of Formula 2.

**F3** Results of Formula 3. This formula indicates the amount of space that is wasted in a table. This is measured in terms of the number of empty pages and the number of pages that include data that exists in the pages of a table. In multidimensional clustering (MDC) or insert time clustering (ITC) tables, the number of empty blocks and the number of blocks that include data is measured.

**REORG**

Each hyphen (-) displayed in this column indicates that the calculated results were within the set bounds of the corresponding formula, and each asterisk (\*) indicates that the calculated results exceeded the set bounds of its corresponding formula.

- - or \* on the left side of the column corresponds to F1 (Formula 1)
- - or \* in the middle of the column corresponds to F2 (Formula 2)
- - or \* on the right side of the column corresponds to F3 (Formula 3).

Table reorganization is suggested when the results of the calculations exceed the bounds set by the formula.

For example, --- indicates that, since the formula results of F1, F2, and F3 are within the set bounds of the formula, no table reorganization is suggested. The notation \*\*-- indicates that you can investigate whether the conditions represented by F1 and F3 are affecting your workloads. If the conditions represented by F1 and F3 are affecting your workload, you might consider doing a table reorganization. The notation \*--- indicates that F1 is the only formula that is exceeding its bounds.

The table name is truncated to 30 characters, and the ">" symbol in the thirty-first column represents the truncated portion of the table name. An "\*" suffix to a table name indicates it is an MDC or ITC table. An "\*" suffix to an index name indicates it is an MDC or ITC dimension index.

The terms for the index statistics (formulas 4-8) mean:

**INDCARD**

(INDEX CARDINALITY) Number of index entries in the index. This could be different than table cardinality for some indexes. For example, for indexes on XML columns the index cardinality is likely greater than the table cardinality.

<b>LEAF</b>	Total number of index leaf pages (NLEAF). Depending on whether the index is partitioned, this value comes from the NLEAF column of SYSCAT.INDEXES or SYSCAT.SYSINDEXPARTITIONS.
<b>ELEAF</b>	<p>Number of pseudo empty index leaf pages (NUM_EMPTY_LEAFS)</p> <p>A pseudo empty index page is a page on which all the RIDs are marked as deleted, but have not been physically removed.</p>
<b>NDEL</b>	Number of pseudo deleted RIDs (NUMRIDS_DELETED)
	A pseudo deleted RID is a RID that is marked deleted. This statistic reports pseudo deleter RIDs on leaf pages that are not pseudo empty. It does not include RIDs marked as deleted on leaf pages where all the RIDs are marked deleted.
<b>KEYS</b>	Number of unique index entries that are not marked deleted (FULLKEYCARD)
<b>LEAF_RECSIZE</b>	Record size of the index entry on a leaf page. This is the average size of the index entry excluding any overhead and is calculated from the average column length of all columns participating in the index.
<b>NLEAF_RECsize</b>	Record size of the index entry on a non-leaf page. This is the average size of the index entry excluding any overhead and is calculated from the average column length of all columns participating in the index except any INCLUDE columns.
<b>LEAF_PAGE_OVERHEAD</b>	Reserved space on the index leaf page for internal use.
<b>NLEAF_PAGE_OVERHEAD</b>	Reserved space on the index non-leaf page for internal use.
<b>INDEXPAGESIZE</b>	Page size of the table space in which the index resides, specified at the time of index or table creation. If not specified, INDEXPAGESIZE has the same value as TABLEPAGESIZE.
<b>LVLS</b>	Number of index levels (NLEVELS)
<b>PCTFREE</b>	Specifies the percentage of each index page to leave as free space, a value that is assigned when defining the index. Values can range from 0 to 99. The default value is 10.
<b>LEAF_RECsize_OVERHEAD</b>	Index record overhead on a leaf page. For indexes on tables in LARGE table spaces the overhead is 11 for partitioned tables and 9 for other tables. For indexes on tables in REGULAR table spaces these values are 9 for partitioned tables and 7 for others. The only exception to these rules are XML paths and XML regions indexes where the overhead is always 9. This information is also available in the following table for easy reference.
<b>NLEAF_RECsize_OVERHEAD</b>	Index record overhead on a non-leaf page. For indexes on tables in LARGE table spaces the overhead is 14 for partitioned tables and 12 for other tables. For indexes on tables in REGULAR table spaces these values are 12 for partitioned tables and 10 for others. The only exception to these rules

are XML paths and XML regions indexes where the overhead is always 12. This information is also available in the following table for easy reference.

#### DUPKEYSIZE

Size of duplicate keys on index leaf pages. For indexes on tables in LARGE table spaces the DUPKEYSIZE is 9 for partitioned tables and 7 for other tables. For indexes on tables in REGULAR table spaces these values are 7 for partitioned tables and 5 for others. The only exception to these rules are XML paths and XML regions indexes where the DUPKEYSIZE is always 7. This information is also available in the following table for easy reference.

*Table 44. LEAF\_RECSIZE\_OVERHEAD, NLEAF\_RECSIZE\_OVERHEAD, and DUPKEYSIZE values are a function of index type, table partitioning, and table space type (REGULAR table space)*

Variable	Regular Table (XML paths or regions index)	Regular Table (All other indexes)	Partitioned Table (All indexes)
LEAF_RECSIZE_OVERHEAD	9	7	9
NLEAF_RECSIZE_OVERHEAD	12	10	12
DUPKEYSIZE	7	5	7

*Table 45. LEAF\_RECSIZE\_OVERHEAD, NLEAF\_RECSIZE\_OVERHEAD, and DUPKEYSIZE values are a function of index type, table partitioning, and table space type (LARGE table space\*\*)*

Variable	Regular Table (XML paths or regions index)	Regular Table (All other indexes)	Partitioned Table (All indexes)
LEAF_RECSIZE_OVERHEAD	9	9	11
NLEAF_RECSIZE_OVERHEAD	12	12	14
DUPKEYSIZE	7	7	9

\*\* For indexes on tables in large table spaces the indexes will be assumed to have large RIDs. This may cause some of the formulas to give inaccurate results if the table space of the table was converted to large but the indexes have not yet been recreated or reorganized.

**F4** Results of Formula 4.

**F5** Results of Formula 5. The notation +++ indicates that the result exceeds 999, and is invalid. Rerun **REORGCHK** with the **UPDATE STATISTICS** option, or issue **RUNSTATS**, followed by the **REORGCHK** command.

**Note:** This formula is not supported when LEAF < 2.

**F6** Results of Formula 6. The notation +++ indicates that the result exceeds 999, and might be invalid. Rerun **REORGCHK** with the **UPDATE STATISTICS** option, or issue **RUNSTATS**, followed by the **REORGCHK** command. If the statistics are current and valid, you should reorganize.

**Note:** This formula is not supported when NLEVELS < 3.

**F7** Results of Formula 7.

**F8** Results of Formula 8.

#### REORG

Each hyphen (-) displayed in this column indicates that the calculated results were within the set bounds of the corresponding formula, and each asterisk (\*) indicates that the calculated result exceeded the set bounds of its corresponding formula.

- - or \* on the left column corresponds to F4 (Formula 4)
- - or \* in the second from left column corresponds to F5 (Formula 5)
- - or \* in the middle column corresponds to F6 (Formula 6).
- - or \* in the second column from the right corresponds to F7 (Formula 7)
- - or \* on the right column corresponds to F8 (Formula 8).

Index reorganization advice is as follows:

- If the results of the calculations for Formula 1, 2 and 3 do not exceed the bounds set by the formula and the results of the calculations for Formula 4, 5 or 6 do exceed the bounds set, then index reorganization is recommended.
- If only the results of the calculations Formula 7 exceed the bounds set, but the results of Formula 1, 2, 3, 4, 5 and 6 are within the set bounds, then cleanup of the indexes using the **CLEANUP** option of index reorganization is recommended.
- If the only calculation result to exceed the set bounds is that of Formula 8, then a cleanup of the pseudo empty pages of the indexes using the **CLEANUP PAGES** option of index reorganization is recommended.
- The RECLAIMABLE\_SPACE column in the **admin\_get\_tab\_info** and **admin\_get\_index\_info** functions show the amount of reclaimable space, in kilobytes, for tables and indexes. You can use this value to determine when to run a reorganization with the RECLAIM EXTENTS option. For more details on RECLAIMABLE\_SPACE, and how to evaluate the effectiveness of space reclaim, see the related links.

On a partitioned table the results for formulas (5 to 8) can be misleading depending on when the statistics are collected. When data partitions are detached, the index keys for the detached partition are not cleaned up immediately. Instead, the cleanup is deferred and eventually the keys are removed by index cleaners which operate asynchronously in the background (this is known as Asynchronous Index Cleanup or AIC). While the index keys pending cleanup exist in the index, they will not be counted as part of the keys in the statistics because they are invisible and no longer part of the table. As a result, statistics collected before asynchronous index cleanup is run will be misleading. If the **REORGCHK** command is issued before asynchronous index cleanup completes, it will likely generate a false alarm for index reorganization or index cleanup based on the inaccurate statistics. Once asynchronous index cleanup is run, all the index keys that still belong to detached data partitions which require cleanup will be removed and this may eliminate the need for index reorganization.

For partitioned tables, you are encouraged to issue the **REORGCHK** after an asynchronous index cleanup has completed in order to generate accurate index statistics in the presence of detached data partitions. To determine whether or not there are detached data partitions in the table, you can check the status field in the SYSCAT.DATAPARTITIONS catalog view and look for the value I (index cleanup), L (logically detached), or D (detached with dependent MQT).

## Usage notes

This command does not display statistical information for declared temporary tables or created temporary tables.

This utility does not support the use of nicknames.

A new server release might introduce new table and index features. These new features might impact **REORGCHK** logic, that is, how **REORGCHK** computes **REORG** recommendations. If **REORGCHK** is issued from a client not at the same level as the server, it might report different results than those reported from a client at the same level as the server. **REORGCHK** is a client application, therefore, **REORGCHK** should be run from a client running the same level as the server. Doing so ensures the most accurate report is generated. For server administrative work, in general, use a client and a server at the same level.

Unless you specify the **CURRENT STATISTICS** option, **REORGCHK** gathers statistics on all columns using the default options only. Specifically, column group are not gathered and if LIKE statistics were previously gathered, they are not gathered by **REORGCHK**. The statistics gathered depend on the kind of statistics currently stored in the catalog tables:

- If detailed index statistics are present in the catalog for any index, table statistics and detailed index statistics (without sampling) for all indexes are collected.
- If detailed index statistics are not detected, table statistics as well as regular index statistics are collected for every index.
- If distribution statistics are detected, distribution statistics are gathered on the table. If distribution statistics are gathered, the number of frequent values and quantiles are based on the database configuration parameter settings.

**REORGCHK** calculates statistics obtained from eight different formulas to determine if performance has deteriorated or can be improved by reorganizing a table or its indexes. When a table uses less than or equal to ( **NPARTITIONS** \* 1 extent size ) of pages, no table reorganization is recommended based on each formula. More specifically,

- For non-partitioned tables ( **NPARTITIONS** =1 ), the threshold is:  
`(FPAGES <= 1 extent size)`
- For partitioned tables, it is:  
`(FPAGES <= NPARTITIONS * 1 extent size)`
- In a multi-partitioned database, after the number of database partitions in a database partition group of the table is considered, this threshold for not recommending table reorganization changes to:  
`FPAGES <= 'number of database partitions in a database partition group of the table' * NPARTITIONS * 1 extent size`

Long field or LOB data is not accounted for while calculating TSIZE.

**REORGCHK** uses the following formulas to analyze the physical location of rows and the size of the table:

- Formula F1:

$$100*\text{OVERFLOW}/\text{CARD} < 5$$

The total number of overflow rows in the table should be less than 5 percent of the total number of rows. Overflow rows can be created when rows are updated and the new rows contain more bytes than the old ones (VARCHAR fields), or when columns are added to existing tables.

- Formula F2:

For regular tables:

$$100*\text{TSIZE} / ((100-\text{TPCTFREE})/100 * (\text{FPAGES}-\text{NPARTITIONS}) * (\text{TABLEPAGESIZE}-68)) > 70$$

The table size in bytes (TSIZE) should be more than 70 percent of the total space allocated for the table. (There should be less than 30% free space.) The total space allocated for the table depends upon the page size of the table space in which the table resides (minus an overhead of 68 bytes). Because the last page allocated in the data object is not usually filled, 1 is subtracted from FPAGES for each partition (which is the same as FPAGES-NPARTITIONS). When table compression is used, FPAGES is adjusted to account for the estimated dictionary size.

Regular tables in REGULAR table spaces are limited to 255 rows on a data page. If you are using a large page size and short table rows, data page space might be wasted depending on how rows are stored on the page. In this case, the formula F2 might get a value that is less than 70. However, reorganizing the table might not recover the data page space because of the 255 row limit. If you want to use the wasted space, you should either use a smaller page size or convert your REGULAR table spaces to LARGE table spaces, and then reorganize the table. This does not affect tables that reside in LARGE table spaces.

For MDC tables:

$$100 * \text{TSIZE} / ((\text{ACTBLK}-\text{FULLKEYCARD}) * \text{EXTENTSIZE} * (\text{TABLEPAGESIZE}-68)) > 70$$

FULLKEYCARD represents the cardinality of the composite dimension index for the MDC table. Extentsize is the number of pages per block. The formula checks if the table size in bytes is more than the 70 percent of the remaining blocks for a table after subtracting the minimum required number of blocks.

- Formula F3:

$$100 * \text{NPAGES}/\text{FPAGES} > 80$$

The number of pages that contain no rows at all should be less than 20 percent of the total number of pages. (Pages can become empty after rows are deleted.) As previously noted, no table reorganization is recommended when ( $\text{FPAGES} \leq \text{NPARTITIONS} * 1$  extent size). Therefore, F3 is not calculated. For non-partitioned tables, NPARTITIONS = 1. In a multi-partitioned database, this condition changes to FPAGES = 'number of database partitions in a database partition group of the table' \* NPARTITIONS \* 1 extent size.

For MDC or ITC tables, the formula is:

$$100 * \text{activeblocks} / \\ ( \\ (\text{fpages\_adjust} / \text{tExtentSize}) - \\ (\text{numberOfTablePartitions} * \text{numberOfDatabasePartitions}) \\ )$$

**REORGCHK** uses the following formulas to analyze the indexes and their the relationship to the table data:

- Formula F4:

- For non-partitioned tables:

$$\text{CLUSTERRATIO or normalized CLUSTERFACTOR} > 80$$

The global CLUSTERFACTOR and CLUSTERRATIO take into account the correlation between the index key and distribution key. The clustering ratio of an index should be greater than 80 percent. When multiple indexes are defined on one table, some of these indexes have a low cluster ratio. (The index sequence is not the same as the table sequence.) This cannot be avoided. Be sure to specify the most important index when reorganizing the table. The cluster ratio is usually not optimal for indexes that contain many duplicate keys and many entries.

- For partitioned tables:

AVGPARTITION\_CLUSTERRATIO or normalized AVGPARTITION \_CLUSTERFACTOR > 80

AVGPARTITION\_CLUSTERFACTOR and AVGPARTITION\_CLUSTERRATIO values reflect how clustered data is within a data partition with respect to an index key. A partitioned table can be perfectly clustered for a particular index key within each data partition, and still have a low value for the CLUSTERFACTOR and CLUSTERRATIO because the index key is not a prefix of the table partitioning key. Design your tables and indexes using the most important index keys as a prefix of the table partitioning key. In addition, because the optimizer uses the global clusteredness values to make decisions about queries that span multiple data partitions, it is possible to perform a clustering reorganization and have the optimizer still not choose the clustering index when the keys do not agree.

**Note:**

- If readahead prefetching is enabled, formula F4 might not be a good indicator for issuing the **REORG** command. When you decide whether to issue the **REORG** command, it is more appropriate to rely on the performance of the query.
- For a random ordering of index key columns, the CLUSTERRATIO is low. This number is low since a random ordering of index key columns makes the index keys out of order versus the insert order of the data. A random ordering cannot be used as a clustering index. For these reasons, the result of formula F4 for REORGCHK always indicates that a reorganization is not required if the index has a random ordering. The same is true when you use the REORGCHK\_IX\_STATS stored procedure.
- Formula F5:
  - For a single database partition:
 
$$\frac{100 * (\text{KEYS} * (\text{LEAF\_RECSIZE} + \text{LEAF\_RECSIZE\_OVERHEAD}) + (\text{INDCARD} - \text{KEYS}) * \text{DUPKEYSIZE})}{((\text{LEAF\_NUM\_EMPTY\_LEAFS} - 1) * (\text{INDEXPAGESIZE} - \text{LEAF\_PAGE\_OVERHEAD}))} > \text{MIN}(50, (100 - \text{PCTFREE}))$$

The percentage of allocated space in use at the leaf level of the index should be greater than the minimum of 50 and 100-PCTFREE percent, where PCTFREE is defined by the **CREATE INDEX** statement. If the space used is less than this value, then the index could be made smaller by running REORG. This formula is only checked when LEAF>1 since you cannot have an index with less than 1 leaf page.
  - For a multi-partition database environment:
 
$$\frac{100 * (\text{KEYS} * (\text{LEAF\_RECSIZE} + \text{LEAF\_RECSIZE\_OVERHEAD}) + (\text{INDCARD} - \text{KEYS}) * \text{DUPKEYSIZE})}{((\text{LEAF\_NUM\_EMPTY\_LEAFS} - \text{NPARTITIONS}) * (\text{INDEXPAGESIZE} - \text{LEAF\_PAGE\_OVERHEAD}))} > \text{MIN}(50, (100 - \text{PCTFREE}))$$
- Formula F6:
 
$$((100 - \text{PCTFREE}) * ((\text{FLOOR}(100 - \text{LEVEL2PCTFREE}) / 100 * (\text{INDEXPAGESIZE} - \text{NLEAF\_PAGE\_OVERHEAD}) / (\text{NLEAF\_RECSIZE} + \text{NLEAF\_RECSIZE\_OVERHEAD}))) * (\text{FLOOR}(100 - \text{MIN}(10, \text{LEVEL2PCTFREE})) / 100 * (\text{INDEXPAGESIZE} - \text{NLEAF\_PAGE\_OVERHEAD}) / (\text{NLEAF\_RECSIZE} + \text{NLEAF\_RECSIZE\_OVERHEAD}))^{(\text{NLEVELS} - 3)} * (\text{INDEXPAGESIZE} - \text{LEAF\_PAGE\_OVERHEAD}) / (\text{KEYS} * (\text{LEAF\_RECSIZE} + \text{LEAF\_RECSIZE\_OVERHEAD}) + (\text{INDCARD} - \text{KEYS}) * \text{DUPKEYSIZE})) < 100$$

To determine if recreating the index would result in a tree having fewer levels. This formula checks the ratio between the amount of space in an index tree that has one less level than the current tree, and the amount of space needed. If a tree with one less level could be created and still leave PCTFREE available, then a reorganization is recommended. The actual number of index entries should be more than (100-PCTFREE) percent of the number of entries an NLEVELS-1 index tree can handle (only checked if NLEVELS>2). In the case where NLEVELS = 2, the other **REORGCHK** formulas should be relied upon to determine if the index should be reorganized.

In simplified form, formula F6 can be rewritten in the following form:

$$\frac{\text{Amount of space needed for an index if it was one level smaller}}{\text{Amount of space needed for all the entries in the index}} < 1$$

When the above left part is  $> 1$ , it means all index entries in the existing index can fit into an index that is one level smaller than the existing index. In this case, a reorg index is recommended.

The amount of space needed for an NLEVELS-1 index is calculated by:

$$(\text{The max number of leaf pages that a NLEVELS-1 index can have}) * \\ (\text{Amount of space available to store index entries per leaf page}) \\ \text{where,}$$

$$\begin{aligned} \text{The max number of leaf pages that a NLEVELS-1 index can have} = \\ (\text{No. of entries a level 2 index page can have}) * \\ (\text{No. of entries per page on levels greater than 2}) ** \\ (\text{No. of levels in the intended index} - 2) = \end{aligned}$$

$$\begin{aligned} & (100 - \text{LEVEL2PCTFREE}) \\ & \{ \text{FLOOR} \left( \frac{[-----]}{100} \right) * \\ & \quad ( \text{PageSize} - \text{Overhead} ) \\ & \quad [-----] ) * \\ & \quad ( \text{Avg. size of each nonleaf index entry} ) \\ & \quad (100 - \text{MIN}(10, \text{LEVEL2PCTFREE})) \\ & \text{FLOOR} \left( \frac{[-----]}{100} \right) * \\ & \quad ( \text{PageSize} - \text{Overhead} ) \\ & \quad [-----] ) ** \\ & \quad ( \text{Avg. size of each nonleaf index entry} ) \\ & \} \end{aligned}$$

$(100 - \text{LEVEL2PCTFREE})$  is the percentage of used space on level 2 of the index.

Level 2 is the level immediately above the leaf level.

$(100 - \text{MIN}(10, \text{LEVEL2PCTFREE}))$  is the percentage of used space on all levels above the second level.

NLEVELS is the number of index levels in the existing index.

The amount of space available to store index entries per leaf page =  
 $((100-\text{PCTFREE})/100 * (\text{INDEXPAGESIZE} - \text{LEAF\_PAGE\_OVERHEAD})) =$   
( Used space per page \* (PageSize - Overhead) )

The amount of space needed for all index entries:  
 $\text{KEYS} * (\text{LEAF\_RECSIZE} + \text{LEAF\_RECSIZE\_OVERHEAD}) +$   
 $(\text{INDCARD} - \text{KEYS}) * \text{DUPKEYSIZE}$

$(\text{KEYS} * (\text{LEAF\_RECSIZE} + \text{LEAF\_RECSIZE\_OVERHEAD}))$  represents the space used for the first occurrence of each key value in the index and  $((\text{INDCARD} - \text{KEYS}) * \text{DUPKEYSIZE})$  represents the space used for subsequent (duplicate) occurrences of a key value.

- Formula F7:

$$100 * (\text{NUMRIDS\_DELETED} / (\text{NUMRIDS\_DELETED} + \text{INDCARD})) < 20$$

The number of pseudo-deleted RIDs on non-pseudo-empty pages should be less than 20 percent.

- Formula F8:

$100 * (\text{NUM\_EMPTY\_LEAFS}/\text{LEAF}) < 20$

The number of pseudo-empty leaf pages should be less than 20 percent of the total number of leaf pages.

Running statistics on many tables can take time, especially if the tables are large.

## Usage notes for index compression

Formula F5 determines the ratio between the amount of space needed by the keys and the amount of space allocated. Formula F6 determines if recreating the index would result in a tree having fewer levels. The following formula checks the ratio between the amount of space in an index tree that has one less level than the current tree, and the amount of space needed. This formula relies on the amount of space needed for all index entries. Both formulae use the amount of space needed for all index entries.

The amount of space needed for all index entries in an uncompressed index is as follows:

$$\text{KEYS} * (\text{LEAF\_RECSIZE} + \text{LEAF\_RECSIZE\_OVERHEAD}) + \\ (\text{INDCARD} - \text{KEYS}) * \text{DUPKEYSIZE}$$

where LEAF\_RECSIZE is the average size of index key and DUPKEYSIZE is the size of a RID.

In a compressed index, LEAF\_RECSIZE is affected by prefix compression. DUPKEYSIZE is not a reliable way to measure the size of duplicate keys on indexes. The amount of space needed in a compressed index is the amount of space needed for all uncompressed index entries multiplied by the index compression ratio.

$$(\text{KEYS} * (\text{LEAF\_RECSIZE} + \text{LEAF\_RECSIZE\_OVERHEAD}) + \\ (\text{INDCARD} - \text{KEYS}) * \text{DUPKEYSIZE}) * \text{COMPRESSION\_RATIO}$$

where COMPRESSION\_RATIO is the estimated index compression ratio in the index. The COMPRESSION\_RATIO is calculated as:

$$(100 - \text{PCT\_PAGES\_SAVED}) / 100$$

where PCT\_PAGES\_SAVED is the estimated percentage of leaf pages saved from index compression. This value is taken from the catalogs. If statistics are not collected, PCT\_PAGES\_SAVED is -1 in the catalogs, and COMPRESSION\_RATIO is 1.

Both the **REORGCHK** command and the REORGCHK\_IX\_STATS procedure show the PCT\_PAGES\_SAVED value.

## Usage notes for partitioned tables

For a data partitioned table, **REORGCHK** returns statistics and reorganization recommendations for the table and the data partitions of the table.

For table statistics and reorganization recommendations, **REORGCHK** lists the table information that contains the SCHEMA.NAME for the table, the table level statistics, and reorg recommendation. After the table information, the information for each data partition information is listed. For each partition, the information includes the SCHEMA.NAME for the table, the partition name, the table statistics for the partition, and reorganization recommendation for the partition.

For index statistics and reorganization recommendations, **REORGCHK** returns the SCHEMA.NAME for each table followed by the fully qualified index name and

index statistics and index reorganization recommendation for each nonpartitioned index on the table. If the table has partitioned indexes, **REORGCHK** returns the information for partitioned indexes after the nonpartitioned indexes. **REORGCHK** returns the following information for each data partition of the table, the fully qualified index name, the partition name, index statistics for the partition, and index reorganization recommendations for the partition.

To provide better data availability to a data partitioned table, a reorganization of a specific data partition can be performed if recommended. **REORG TABLE** with the **ON DATA PARTITION** clause supports reorganizing a partition of a table.

For partitioned indexes, index reorganization of all indexes for a specific data partition can be performed using **REORG INDEXES ALL** with the **ON DATA PARTITION** clause if recommended.

The **REORG INDEX** command can be used to reorganized a nonpartitioned index on a data partitioned table.

See the REORG column for information about reorganization recommendations for data partitioned tables.

The following sample table statistics output is for the partitioned table MYDPARTT1. The table has three data partitions with default partition names PART0, PART1, and PART2.

Table statistics:

SCHEMA.NAME	CARD	OV	NP	FP	ACTBLK	SIZE	F1	F2	F3	REORG
<hr/>										
Table: USER1.MYDPARTT1	-	-	-	-	-	-	-	-	-	-
Table: USER1.MYDPARTT1	-	-	-	-	-	-	-	-	-	-
Data Partition: PART0	-	-	-	-	-	-	-	-	-	-
Table: USER1.MYDPARTT1	-	-	-	-	-	-	-	-	-	-
Data Partition: PART1	-	-	-	-	-	-	-	-	-	-
Table: USER1.MYDPARTT1	-	-	-	-	-	-	-	-	-	-
Data Partition: PART2	-	-	-	-	-	-	-	-	-	-
<hr/>										

The following sample index statistics output is a partitioned table MYDPARTT1. The table has three data partitions, one nonpartitioned index MYNONPARTIDX1, and one partitioned index MYDPARTIDX1.

Index statistics:

SCHEMA.NAME	INDCARD	LEAF	ELEAF	LVLS	NDEL	KEYS	...	F4	F5	F6	F7	F8	REORG
<hr/>													
Table: USER1.MYDPARTT1	-	-	-	-	-	-	...	-	-	-	-	-	-
Index: USER1.MYNONPARTIDX1	-	-	-	-	-	-	-	-	-	-	-	-	-
Index: USER1.MYDPARTIDX1	-	-	-	-	-	-	...	-	-	-	-	-	-
Data Partition: PART0	-	-	-	-	-	-	-	-	-	-	-	-	-
Index: USER1.MYDPARTIDX1	-	-	-	-	-	-	...	-	-	-	-	-	-
Data Partition: PART1	-	-	-	-	-	-	-	-	-	-	-	-	-
Index: USER1.MYDPARTIDX1	-	-	-	-	-	-	...	-	-	-	-	-	-
Data Partition: PART2	-	-	-	-	-	-	-	-	-	-	-	-	-
<hr/>													

## **RESET ADMIN CONFIGURATION**

Resets entries in the Db2 Administration Server (DAS) configuration file on the node to which you are connected. The DAS is a special administrative tool that enables remote administration of Db2 servers.

The values are reset by node type, which is always a server with remote clients. For a list of DAS parameters, see the description of the **UPDATE ADMIN CONFIGURATION** command.

**Important:** The Db2 Administration Server (DAS) has been deprecated in Version 9.7 and might be removed in a future release. The DAS is not supported in Db2 pureScale environments. Use software programs that use the Secure Shell protocol for remote administration. For more information, see “Db2 administration server (DAS) has been deprecated” at [.](#)

## Scope

This command resets the DAS configuration file on the administration node of the system to which you are connected.

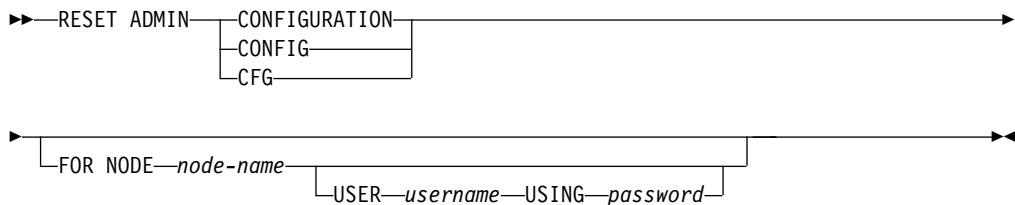
## Authorization

DASADM

## Required connection

Partition. To reset the DAS configuration for a remote system, specify the system using the **FOR NODE** option with the administration node name.

## Command syntax



## Command parameters

**FOR NODE *node-name***

Enter the name of an administrator node to reset DAS configuration parameters there.

**USER** *username* **USING** *password*

If connection to the remote system requires user name and password, enter this information.

## Usage notes

To reset the DAS configuration parameters on a remote system, specify the system using the administrator node name as an argument to the **FOR NODE** option and specify the user name and password if the connection to that node requires username and password authorization.

To view or print a list of the DAS configuration parameters, use the **GET ADMIN CONFIGURATION** command. To change the value of an admin parameter, use the **UPDATE ADMIN CONFIGURATION** command.

Changes to the DAS configuration parameters that can be updated online take place immediately. Other changes become effective only after they are loaded into memory when you restart the DAS with the **db2admin** command.

If an error occurs, the DAS configuration file does not change.

The DAS configuration file cannot be reset if the checksum is invalid. This might occur if you edit the DAS configuration file manually and do not use the appropriate command. If the checksum is invalid, you must drop and re-create the DAS to reset its configuration file.

## **RESET ALERT CONFIGURATION**

Resets the health indicator settings for specific objects to the current defaults for that object type or resets the current default health indicator settings for an object type to the install defaults.

**Important:** This command or API has been deprecated and might be removed in a future release because the health monitor has been deprecated in Version 9.7. It is not supported in Db2 pureScale environments. For more information, see “Health monitor has been deprecated” at [http://www.ibm.com/support/knowledgecenter/SSEPGG\\_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0055045.html](http://www.ibm.com/support/knowledgecenter/SSEPGG_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0055045.html).

## **Authorization**

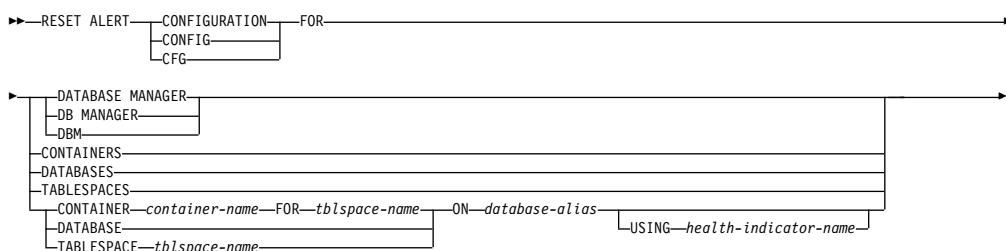
One of the following authorities:

- SYSADM
  - SYSMAINT
  - SYSCTRL

## Required connection

Instance. An explicit attachment is not required.

## Command syntax



## Command parameters

DATABASE MANAGER | DB MANAGER | DBM

**DB MANAGER / DB MANAGER / DBA** Resets alert settings for the database manager.

## CONTAINERS

**ALTER TABLESPACE** Resets default alert settings for all table space containers managed by the

database manager to the install default. These are the settings that apply to all table space containers that do not have custom settings. Custom settings are defined using the **CONTAINER container-name FOR tblspace-name ON database-alias** clause.

#### DATABASES

Resets alert settings for all databases managed by the database manager. These are the settings that apply to all databases that do not have custom settings. Custom settings are defined using the **DATABASE ON database-alias** clause.

#### TABLESPACES

Resets default alert settings for all table spaces managed by the database manager to the install default. These are the settings that apply to all table spaces that do not have custom settings. Custom settings are defined using the **TABLESPACE tblspace-name ON database-alias** clause.

#### CONTAINER container-name FOR tblspace-name ON database-alias

Resets the alert settings for the table space container called *container-name*, for the table space specified using the **FOR tblspace-name** clause, on the database specified using the **ON database-alias** clause. If this table space container has custom settings, then these settings are removed and the current table space containers default is used.

#### DATABASE ON database-alias

Resets the alert settings for the database specified using the **ON database-alias** clause. If this database has custom settings, then these settings are removed and the install default is used.

#### TABLESPACE tblspace-name ON database-alias

Resets the alert settings for the table space called *tblspace-name*, on the database specified using the **ON database-alias** clause. If this table space has custom settings, then these settings are removed and the install default is used.

#### USING *health-indicator-name*

Specifies the set of health indicators for which alert configuration will be reset. Health indicator names consist of a two-letter object identifier followed by a name that describes what the indicator measures. For example:

```
db.sort_privmem_util
```

If you do not specify this option, all health indicators for the specified object or object type will be reset.

## RESET DATABASE CONFIGURATION

Resets the configuration of a specific database to the system defaults.

### Scope

This command updates all members by default, except when **MEMBER** is specified to reset only one member.

### Authorization

One of the following authorities:

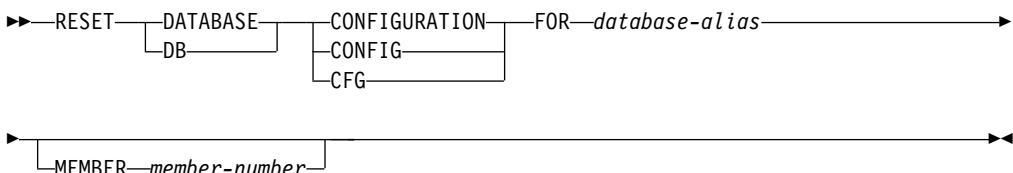
- SYSADM
- SYSCTRL

- SYSMAINT

## Required connection

Instance. An explicit attachment is not required. If the database is listed as remote, an instance attachment to the remote node is established for the duration of the command.

## Command syntax



## Command parameters

### **FOR** *database-alias*

Specifies the alias of the database whose configuration is to be reset to the system defaults.

### **MEMBER** *member-number*

If a database configuration reset is to be applied to a specific member, this parameter may be used. If this parameter is not provided, the reset will take effect on all members.

## Example

### Reset the database configuration on a multi-partition instance

A user has a partitioned database environment that has 4 database partitions as defined in the db2nodes.cfg:

```

10 gilera 0
20 gilera 1
30 motobi 0
40 motobi 1

```

The user has created the SAMPLE database on the instance. The catalog partition for SAMPLE is on database partition number 10. Let's assume the user is logged on to system motobi.

The following command will reset all the database configuration values for database SAMPLE on all database partitions:

```
db2 reset db cfg for sample
```

The following commands will reset all the database configuration values for database SAMPLE, only at database partition number 30:

```
db2 reset db cfg for sample dbpartitionnum 30
```

or

```
export DB2NODE=30
db2 reset db cfg for sample
```

## Usage notes

To view or print a list of the database configuration parameters, use the **GET DATABASE CONFIGURATION** command.

To change the value of a configurable parameter, use the **UPDATE DATABASE CONFIGURATION** command.

Changes to the database configuration file become effective only after they are loaded into memory. All applications must disconnect from the database before this can occur.

If an error occurs, the database configuration file does not change.

The database configuration file cannot be reset if the checksum is invalid. This might occur if the database configuration file is changed without using the appropriate command. If this happens, the database must be restored to reset the database configuration file.

The **RESET DATABASE CONFIGURATION** command will reset the database configuration parameters to the documented default configuration values, where **auto\_runstats** will be ON. **Self\_tuning\_mem** will be reset to ON on non-partitioned database environments and to OFF on partitioned database environments.

The **RESET DATABASE CONFIGURATION** command does not change the database configuration parameters **ENCRLIB** and **ENCRYPTS**. The **RESET DATABASE CONFIGURATION** command is not done through a database connection, so Db2 is not able to determine whether a user holds SECADM authority.

## Compatibilities

For compatibility with previous versions:

- **DBPARTITIONNUM** can be substituted for **MEMBER**, except when the **DB2\_ENFORCE\_MEMBER\_SYNTAX** registry variable is set to ON.

## RESET DATABASE MANAGER CONFIGURATION

Resets the parameters in the database manager configuration file to the system defaults. The values are reset by node type.

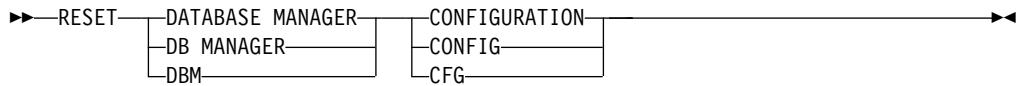
### Authorization

SYSADM

### Required connection

None or instance. An instance attachment is not required to perform local database manager configuration operations, but is required to perform remote database manager configuration operations. To update the database manager configuration for a remote instance, it is necessary to first attach to that instance. To update a configuration parameter online, it is also necessary to first attach to the instance.

## Command syntax



## Command parameters

None

### Usage notes

This command resets all parameters set by the installation program. This could cause error messages to be returned when restarting Db2. For example, if the **svccname** parameter is reset, the user will receive the SQL5043N error message when trying to restart Db2.

Before running this command, save the output from the **GET DATABASE MANAGER CONFIGURATION** command to a file so that you can refer to the existing settings. Individual settings can then be updated using the **UPDATE DATABASE MANAGER CONFIGURATION** command.

It is not recommended that the **svccname** parameter, set by the installation program, be modified by the user.

To view or print a list of the database manager configuration parameters, use the **GET DATABASE MANAGER CONFIGURATION** command. To change the value of a configurable parameter, use the **UPDATE DATABASE MANAGER CONFIGURATION** command.

For more information about these parameters, refer to the summary list of configuration parameters and the individual parameters.

Some changes to the database manager configuration file become effective only after they are loaded into memory. For more information about which parameters are configurable online and which ones are not, see the configuration parameter summary. Server configuration parameters that are not reset immediately are reset during execution of **db2start**. For a client configuration parameter, parameters are reset the next time you restart the application. If the client is the command line processor, it is necessary to invoke **TERMINATE**.

If an error occurs, the database manager configuration file does not change.

The database manager configuration file cannot be reset if the checksum is invalid. This might occur if you edit the configuration file manually and do not use the appropriate command. If the checksum is invalid, you must re-create the instance.

## RESET MONITOR

Resets the internal database system monitor data areas of a specified database, or of all active databases, to zero. The internal database system monitor data areas include the data areas for all applications connected to the database, as well as the data areas for the database itself.

## Scope

This command is issued on the currently attached member and, by default, returns information only for that member. In the case of multiple members per host, the currently attached member is the first member that is listed in the db2nodes.cfg file on that host.

To issue the command for a specific member that is not the currently attached member, specify the **ATTACH\_MEMBER** parameter. To issue the command for all members and receive an aggregated result, specify the **GLOBAL** parameter.

To change the currently attached member, issue the **SET CLIENT** command with the **ATTACH\_MEMBER** parameter . You must issue the **DETACH** command followed by the **ATTACH** command from your application for this change to take effect.

## Authorization

One of the following authorities:

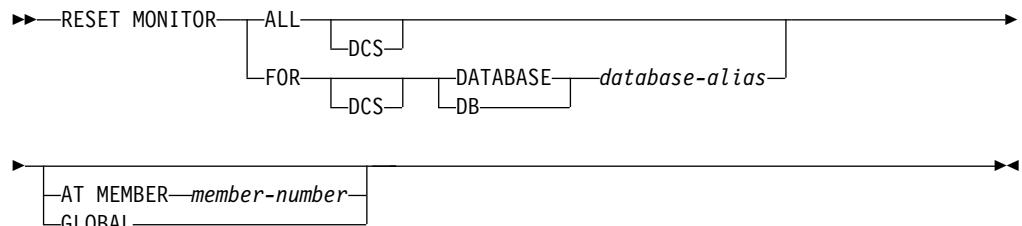
- SYSADM
- SYSCTRL
- SYSMAINT
- SYSMON

## Required connection

Instance. If there is no instance attachment, a default instance attachment is created.

To reset the monitor switches for a remote instance (or a different local instance), it is necessary to first attach to that instance.

## Command syntax



## Command parameters

**ALL** This option indicates that the internal counters should be reset for all databases.

### **FOR DATABASE *database-alias***

This option indicates that only the database with alias *database-alias* should have its internal counters reset.

**DCS** Depending on which clause it is specified, this keyword resets the internal counters of:

- All DCS databases
- A specific DCS database.

**AT MEMBER** *member-number*

Specifies the member for which the internal counters are to be reset.

GLOBAL

Resets the internal counters for all members in a partitioned database environment or in a Db2 pureScale environment.

## Usage notes

Each process (attachment) has its own private view of the monitor data. If one user resets, or turns off a monitor switch, other users are not affected. Change the setting of the monitor switch configuration parameters to make global changes to the monitor switches.

If **ALL** is specified, some database manager information is also reset to maintain consistency of the returned data, and some member-level counters are reset.

## Compatibilities

For compatibility with previous versions:

- **DBPARTITIONNUM** or **NODE** can be substituted for **MEMBER**, except when the **DB2 ENFORCE MEMBER SYNTAX** registry variable is set to **ON**.

## **RESTART DATABASE**

Restarts a database that has been abnormally terminated and left in an inconsistent state. At the successful completion of **RESTART DATABASE**, the application remains connected to the database if the user has CONNECT privilege.

## Scope

This command affects only the database partition where the command is run. In Db2 pureScale environments, this command resumes I/O write operations for all suspended members.

In Db2 pureScale environments, this command might trigger, when needed, a group crash recovery, which performs the crash recovery for all members of the group, or a member crash recovery.

## Authorization

None.

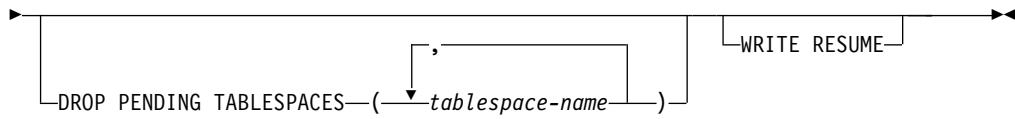
## Required connection

This command establishes a database connection.

## Command syntax

```
►► RESTART [DATABASE database-alias]
 [DB]

►► [USER username] [USING password]
```



## Command parameters

### **DATABASE** *database-alias*

Identifies the database to restart.

### **USER** *username*

Identifies the user name under which the database is to be restarted.

### **USING** *password*

The password used to authenticate *username*. If the password is omitted, the user is prompted to enter it.

### **DROP PENDING TABLESPACES** *tablespace-name*

Specifies that the database restart operation is to be successfully completed even if table space container problems are encountered.

If a problem occurs with a container for a specified table space during the restart process, the corresponding table space will not be available (it will be in drop-pending state) after the restart operation. If a table space is in the drop-pending state, the only possible action is to drop the table space.

If a problem occurs with a container during a member crash recovery, the member crash recovery operation will fail. To correct this situation, shut down all members using a **db2stop -force** command and manually initiate a group crash recovery by reissuing the **RESTART DATABASE** command.

Following the group crash recovery, the table space corresponding to the problematic container will not be available (for more information, see the "Recovering with damaged table spaces" topic).

In the case of circular logging, a troubled table space will cause a restart failure. A list of troubled table space names can found in the administration notification log if a restart database operation fails because of container problems. If there is only one system temporary table space in the database, and it is in drop pending state, a new system temporary table space must be created immediately following a successful database restart operation.

### **WRITE RESUME**

Forces a restart for databases that crashed while I/O write operations were suspended. Before performing crash recovery, this parameter will resume I/O write operations. In Db2 pureScale environments, this parameter resumes I/O write operations for all suspended members.

You can also use the **WRITE RESUME** parameter if the connection that you used to suspend I/O write operations is currently hung and all subsequent connection attempts are also hanging. When you use the parameter in this case, the **RESTART DATABASE** command resumes I/O write operations for the database without performing crash recovery. The **RESTART DATABASE** command with the **WRITE RESUME** parameter performs crash recovery only when you use it after a database crash.

## Usage notes

Issue this command if an attempt to connect to a database returns an error message indicating that the database must be restarted. This error message is generated only if the previous session with this database terminated abnormally, for example, because of a power failure.

### Partitioned database environments

On a partitioned database system, to resolve the indoubt transactions, you should issue the **RESTART DATABASE** command on all database partitions, as shown in the following example:`db2_all "db2 restart database database-alias"`

If you restart the database on only a single database partition within a partitioned database environment, a message indicating that you must restart the database might be returned on a subsequent database query. This message is returned because you did not restart the database on a database partition on which the query depends. Restarting the database on all database partitions solves the problem.

### Db2 pureScale environments

In a Db2 pureScale environment, the **RESTART DATABASE** command is the only way to manually invoke crash recovery. The database manager automatically determines whether a group crash recovery or a member crash recovery is required. After group crash recovery completes, if any indoubt transactions exist on any of the members that did not perform group crash recovery, a member crash recovery on those members must be performed to enable resolution of those indoubt transactions.

If the write operations for the database were in the process of being suspended at the time of the crash, perform crash recovery by using the **RESTART DATABASE** command. If a **SET WRITE SUSPEND** operation is running on another member, you might have to wait for the **SET WRITE SUSPEND** operation to complete before performing crash recovery. After it is complete, submit the **RESTART DATABASE** command with the **WRITE RESUME** parameter to restart the database and resume write operations for all the suspended members.

If the write operations were successfully suspended on the database at the time of the crash, there are two ways that you can perform crash recovery:

- You can use the **RESTART DATABASE** command with the **WRITE RESUME** parameter.
- You can issue a **SET WRITE** command with the **RESUME** parameter from an active member and then issue the **RESTART DATABASE** command from the crashed member.

## RESTORE DATABASE

Restores a database that has been backed up using the Db2 backup utility. The restored database is in the same state that it was in when the backup copy was made. The **Restore Database** command can also be used to encrypt an existing database.

This utility can also perform the following services:

- Overwrite a database with a different image or restore the backup copy to a new database.

- Restore backup images in Db2 Version 11.1 that were created in Db2 Versions 9.7, 10.1, or 10.5.
  - If a database upgrade is required, it is invoked automatically at the end of the restore operation.
- If, at the time of the backup operation, the database was enabled for rollforward recovery, the database can be brought to its previous state by starting the rollforward utility after successful completion of a restore operation.
- Restore a table space level backup.
- Transport a set of table spaces, storage groups, and SQL schemas from database backup image to a database by using the **TRANSPORT** option (in Db2 Version 9.7 Fix Pack 2 and later fix packs). The **TRANSPORT** option is not supported in the Db2 pureScale environment, or in partitioned database environments.
- If the database name exists when this command is issued, it replaces and redefines all storage groups as they were at the time the backup image was produced, unless otherwise redirected by the user.

For more information about the restore operations that are supported by Db2 database systems between different operating systems and hardware platforms, see “Backup and restore operations between different operating systems and hardware platforms” in the *Data Recovery and High Availability Guide and Reference*.

Incremental images and images only capturing differences from the time of the previous capture (called a “delta image”) cannot be restored when there is a difference in operating systems or word size (32-bit or 64-bit).

Following a successful restore operation from one environment to a different environment, no incremental or delta backups are allowed until a non-incremental backup is taken. (This is not a limitation following a restore operation within the same environment).

Even with a successful restore operation from one environment to a different environment, some considerations exist: packages must be rebound before use (using the **BIND** command, the **REBIND** command, or the **db2rbind** utility); SQL procedures must be dropped and re-created; and all external libraries must be rebuilt on the new platform. (These are not considerations when restoring to the same environment).

A restore operation that is run over an existing database and existing containers reuses the same containers and table space map.

A restore operation that is run against a new database reacquires all containers and rebuilds an optimized table space map. A restore operation that is run over an existing database with one or more missing containers also reacquires all containers and rebuilds an optimized table space map.

## Scope

This command only affects the node on which it is run.

You cannot restore SYSCATSPACE online.

## Authorization

To restore to an existing database, one of the following authorities:

- SYSADM
  - SYSCTRL
  - SYSMAINT

To restore to a new database, one of the following authorities:

- SYSADM
  - SYSCTRL

If a user name is specified, this user requires CONNECT authority on the database.

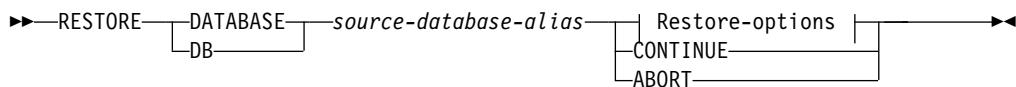
## Required connection

The required connection varies based on the type of restore action:

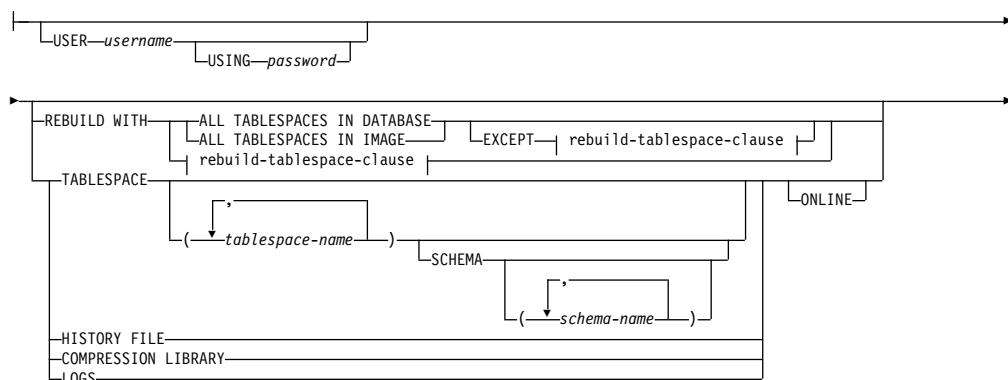
- You require a database connection to restore to an existing database. This command automatically establishes an exclusive connection to the specified database.
  - You require an instance and a database connection to restore to a new database. The instance attachment is required to create the database.

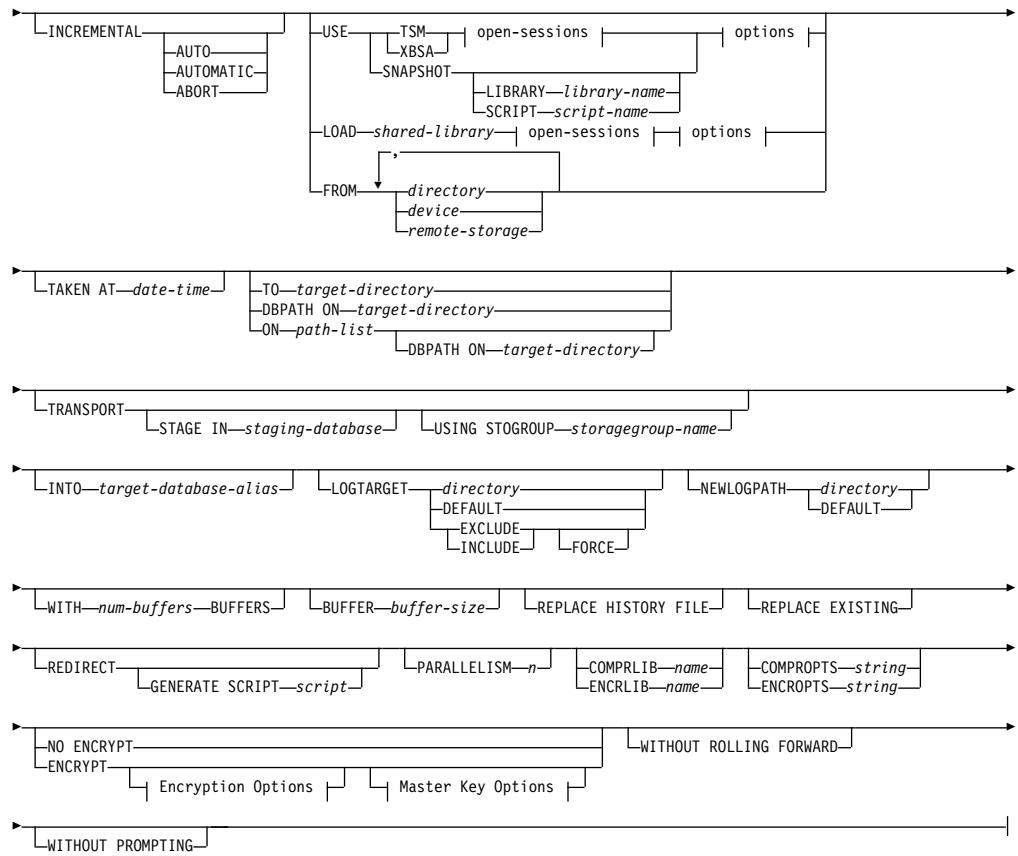
To restore to a new database at an instance different from the current instance, it is necessary to first attach to the instance where the new database resides. The new instance can be local or remote. The current instance is defined by the value of the **DB2INSTANCE** environment variable.
  - For snapshot restore, *instance* and *database* connections are required.

## Command syntax



## **Restore-options:**





### **Rebuild-tablespace-clause:**

```

 TABLESPACE (-> tablespace-name) ,

```

### **Open-sessions:**

```

 OPEN num-sessions SESSIONS

```

### **Options:**

```

 OPTIONS "options-string"
 @ file-name

```

### **Encryption Options:**

```

 CIPHER AES MODE CBC KEY LENGTH key-length
 3DES

```

## **Master Key Options:**

|—MASTER KEY LABEL—*label-name*—|

## **Command parameters**

### **DATABASE *source-database-alias***

Alias of the source database from which the backup was taken.

### **CONTINUE**

Specifies that the containers have been redefined, and that the final step in a redirected restore operation should be performed.

### **ABORT**

This parameter:

- Stops a redirected restore operation. This is useful when an error has occurred that requires one or more steps to be repeated. After **RESTORE DATABASE** with the **ABORT** option has been issued, each step of a redirected restore operation must be repeated, including **RESTORE DATABASE** with the **REDIRECT** option.
- Terminates an incremental restore operation before completion.

### **USER *username***

Specifies the user name to be used when attempting a connection to the database.

### **USING *password***

The password that is used to authenticate the user name. If the password is omitted, the user is prompted to enter it.

### **REBUILD WITH ALL TABLE SPACES IN DATABASE**

Restores the database with all the table spaces that are known to the database at the time of the image being restored. This restore overwrites a database if it already exists.

### **REBUILD WITH ALL TABLE SPACES IN DATABASE EXCEPT**

#### ***rebuild-tablespace-clause***

Restores the database with all the table spaces that are known to the database at the time of the image being restored except for those specified in the list. This restore overwrites a database if it already exists.

### **REBUILD WITH ALL TABLE SPACES IN IMAGE**

Restores the database with only the table spaces in the image being restored. This restore overwrites a database if it already exists.

### **REBUILD WITH ALL TABLE SPACES IN IMAGE EXCEPT *rebuild-tablespace-clause***

Restores the database with only the table spaces in the image being restored except for those specified in the list. This restore overwrites a database if it already exists.

### **REBUILD WITH *rebuild-tablespace-clause***

Restores the database with only the list of table spaces specified. This restore overwrites a database if it already exists.

### **TABLE SPACE *tablespace-name***

A list of names that are used to specify the table spaces that are to be restored.

Table space names are required when the **TRANSPORT** option is specified. This option may take as much time as a full restore operation.

**SCHEMA** *schema-name*

A list of names that are used to specify the schemas that are to be restored.

Schema names are required if the **TRANSPORT** option is specified. The **SCHEMA** option is only valid when the **TRANSPORT** option is specified.

**ONLINE**

This keyword, applicable only when performing a table space-level restore operation, is specified to allow a backup image to be restored online. This means that other agents can connect to the database while the backup image is being restored, and that the data in other table spaces is available while the specified table spaces are being restored.

**HISTORY FILE**

This keyword is specified to restore only the history file from the backup image.

**COMPRESSION LIBRARY**

This keyword is specified to restore only the compression library from the backup image. If the object exists in the backup image, it is restored into the database directory. If the object does not exist in the backup image, the restore operation fails.

**LOGS** This keyword is specified to restore only the set of log files that are contained in the backup image. If the backup image does not contain any log files, the restore operation fails. If this option is specified, the **LOGTARGET** option must also be specified. This option might take as much time as a full restore operation.

**INCREMENTAL**

Without additional parameters, **INCREMENTAL** specifies a manual cumulative restore operation. During manual restore the user must issue each restore command manually for each image that is involved in the restore. Do so according to the following order: last, first, second, third, and so on, up to and including the last image.

**INCREMENTAL AUTOMATIC/AUTO**

Specifies an automatic cumulative restore operation.

**INCREMENTAL ABORT**

Specifies abortion of an in-progress manual cumulative restore operation.

**USE**

**TSM** Specifies that the database is to be restored by using Tivoli Storage Manager (TSM) as the target device.

**XBSA** Specifies that the XBSA interface is to be used. Backup Services APIs (XBSA) are an open application programming interface for applications or facilities needing data storage management for backup or archiving purposes.

**SNAPSHOT**

Specifies that the data is to be restored from a snapshot backup.

You cannot use the **SNAPSHOT** parameter with any of the following parameters:

- **TABLESPACE**
- **INCREMENTAL**
- **TO**
- **ON**

- **DBPATH ON**
- **INTO**
- **NEWLOGPATH**
- **WITH *num-buffers* BUFFERS**
- **BUFFER**
- **REDIRECT**
- **REPLACE HISTORY FILE**
- **COMPRESSION LIBRARY**
- **PARALLELISM**
- **COMPRLIB**
- **OPEN *num-sessions* SESSIONS**
- **HISTORY FILE**
- **LOGS**

Also, you cannot use the **SNAPSHOT** parameter with any restore operation that involves a table space list, which includes the **REBUILD WITH** option.

The default behavior when you restore data from a snapshot backup image is a full database offline restore of all paths that make up the database, including all containers, the local volume directory, and the database path (DBPATH). The logs are excluded from a snapshot restore unless you specify the **LOGTARGET INCLUDE** parameter; the **LOGTARGET EXCLUDE** parameter is the default for all snapshot restores. If you provide a time stamp, the snapshot backup image with that time stamp is used for the restore.

#### **LIBRARY** *library-name*

Integrated into IBM Data Server is a Db2 ACS API driver for the following storage hardware:

- IBM TotalStorage SAN Volume Controller
- IBM Enterprise Storage Server Model 800
- IBM Storwize V7000
- IBM System Storage DS6000
- IBM System Storage DS8000
- IBM System Storage N Series
- IBM XIV

If you have other storage hardware, and a Db2 ACS API driver for that storage hardware, you can use the **LIBRARY** parameter to specify the Db2 ACS API driver.

The value of the **LIBRARY** parameter is a fully qualified library file name.

#### **SCRIPT** *script-name*

The name of the executable script capable of performing a snapshot restore operation. The script name must be a fully qualified file name.

## OPTIONS

**"options-string"**

Specifies options to be used for the restore operation. The string is passed exactly as it was entered, without the double quotation marks.

**@file-name**

Specifies that the options to be used for the restore operation are contained in a file that is located on the Db2 server. The string is passed to the vendor support library. The file must be a fully qualified file name.

You cannot use the **VENDOROPT** database configuration parameter to specify vendor-specific options for snapshot restore operations. You must use the **OPTIONS** parameter of the restore utilities instead.

**OPEN num-sessions SESSIONS**

Specifies the number of I/O sessions that are to be used with TSM or the vendor product.

**FROM directory/device/remote-storage**

The fully qualified path name of the directory or device on which the backup image resides. If **USE TSM**, **FROM**, and **LOAD** are omitted, the default value is the current working directory of the client machine. This target directory or device must exist on the target server/instance.

To restore from files on remote storage, such as IBM SoftLayer Object Storage or Amazon Simple Storage Service (S3), you can specify a remote storage location using a storage access alias. Local staging space is required to temporarily store the backup image that is transferred from the remote storage server; refer to Remote storage requirements. The syntax for specifying remote storage is:

`DB2REMOTE://<alias>//<storage-path>/<file-name>`

If several items are specified, and the last item is a tape device, the user is prompted for another tape. Valid response options are:

- c** Continue. Continue using the device that generated the warning message (for example, continue when a new tape has been mounted).
- d** Device terminate. Stop using *only* the device that generated the warning message (for example, terminate when there are no more tapes).
- t** Terminate. Abort the restore operation after the user has failed to perform some action requested by the utility.

**LOAD shared-library**

The name of the shared library (DLL on Windows operating systems) containing the vendor backup and restore I/O functions to be used. The name can contain a full path. If the full path is not given, the value defaults to the path on which the user exit program resides.

**TAKEN AT date-time**

The time stamp of the database backup image. The time stamp is displayed after successful completion of a backup operation, and is part of the path name for the backup image. It is specified in the form *yyyymmddhhmmss*. A partial time stamp can also be specified. For example, if two different backup images with time stamps 20021001010101 and 20021002010101 exist, specifying 20021002 causes the image with time

stamp 20021002010101 to be used. If a value for this parameter is not specified, there must be only one backup image on the source media.

#### **TO** *target-directory*

This parameter states the target database directory. This parameter is ignored if the utility is restoring to an existing database. The drive and directory that you specify must be local. If the backup image contains a database that is enabled for automatic storage, then only the database directory changes. The storage paths that are associated with the database do not change.

#### **DBPATH** **ON** *target-directory*

This parameter states the target database directory. This parameter is ignored if the utility is restoring to an existing database. The drive and directory that you specify must be local. If the backup image contains a database that is enabled for automatic storage and the parameter is not specified**ON**, then this parameter is synonymous with the **TO** parameter and only the database directory changes. The storage paths that are associated with the database do not change.

#### **ON** *path-list*

This parameter redefines the storage paths that are associated with a database. If the database contains multiple storage groups this option will redirect all storage groups to the specified paths, such that every defined storage group uses *path-list* as its new storage group paths. Using this parameter with a database that has no storage groups defined or is not enabled for automatic storage results in an error (SQL20321N). The existing storage paths as defined within the backup image are no longer used and automatic storage table spaces are automatically redirected to the new paths. If this parameter is not specified for an automatic storage database, then the storage paths remain as they are defined within the backup image. Without this parameter, while the path might not change, it is possible for the data and containers on the paths to be rebalanced during the restore. For rebalancing conditions, see .

One or more paths can be specified, each separated by a comma. Each path must have an absolute path name and it must exist locally.

If this option is specified with the **REDIRECT** option, then this option takes effect before the initial **RESTORE ... REDIRECT** command returns to the caller, and before any **SET STOGROUP PATHS** or **SET TABLESPACE CONTAINERS** statements are issued. Subsequently, if any storage group paths are redirected, those modifications override any paths specified in the initial **RESTORE ... ON** *path-list* command.

Any storage groups that have their paths redefined during a restore operation do not have any storage path-related operations replayed during a subsequent rollforward operation.

If the database does not already exist on disk and the **DBPATH ON** parameter is not specified, then the first path is used as the target database directory.

For a multi-partition database, the **ON** *path-list* option can only be specified on the catalog partition. The catalog partition must be restored before any other partitions are restored when the **ON** option is used. The restore of the catalog-partition with new storage paths places all non-catalog database partitions in a RESTORE\_PENDING state. The non-catalog database partitions can then be restored in parallel without specifying the **ON** clause in the **RESTORE** command.

In general, the same storage paths must be used for each partition in a multi-partition database and they must all exist before running the **RESTORE DATABASE** command. One exception to this is where database partition expressions are used within the storage path. Doing this allows the database partition number to be reflected in the storage path such that the resulting path name is different on each partition.

Using the RESTORE command with the ON clause has the same implications as a redirected restore operation.

In an HADR environment if the primary database is defined over multiple storage paths, the RESTORE command to initialize the standby database can use the **ON path-list** option to specify these storage paths. These paths must be listed in the same order as the primary database (the order can be found through the db2pd -db dbname -storagepaths command).

You cannot use the **ON** parameter to redefine storage paths for schema transport. Schema transport will use existing storage paths on the target database.

#### **INTO** *target-database-alias*

The target database alias. If the target database does not exist, it is created.

When you restore a database backup to an existing database, the restored database inherits the alias and database name of the existing database.

When you restore a database backup to a nonexistent database, the new database is created with the alias and database name that you specify. This new database name must be unique on the system where you restore it.

#### **TRANSPORT INTO** *target-database-alias*

Specifies the existing target database alias for a transport operation. The table spaces and schemas being transported are added to the database.

The **TABLESPACE** and **SCHEMA** options must specify table space names and schema names that define a valid transportable set or the transport operation fails. SQLCODE=SQL2590N rc=1.

The system catalogs cannot be transported. SQLCODE=SQL2590N rc=4.

After the schemas have been validated by the **RESTORE** command, the system catalog entries describing the objects in the table spaces being transported are created in the target database. After completion of the schema recreation, the target database takes ownership of the physical table space containers.

The physical and logical objects that are contained in the table spaces being restored are re-created in the target database and the table space definitions and containers are added to the target database. Failure during the creation of an object, or the replay of the DDL returns an error.

#### **STAGE IN** *staging-database*

Specifies the name of a temporary staging database for the backup image that is the source for the transport operation. If the **STAGE IN** option is specified, the temporary database is not dropped after the transport operation completes. The database is no longer required after the transport has completed and can be dropped by the DBA.

The following is true if the **STAGE IN** option is not specified:

- The database name is of the form SYSTGxxx where xxx is an integer value.

- The temporary staging database is dropped after the transport operation completes.

#### **USING STOGROUP *storagegroup-name***

For automatic storage table spaces, this specifies the target storage group that will be associated with all table spaces being transported. If the storage group is not specified, then the currently designated default storage group of the target database is used. This clause only applies to automatic storage table spaces and is only valid during a schema transport operation.

Identifies the storage group in which table space data will be stored. *storagegroup-name* must identify a storage group that exists at the *target-database-alias* of the **TRANSPORT** operation. (SQLSTATE 42704). This is a one-part name.

#### **LOGTARGET *directory***

Non-snapshot restores:

The absolute path name of an existing directory on the database server to be used as the target directory for extracting log files from a backup image. If this option is specified, any log files that are contained within the backup image will be extracted into the target directory. If this option is not specified, log files that are contained within a backup image will not be extracted. To extract only the log files from the backup image, specify the **LOGS** option. This option automatically appends the database partition number and a log stream ID to the path.

#### **DEFAULT**

Restore log files from the backup image into the database's default log directory, for example /home/db2user/db2inst/NODE0000/SQL00001/LOGSTREAM0000.

Snapshot restores:

#### **INCLUDE**

Restore log directory volumes from the snapshot image. If this option is specified and the backup image contains log directories, then they will be restored. Existing log directories and log files on disk will be left intact if they do not conflict with the log directories in the backup image. If existing log directories on disk conflict with the log directories in the backup image, then an error will be returned.

#### **EXCLUDE**

Do not restore log directory volumes. If this option is specified, then no log directories will be restored from the backup image. Existing log directories and log files on disk will be left intact if they do not conflict with the log directories in the backup image. If a path belonging to the database is restored and a log directory will implicitly be restored because of this, thus causing a log directory to be overwritten, an error will be returned.

#### **FORCE**

Allow existing log directories in the current database to be overwritten and replaced when restoring the snapshot image. Without this option, existing log directories and log files on disk which conflict with log directories in the snapshot image will cause the restore to fail. Use this option to indicate that the restore can overwrite and replace those existing log directories.

**Note:** Use this option with caution, and always ensure that you have backed up and archived all logs that might be required for recovery.

For snapshot restores, the default value of the directory option is **LOGTARGET EXCLUDE**.

#### **NEWLOGPATH** *directory*

The absolute path name of a directory that will be used for active log files after the restore operation. This parameter has the same function as the **newlogpath** database configuration parameter. The parameter can be used when the log path in the backup image is not suitable for use after the restore operation; for example, when the path is no longer valid, or is being used by a different database.

**Note:** When the **newlogpath** command parameter is set, the node number is automatically appended to the value of **logpath** parameter. The node number is also automatically appended to the value of the **logpath** parameter when the **newlogpath** database configuration parameter is updated. For more information, see **newlogpath - Change the database log path**.

#### **DEFAULT**

After the restore completes, the database should use the default log directory: /home/db2User/db2inst/NODE0000/SQL00001/LOGSTREAM0000 for logging.

#### **WITH** *num-buffers* **BUFFERS**

The number of buffers to be used. The Db2 database system will automatically choose an optimal value for this parameter unless you explicitly enter a value. A larger number of buffers can be used to improve performance when multiple sources are being read from, or if the value of **PARALLELISM** has been increased.

#### **BUFFER** *buffer-size*

The size, in pages, of the buffer used for the restore operation. The Db2 database system will automatically choose an optimal value for this parameter unless you explicitly enter a value. The minimum value for this parameter is eight pages.

The restore buffer size must be a positive integer multiple of the backup buffer size that is specified during the backup operation. If an incorrect buffer size is specified, the buffers are allocated to be of the smallest acceptable size.

#### **REPLACE HISTORY FILE**

Specifies that the restore operation should replace the history file on disk with the history file from the backup image.

#### **REPLACE EXISTING**

If a database with the same alias as the target database alias already exists, this parameter specifies that the restore utility is to replace the existing database with the restored database. This is useful for scripts that invoke the restore utility because the command line processor will not prompt the user to verify deletion of an existing database. If the **WITHOUT PROMPTING** parameter is specified, it is not necessary to specify **REPLACE EXISTING**, but in this case, the operation will fail if events occur that normally require user intervention.

## **REDIRECT**

Specifies a redirected restore operation. To complete a redirected restore operation, this command should be followed by one or more **SET TABLESPACE CONTAINERS** commands or **SET STOGROUP PATHS** commands, and then by a **RESTORE DATABASE** command with the **CONTINUE** option. For example:

```
RESTORE DB SAMPLE REDIRECT
```

```
SET STOGROUP PATHS FOR sg_hot ON '/ssd/fs1', '/ssd/fs2'
SET STOGROUP PATHS FOR sg_cold ON '/hdd/path1', '/hdd/path2'
```

```
RESTORE DB SAMPLE CONTINUE
```

If a storage group has been renamed since the backup image was produced, the storage group name that is specified on the **SET STOGROUP PATHS** command refers to the storage group name from the backup image, not the most recent name.

All commands that are associated with a single redirected restore operation must be invoked from the same window or CLP session.

## **GENERATE SCRIPT *script***

Creates a redirect restore script with the specified file name. The script name can be relative or absolute and the script will be generated on the client side. If the file cannot be created on the client side, an error message (SQL9304N) will be returned. If the file already exists, it will be overwritten. For more information, see the following examples.

## **WITHOUT ROLLING FORWARD**

Specifies that the database is not to be put in rollforward pending state after it has been successfully restored.

If, following a successful restore operation, the database is in rollforward pending state, the **ROLLFORWARD** command must be invoked before the database can be used again.

If this option is specified when restoring from an online backup image, error SQL2537N will be returned.

If the backup image is of a recoverable database, then **WITHOUT ROLLING FORWARD** cannot be specified with **REBUILD** option.

## **PARALLELISM *n***

Specifies the number of buffer manipulators that are to be created during the restore operation. The Db2 database system will automatically choose an optimal value for this parameter unless you explicitly enter a value.

## **COMPRLIB | ENCRLIB *name***

Indicates the name of the library that is used to decompress or decrypt a backup image. The path to the following libraries is \$HOME/sql1lib/lib.

- Encryption libraries: libdb2encr.so (for Linux or UNIX based operating systems); libdb2encr.a (for AIX); and db2encr.dll (for Windows operating systems)
- Compression library: libdb2compr.so (for Linux or UNIX based operating systems); libdb2compr.a (for AIX); and db2compr.dll (for Windows operating systems)
- Encryption and compression libraries: libdb2compr\_encr.so (for Linux or UNIX based operating systems); libdb2compr\_encr.a (for AIX); and db2compr\_encr.dll (for Windows operating systems)

The name must be a fully qualified path that refers to a file on the server. If this parameter is not specified, the Db2 database system attempts to use the library that is stored in the image. If the backup image is not compressed or encrypted, the value of this parameter is ignored. If the specified library cannot be loaded, the operation fails.

#### **COMPROPTS | ENCRYPTS** *string*

Describes a block of binary data that is passed to the initialization routine in the decompression or decryption library. The Db2 database system passes this string directly from the client to the server. Any byte reversal or code page conversion issues are handled by the library. If the first character of the data block is "@", the remainder of the data is interpreted by the Db2 database system as the name of a file that is found on the server. The Db2 database system then replaces the contents of the data block with the contents of this file and passes the new value to the initialization routine instead. The maximum length for the string is 1024 bytes.

For the default Db2 libraries `libdb2compr_enqr.so` (compression and encryption) or `libdb2enqr.so` (encryption only), the format of the **ENCRYPTS** variable is as follows:

`Master Key Label=label-name`

The master key label is optional. If no master key label is specified, the database manager looks in the keystore for a master key label that was used to create the backup image. If you are using other libraries, the format of the **ENCRYPTS** variable depends on those libraries.

#### **NO ENCRYPT**

Specifies that an encrypted database is to be restored into a non-encrypted new or existing database. This option does not work on table space restore unless schema transport is specified with table space restore and the target database is not encrypted.

#### **ENCRYPT**

Specifies that the restored database is to be encrypted. Encryption includes all system, user, and temporary table spaces, indexes, and all transaction log data. All data types within those table spaces are encrypted, including long field data, LOBs, and XML data. You cannot specify this option when restoring into an existing database; for table space-level restore operations; when the **TRANSPORT** option is specified; or when the **USE SNAPSHOT** option is specified.

#### **CIPHER**

Specifies the encryption algorithm that is to be used for encrypting the database. You can choose one of the following FIPS 140-2 approved options:

**AES** Advanced Encryption Standard (AES) algorithm. This is the default.

**3DES** Triple Data Encryption Standard (3DES) algorithm.

#### **MODE CBC**

Specifies the encryption algorithm mode that is to be used for encrypting the database. CBC (Cipher Block Chaining) is the default mode.

### KEY LENGTH *key-length*

Specifies the length of the key that is to be used for encrypting the database. The length can be one of the following values, which are specified in bits:

- 128** Available with AES only
- 168** Available with 3DES only
- 192** Available with AES only
- 256** Available with AES only

### MASTER KEY LABEL

Specifies a label for the master key that is used to protect the key that is used to encrypt the database. The encryption algorithm that is used for encrypting with the master key is always AES. If the master key is automatically generated by the Db2 data server, it is always a 256-bit key.

### *label-name*

Uniquely identifies the master key within the keystore that is identified by the value of the **keystore\_type** database manager configuration parameter. The maximum length of *label-name* is 255 bytes.

### WITHOUT PROMPTING

Specifies that the restore operation is to run unattended. Actions that normally require user intervention will return an error message. When using a removable media device, such as tape or diskette, the user is prompted when the device ends, even if this option is specified.

## Examples

1. In the following example, the database WSDB is defined on all 4 database partitions, numbered 0 - 3. The path /dev3/backup is accessible from all database partitions. The following offline backup images are available from /dev3/backup:

```
wsdb.0.db2inst1.DBPART000.200802241234.001
wsdb.0.db2inst1.DBPART001.200802241234.001
wsdb.0.db2inst1.DBPART002.200802241234.001
wsdb.0.db2inst1.DBPART003.200802241234.001
```

To restore the catalog partition first, then all other database partitions of the WSDB database from the /dev3/backup directory, issue the following commands from one of the database partitions:

```
db2_all '<<+0< db2 RESTORE DATABASE wsdb FROM /dev3/backup
TAKEN AT 200802241234
 INTO wsdb REPLACE EXISTING'
db2_all '<<+1< db2 RESTORE DATABASE wsdb FROM /dev3/backup
TAKEN AT 200802241234
 INTO wsdb REPLACE EXISTING'
db2_all '<<+2< db2 RESTORE DATABASE wsdb FROM /dev3/backup
TAKEN AT 200802241234
 INTO wsdb REPLACE EXISTING'
db2_all '<<+3< db2 RESTORE DATABASE wsdb FROM /dev3/backup
TAKEN AT 200802241234
 INTO wsdb REPLACE EXISTING'
```

The **db2\_all** utility issues the restore command to each specified database partition. When performing a restore using **db2\_all**, you should always

specify **REPLACE EXISTING** and/or **WITHOUT PROMPTING**. Otherwise, if there is prompting, the operation will look like it is hanging. This is because **db2\_all** does not support user prompting.

2. Following is a typical redirected restore scenario for a database whose alias is MYDB:

- a. Issue a **RESTORE DATABASE** command with the **REDIRECT** option.

```
restore db mydb replace existing redirect
```

After successful completion of step 1, and before completing step 3, the restore operation can be aborted by issuing:

```
restore db mydb abort
```

- b. Issue a **SET TABLESPACE CONTAINERS** command for each table space whose containers must be redefined. For example:

```
set tablespace containers for 5 using
(file 'f:\ts3con1' 20000, file 'f:\ts3con2' 20000)
```

To verify that the containers of the restored database are the ones specified in this step, issue the **LIST TABLESPACE CONTAINERS** command.

- c. After successful completion of steps 1 and 2, issue:

```
restore db mydb continue
```

This is the final step of the redirected restore operation.

- d. If step 3 fails, or if the restore operation has been aborted, the redirected restore can be restarted, beginning at step 1.

3. following example is a sample weekly incremental backup strategy for a recoverable database. It includes a weekly full database backup operation, a daily non-cumulative (delta) backup operation, and a mid-week cumulative (incremental) backup operation:

```
(Sun) backup db mydb use tsm
(Mon) backup db mydb online incremental delta use tsm
(Tue) backup db mydb online incremental delta use tsm
(Wed) backup db mydb online incremental use tsm
(Thu) backup db mydb online incremental delta use tsm
(Fri) backup db mydb online incremental delta use tsm
(Sat) backup db mydb online incremental use tsm
```

For an automatic database restore of the images created on Friday morning, issue:

```
restore db mydb incremental automatic taken at (Fri)
```

For a manual database restore of the images created on Friday morning, issue:

```
restore db mydb incremental taken at (Fri)
restore db mydb incremental taken at (Sun)
restore db mydb incremental taken at (Wed)
restore db mydb incremental taken at (Thu)
restore db mydb incremental taken at (Fri)
```

4. To produce a backup image, which includes logs, for transportation to a remote site:

```
backup db sample online to /dev3/backup include logs
```

To restore that backup image, supply a **LOGTARGET** path and specify this path during **ROLLFORWARD**:

```
restore db sample from /dev3/backup logtarget /dev3/logs
rollforward db sample to end of logs and stop overflow log path /dev3/logs
```

5. To retrieve only the log files from a backup image that includes logs:  

```
restore db sample logs from /dev3/backup logtarget /dev3/logs
```
6. In the following example, three identical target directories are specified for a backup operation on database SAMPLE. The data will be concurrently backed up to the three target directories, and three backup images will be generated with extensions .001, .002, and .003.  

```
backup db sample to /dev3/backup, /dev3/backup, /dev3/backup
```

To restore the backup image from the target directories, issue:

```
restore db sample from /dev3/backup, /dev3/backup, /dev3/backup
```

7. The **USE TSM OPTIONS** keywords can be used to specify the TSM information to use for the restore operation. On Windows platforms, omit the **-fromowner** option.
  - Specifying a delimited string:  

```
restore db sample use TSM options '"-fromnode=bar -fromowner=dmcinnis"'
```
  - Specifying a fully qualified file:  

```
restore db sample use TSM options @/u/dmcinnis/myoptions.txt
```

The file *myoptions.txt* contains the following information: **-fromnode=bar**  
**-fromowner=dmcinnis**

8. The following is a simple restore of a multi-partition automatic-storage-enabled database with new storage paths. The database was originally created with one storage path, */myPath0*:
  - On the catalog partition issue: `restore db mydb on /myPath1,/myPath2`
  - On all non-catalog partitions issue: `restore db mydb`
9. A script output of the following command on a non-auto storage database:  

```
restore db sample from /home/jseifert/backups taken at 20050301100417 redirect generate script SAMPLE_NODE0000.clp
```

would look like this:

```
-- ****
-- ** automatically created redirect restore script
-- ****
UPDATE COMMAND OPTIONS USING S ON Z ON SAMPLE_NODE0000.out V ON;
SET CLIENT ATTACH_DBPARTITIONNUM 0;
SET CLIENT CONNECT_DBPARTITIONNUM 0;
-- ****
-- ** initialize redirected restore
-- ****
RESTORE DATABASE SAMPLE
-- USER '<username>'
-- USING '<password>'
FROM '/home/jseifert/backups'
TAKEN AT 20050301100417
-- DBPATH ON '<target-directory>'
INTO SAMPLE
-- NEWLOGPATH '/home/jseifert/jseifert/SAMPLE/NODE0000/LOGSTREAM0000/'
-- WITH <num-buff> BUFFERS
-- BUFFER <buffer-size>
-- REPLACE HISTORY FILE
-- REPLACE EXISTING
REDIRECT
-- PARALLELISM <n>
-- WITHOUT ROLLING FORWARD
-- WITHOUT PROMPTING
;
```

```

-- ** tablespace definition
-- ****
-- **** Tablespace name = SYSCATSPACE
-- ** Tablespace ID = 0
-- ** Tablespace Type = System managed space
-- ** Tablespace Content Type = Any data
-- ** Tablespace Page size (bytes) = 4096
-- ** Tablespace Extent size (pages) = 32
-- ** Using automatic storage = No
-- ** Total number of pages = 5572
-- ****
SET TABLESPACE CONTAINERS FOR 0
-- IGNORE ROLLFORWARD CONTAINER OPERATIONS
USING (
 PATH 'SQLT0000.0'
);
-- ****
-- ** Tablespace name = TEMPSPACE1
-- ** Tablespace ID = 1
-- ** Tablespace Type = System managed space
-- ** Tablespace Content Type = System Temporary data
-- ** Tablespace Page size (bytes) = 4096
-- ** Tablespace Extent size (pages) = 32
-- ** Using automatic storage = No
-- ** Total number of pages = 0
-- ****
SET TABLESPACE CONTAINERS FOR 1
-- IGNORE ROLLFORWARD CONTAINER OPERATIONS
USING (
 PATH 'SQLT0001.0'
);
-- ****
-- ** Tablespace name = USERSPACE1
-- ** Tablespace ID = 2
-- ** Tablespace Type = System managed space
-- ** Tablespace Content Type = Any data
-- ** Tablespace Page size (bytes) = 4096
-- ** Tablespace Extent size (pages) = 32
-- ** Using automatic storage = No
-- ** Total number of pages = 1
-- ****
SET TABLESPACE CONTAINERS FOR 2
-- IGNORE ROLLFORWARD CONTAINER OPERATIONS
USING (
 PATH 'SQLT0002.0'
);
-- ****
-- ** Tablespace name = DMS
-- ** Tablespace ID = 3
-- ** Tablespace Type = Database managed space
-- ** Tablespace Content Type = Any data
-- ** Tablespace Page size (bytes) = 4096
-- ** Tablespace Extent size (pages) = 32
-- ** Using automatic storage = No
-- ** Auto-resize enabled = No
-- ** Total number of pages = 2000
-- ** Number of usable pages = 1960
-- ** High water mark (pages) = 96
-- ****
SET TABLESPACE CONTAINERS FOR 3
-- IGNORE ROLLFORWARD CONTAINER OPERATIONS
USING (
 FILE /tmp/dms1 1000
, FILE /tmp/dms2 1000
);
-- ****

```

```

-- ** Tablespace name = RAW
-- ** Tablespace ID = 4
-- ** Tablespace Type = Database managed space
-- ** Tablespace Content Type = Any data
-- ** Tablespace Page size (bytes) = 4096
-- ** Tablespace Extent size (pages) = 32
-- ** Using automatic storage = No
-- ** Auto-resize enabled = No
-- ** Total number of pages = 2000
-- ** Number of usable pages = 1960
-- ** High water mark (pages) = 96
-- ****
SET TABLESPACE CONTAINERS FOR 4
-- IGNORE ROLLFORWARD CONTAINER OPERATIONS
USING (
 DEVICE '/dev/hdb1' 1000
 , DEVICE '/dev/hdb2' 1000
);
-- ****
-- ** start redirect restore
-- ****
RESTORE DATABASE SAMPLE CONTINUE;
-- ****
-- ** end of file
-- ****

```

10. A script output of the following command on an automatic storage database:

```
restore db test from /home/jseifert/backups taken at 20050304090733 redirect
generate script TEST_NODE0000.clp
```

would look like this:

```

-- ****
-- ** automatically created redirect restore script
-- ****
UPDATE COMMAND OPTIONS USING S ON Z ON TEST_NODE0000.out V ON;
SET CLIENT ATTACH_MEMBER 0;
SET CLIENT CONNECT_MEMBER 0;
-- ****
-- ** initialize redirected restore
-- ****
RESTORE DATABASE TEST
-- USER '<username>'
-- USING '<password>'
FROM '/home/jseifert/backups'
TAKEN AT 20050304090733
ON '/home/jseifert'
-- DBPATH ON <target-directory>
INTO TEST
-- NEWLOGPATH '/home/jseifert/jseifert/TEST/NODE0000/LOGSTREAM0000/'
-- WITH <num-buff> BUFFERS
-- BUFFER <buffer-size>
-- REPLACE HISTORY FILE
-- REPLACE EXISTING
REDIRECT
-- PARALLELISM <n>
-- WITHOUT ROLLING FORWARD
-- WITHOUT PROMPTING
;
-- ****
-- ** storage group definition
-- ** Default storage group ID = 0
-- ** Number of storage groups = 3
-- ****
-- ** Storage group name = SG_DEFAULT
-- ** Storage group ID = 0
-- ** Data tag = None
-- ****
-- SET STOGROUP PATHS FOR SG_DEFAULT
-- ON '/hdd/path1'
-- , '/hdd/path2'

```

```

-- ;
-- **** Storage group name = SG_HOT
-- ** Storage group ID = 1
-- ** Data tag = 1
-- ****
-- SET STOGROUP PATHS FOR SG_HOT
-- ON '/ssd/fs1'
-- , '/ssd/fs2'
-- ;
-- **** Storage group name = SG_COLD
-- ** Storage group ID = 2
-- ** Data tag = 9
-- ****
-- SET STOGROUP PATHS FOR SG_COLD
-- ON '/hdd/slowpath1'
-- ;
-- **** tablespace definition
-- ****
-- ** Tablespace name = SYSCATSPACE
-- ** Tablespace ID = 0
-- ** Tablespace Type = Database managed space
-- ** Tablespace Content Type = Any data
-- ** Tablespace Page size (bytes) = 4096
-- ** Tablespace Extent size (pages) = 4
-- ** Using automatic storage = Yes
-- ** Storage group ID = 0
-- ** Source storage group ID = -1
-- ** Data tag = None
-- ** Auto-resize enabled = Yes
-- ** Total number of pages = 6144
-- ** Number of usable pages = 6140
-- ** High water mark (pages) = 5968
-- ****
-- ** Tablespace name = TEMPSPACE1
-- ** Tablespace ID = 1
-- ** Tablespace Type = System managed space
-- ** Tablespace Content Type = System Temporary data
-- ** Tablespace Page size (bytes) = 4096
-- ** Tablespace Extent size (pages) = 32
-- ** Using automatic storage = Yes
-- ** Total number of pages = 0
-- ****
-- ** Tablespace name = USERSPACE1
-- ** Tablespace ID = 2
-- ** Tablespace Type = Database managed space
-- ** Tablespace Content Type = Any data
-- ** Tablespace Page size (bytes) = 4096
-- ** Tablespace Extent size (pages) = 32
-- ** Using automatic storage = Yes
-- ** Storage group ID = 1
-- ** Source storage group ID = -1
-- ** Data tag = 1
-- ** Auto-resize enabled = Yes
-- ** Total number of pages = 256
-- ** Number of usable pages = 224
-- ** High water mark (pages) = 96
-- ****
-- ** Tablespace name = DMS
-- ** Tablespace ID = 3
-- ** Tablespace Type = Database managed space
-- ** Tablespace Content Type = Any data
-- ** Tablespace Page size (bytes) = 4096
-- ** Tablespace Extent size (pages) = 32
-- ** Using automatic storage = No
-- ** Storage group ID = 2
-- ** Source storage group ID = -1
-- ** Data tag = 9
-- ** Auto-resize enabled = No

```

```

-- ** Total number of pages = 2000
-- ** Number of usable pages = 1960
-- ** High water mark (pages) = 96
-- ****
SET TABLESPACE CONTAINERS FOR 3
-- IGNORE ROLLFORWARD CONTAINER OPERATIONS
USING (
 FILE '/tmp/dms1' 1000
, FILE '/tmp/dms2' 1000
);
-- ****
-- ** Tablespace name = RAW
-- ** Tablespace ID = 4
-- ** Tablespace Type = Database managed space
-- ** Tablespace Content Type = Any data
-- ** Tablespace Page size (bytes) = 4096
-- ** Tablespace Extent size (pages) = 32
-- ** Using automatic storage = No
-- ** Auto-resize enabled = No
-- ** Total number of pages = 2000
-- ** Number of usable pages = 1960
-- ** High water mark (pages) = 96
-- ****
SET TABLESPACE CONTAINERS FOR 4
-- IGNORE ROLLFORWARD CONTAINER OPERATIONS
USING (
 DEVICE '/dev/hdb1' 1000
, DEVICE '/dev/hdb2' 1000
);
-- ****
-- ** start redirect restore
-- ****
RESTORE DATABASE TEST CONTINUE;
-- ****
-- ** end of file
-- ****

```

11. The following are examples of the **RESTORE DB** command using the **SNAPSHOT** option:

Restore log directory volumes from the snapshot image and do not prompt.

`db2 restore db sample use snapshot LOGTARGET INCLUDE without prompting`

Do not restore log directory volumes and do not prompt.

`db2 restore db sample use snapshot LOGTARGET EXCLUDE without prompting`

Do not restore log directory volumes and do not prompt. When **LOGTARGET** is not specified, then the default is **LOGTARGET EXCLUDE**.

`db2 restore db sample use snapshot without prompting`

Allow existing log directories in the current database to be overwritten and replaced when restoring the snapshot image containing conflicting log directories, without prompting.

`db2 restore db sample use snapshot LOGTARGET EXCLUDE FORCE without prompting`

Allow existing log directories in the current database to be overwritten and replaced when restoring the snapshot image containing conflicting log directories, without prompting.

`db2 restore db sample use snapshot LOGTARGET INCLUDE FORCE without prompting`

12. The following are examples of a transport operation using the **RESTORE** command with the **TRANSPORT REDIRECT** option:

Given a source database (TT\_SRC) backup image, with storage paths on /src , and a target database (TT\_TGT) with storage paths on /tgt :

```
> RESTORE DB TT_SRC TABLESPACE (AS1) SCHEMA (KRODGER)
 TRANSPORT INTO TT_TGT REDIRECT
```

SQL1277W A redirected restore operation is being performed. Table space configuration can now be viewed and table spaces that do not use automatic storage can have their containers reconfigured.  
DB20000I The RESTORE DATABASE command completed successfully.

Table space 'AS1' is transported into a container path, similar to:  
/tgt/krodger/NODE0000/TT\_TGT/T0000003/C0000000.LRG

To specify a target storage group for the transported table spaces, the **USING STOGROUP** option of the **RESTORE** command can be used. In the following example both table spaces TS1 and TS2 will be restored into the SG\_COLD storage group:

```
> RESTORE DB TT_SRC TABLESPACE (TS1, TS2) SCHEMA (KRODGER)
 TRANSPORT INTO TT_TGT USING STOGROUP SG_COLD
```

**Note:** The **USING STOGROUP** option of the **RESTORE** command is only valid during a transport operation, and cannot be used to specify a target storage group during any other restore operation.

To perform a transport into the default storage group of the target database, the **USING STOGROUP** option does not need to be specified:

```
> RESTORE DB TT_SRC TABLESPACE (TS3) SCHEMA (KRODGER)
 TRANSPORT INTO TT_TGT
```

The storage group name that is specified on the **RESTORE** command during the **TRANSPORT** operation must currently be defined in the target database. It does not need to be defined within the backup image or source database.

13. The following examples show how to specify encryption options.

Restore into a new encrypted database named CCARDS by using the default encryption options:

```
RESTORE DATABASE ccards ENCRYPT;
```

Restore into the same database by using explicitly provided encryption options to decrypt the backup image:

```
RESTORE DATABASE ccards
 ENCRLIB 'libdb2encr.so'
 ENCRYPTS 'Master key Label=mylabel.mydb.myinstance.myserver';
```

If you cannot remember what master key label was used to protect a backup image, run the **RESTORE DATABASE** command with the **SHOW MASTER KEY DETAILS** encryption option; its output is the equivalent of running the **ADMIN\_GET\_ENCRYPTION\_INFO** table function. The database is not restored. For example:

```
RESTORE DATABASE ccards
 ENCRLIB 'libdb2encr.so'
 ENCRYPTS 'show master key details'
```

The command returns the label for each master key that was used to protect the backup image. The command also returns information about the location of the master key at the time that the backup was taken. This information is available in the `sql1ib/db2dump` directory in a file whose name has the following format:

```
db-name.inst-type.inst-name.
db-partition.timestamp.masterKeyDetails
```

If the parameter **AT DBPARTITIONNUM** is used to re-create a database partition that was dropped (because it was damaged), the database at this database partition will be in the restore-pending state. After re-creating the database partition, the database must immediately be restored on this database partition.

## Usage notes

- In a Db2 pureScale environment, both the **RESTORE** operation using the **REBUILD** option, as well as the ensuing database **ROLLFORWARD** operation, must be performed on a member that exists within the database member topology of

every backup image involved in the operation. For example, suppose the **RESTORE REBUILD** operation uses two backup images: backup-image-A has database member topology {0,1}, and backup-image-B has database member topology {0, 1, 2, 3}. Then, both the **RESTORE** operation and the ensuing **ROLLFORWARD** operation must be performed on either member-0 or member-1 (which exist in all backup images).

- A **RESTORE DATABASE** command of the form `db2 restore db name` will perform a full database restore with a database image and will perform a table space restore operation of the table spaces that are found in a table space image. A **RESTORE DATABASE** command of the form `db2 restore db name tablespace` performs a table space restore of the table spaces that are found in the image. In addition, if a list of table spaces is provided with such a command, the explicitly listed table spaces are restored.
- Following the restore operation of an online backup, you must perform a rollforward recovery.
- You can use the **OPTIONS** parameter to enable restore operations in TSM environments supporting proxy nodes. For more information, see the “Configuring a Tivoli Storage Manager client” topic.
- If a backup image is compressed, the Db2 database system detects this and automatically decompresses the data before restoring it. If a library is specified on the `db2Restore` API, it is used for decompressing the data. Otherwise, a check is made to see if a library is stored in the backup image and if the library exists, it is used. Finally, if a library is not stored in the backup image, the data cannot be decompressed and the restore operation fails.
- If the compression library is to be restored from a backup image (either explicitly by specifying the **COMPRESSION LIBRARY** option or implicitly by performing a normal restore of a compressed backup), the restore operation must be done on the same platform and operating system that the backup was taken on. If the platform the backup was taken on is not the same as the platform that the restore is being done on, the restore operation will fail, even if the Db2 database system normally supports cross-platform restores involving the two systems.
- A backed-up SMS table space can only be restored into an SMS table space. You cannot restore it into a DMS table space, or vice versa.
- To restore log files from the backup image that contains them, the **LOGTARGET** option must be specified, providing the fully qualified and valid path that exists on the Db2 server. If those conditions are satisfied, the restore utility will write the log files from the image to the target path. If a **LOGTARGET** is specified during a restore of a backup image that does not include logs, the restore operation will return an error before attempting to restore any table space data. A restore operation will also fail with an error if an invalid, or read-only, **LOGTARGET** path is specified.
- If any log files exist in the **LOGTARGET** path at the time the **RESTORE DATABASE** command is issued, a warning prompt will be returned to the user. This warning will not be returned if **WITHOUT PROMPTING** is specified.
- During a restore operation where a **LOGTARGET** is specified, if any log file cannot be extracted, the restore operation will fail and return an error. If any of the log files being extracted from the backup image have the same name as an existing file in the **LOGTARGET** path, the restore operation will fail and an error will be returned. The restore database utility will not overwrite existing log files in the **LOGTARGET** directory.
- You can also restore only the saved log set from a backup image. To indicate that only the log files are to be restored, specify the **LOGS** option in addition to

the **LOGTARGET** path. Specifying the **LOGS** option without a **LOGTARGET** path will result in an error. If any problem occurs while restoring log files in this mode of operation, the restore operation will terminate immediately and an error will be returned.

- During an automatic incremental restore operation, only the log files included in the target image of the restore operation will be retrieved from the backup image. Any log files that are included in intermediate images referenced during the incremental restore process will not be extracted from those intermediate backup images. During a manual incremental restore operation, the **LOGTARGET** path should only be specified with the final restore command to be issued.
- Offline full database backups as well as offline incremental database backups can be restored to a later database version, whereas online backups cannot. For multi-partition databases, the catalog partition must first be restored individually, followed by the remaining database partitions (in parallel or serial). However, the implicit database upgrade that is done by the restore operation can fail. In a multi-partition database, it can fail on one or more database partitions. In this case, you can follow the **RESTORE DATABASE** command with a single **UPGRADE DATABASE** command issued from the catalog partition to upgrade the database successfully.
- In a partitioned database environment, a table space can have a different storage group association on different database partitions. When a redirected restore modifies table space containers from DMS to automatic storage, the table space is associated with the default storage group. If a new default storage group is selected in between redirected restores of different database partitions, then the table space will have an inconsistent storage group association across the partitioned database environment. If this occurs, then use the **ALTER TABLESPACE** statement to alter the table space to use automatic storage on all database partitions, and rebalance if necessary.
- The **TRANSPORT** option is supported only when the client and database code page are equal.
- The first path that is passed in must contain the first image sequence. If a specified path contains more than one backup image sequence, they must be listed sequentially and continuously.
- For the Db2 Developer-C Edition, restoring a backup database that has a total size of all table spaces greater than the defined storage size, or restoring on an SMS table space will result in a fail.

### Snapshot restore

Like a traditional (non-snapshot) restore, the default behavior when restoring a snapshot backup image will be to NOT restore the log directories —**LOGTARGET EXCLUDE**.

If the Db2 database manager detects that any log directory's group ID is shared among any of the other paths to be restored, then an error is returned. In this case, **LOGTARGET INCLUDE** or **LOGTARGET INCLUDE FORCE** must be specified, as the log directories must be part of the restore.

The Db2 database manager will make all efforts to save existing log directories (primary, mirror and overflow) before the restore of the paths from the backup image takes place.

If you want the log directories to be restored and the Db2 database manager detects that the pre-existing log directories on disk conflict with the log directories in the backup image, then the Db2 database manager will report an error. In such a case, if you have specified **LOGTARGET**

**INCLUDE FORCE**, then this error will be suppressed and the log directories from the image will be restored, deleting whatever existed beforehand.

There is a special case in which the **LOGTARGET EXCLUDE** option is specified and a log directory path resides under the database directory (for example, /NODExxxx/SQLxxxx/LOGSTREAMxxxxx/). In this case, a restore would still overwrite the log directory as the database path, and all of the contents beneath it, would be restored. If the Db2 database manager detects this scenario and log files exist in this log directory, then an error will be reported. If you specify **LOGTARGET EXCLUDE FORCE**, then this error will be suppressed and those log directories from the backup image will overwrite the conflicting log directories on disk.

### Transporting table spaces and schemas

The complete list of table spaces and schemas must be specified.

The target database must be active at the time of transport.

If an online backup image is used, then the staging database is rolled forward to the end of the backup. If an offline backup image is used, then no rollforward processing is performed.

A staging database consisting of the system catalog table space from the backup image is created under the path specified by the **dftdbpath** database parameter. This database is dropped when the **RESTORE DATABASE** command completes. The staging database is required to extract the DDL used to regenerate the objects in the table spaces being transported.

When transporting table spaces, the Db2 database manager attempts to assign the first available buffer pool of matching page size to the table space that is transported. If the target database does not have buffer pools that match the page size of the table spaces being transported, then a hidden buffer pool might be assigned. Hidden buffer pools are temporary place holders for transported table spaces. You can check the buffer pools assigned to the transported table spaces after transport completes. You can issue the **ALTER TABLESPACE** command to update buffer pools.

If database rollforward detects a table space schema transport log record, the corresponding transported table space will be taken offline and moved into drop pending state. This is because database does not have complete logs of transported table spaces to rebuild transported table spaces and their contents. You can take a full backup of the target database after transport completes, so subsequent rollforward does not pass the point of schema transport in the log stream.

The **TRANSPORT** option to transport table spaces and schemas from the database backup image to the target database is not supported if a schema being transported includes an index with an expression-based key.

### Transporting storage groups

A transport operation cannot modify the currently defined storage groups of the target database, and new storage groups cannot be explicitly created during a transport.

The default target storage group of the transport is the default storage group of the target database of the operation. It is also possible to explicitly redirect all table spaces being restored during a transport operation into a specific storage group on the target database.

During a transport operation, when a **RESTORE** command using the **TRANSPORT REDIRECT** option is issued, the default storage group configuration for automatic storage table spaces is not the configuration that is contained in the backup image, but instead the storage groups and storage group paths of the target database. This is because automatic storage table spaces must be restored and redirected directly into existing storage group paths, as defined on the target database.

#### **Db2 native encryption**

When you restore a database backup image to an existing database, the encryption settings of the existing database are always preserved. If you specify the **ENCRYPT** option, an error is returned because the settings on the **RESTORE** command will not be used.

When you restore into a new database in a partitioned database environment, restore the catalog partition first, specifying the encryption options. You can then restore the other partitions without specifying the encryption options because the database already exists. When you use the **db2\_all** command, target the catalog partitions first.

A backup image that was encrypted with Db2 native encryption must be restored into a database server that has Db2 native encryption available. If you want to restore into a server that is using a Db2 version that does not include Db2 native encryption, you must use an unencrypted backup image.

## **REWIND TAPE**

Rewinds tapes for backup and restore operations to streaming tape devices. This command is only supported on Windows operating systems.

#### **Authorization**

One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT

#### **Required connection**

None

#### **Command syntax**

```
►►REWIND TAPE [ON device]►►
```

#### **Command parameters**

##### **ON *device***

Specifies a valid tape device name. The default value is \\.\TAPE0.

## **ROLLFORWARD DATABASE**

The **ROLLFORWARD DATABASE** command recovers a database by applying transactions recorded in the database log files. The **ROLLFORWARD DATABASE** command can be run

after a database or a table space backup image was restored, or if any table spaces were taken offline by the database due to a media error.

The database must be recoverable (that is, the **logarchmeth1** or **logarchmeth2** database configuration parameters must be set to a value other than OFF) before the database can be recovered with rollforward recovery.

## Scope

In a partitioned database environment, this command can be invoked only from the catalog partition but each partition participates in the rollforward operation. A database or table space rollforward operation to a specified point in time affects all database partitions that are listed in the db2nodes.cfg file. A database or table space rollforward operation to the end of logs affects the database partitions that are specified. If no database partitions are specified, it affects all database partitions that are listed in the db2nodes.cfg file; if rollforward recovery is not needed on a particular partition, that partition is ignored.

In a Db2 pureScale environment, this command can be issued from any member, and online table space-level rollforward operation can be performed while other members are online. Unlike in partitioned database environments in which users can choose to rollforward through a subset of the database partitions, in a Db2 pureScale environment the logs from all members are automatically applied.

If a rollforward operation is in progress on a member when it fails, the **ROLLFORWARD** command can be reissued from any member. The rollforward resumes from where it was left off when the original member failed.

For partitioned tables, you are also required to roll forward related table spaces to the same point in time. This requirement applies to table spaces that contain data partitions of a table. If a single table space contains a portion of a partitioned table, rolling forward to the end of the logs is still allowed.

It is not possible to roll forward through log files created on a previous Db2 release version. This restriction is an important consideration when upgrading to a new Db2 database release version.

## Authorization

One of the following authorities:

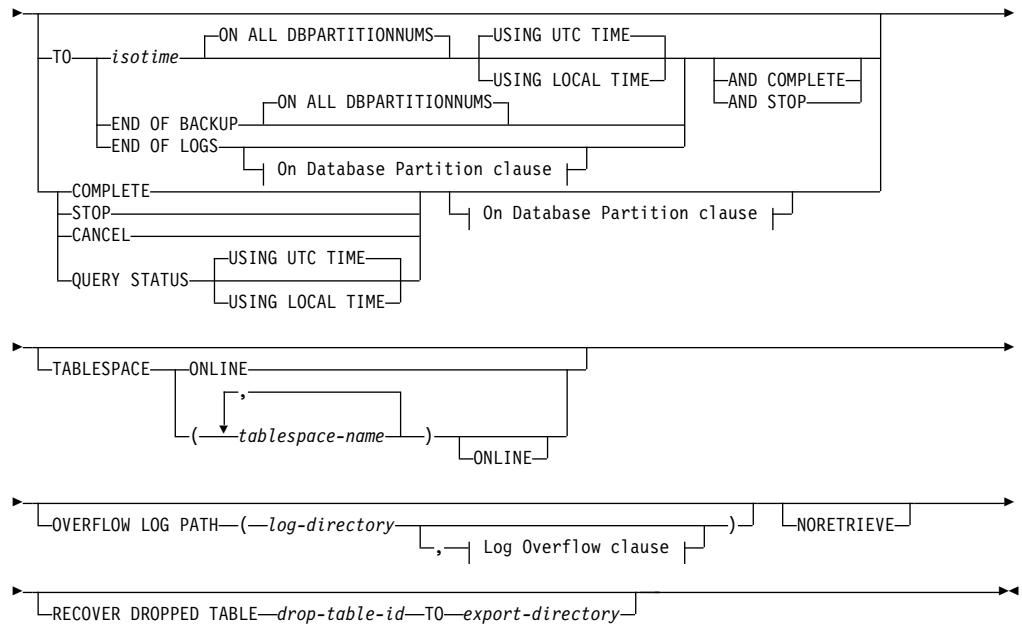
- SYSADM
- SYSCTRL
- SYSMAINT

## Required connection

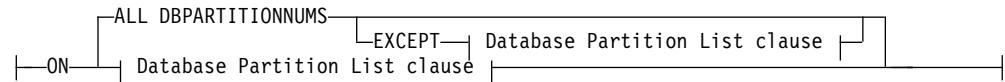
None. This command establishes an exclusive database connection.

## Command syntax

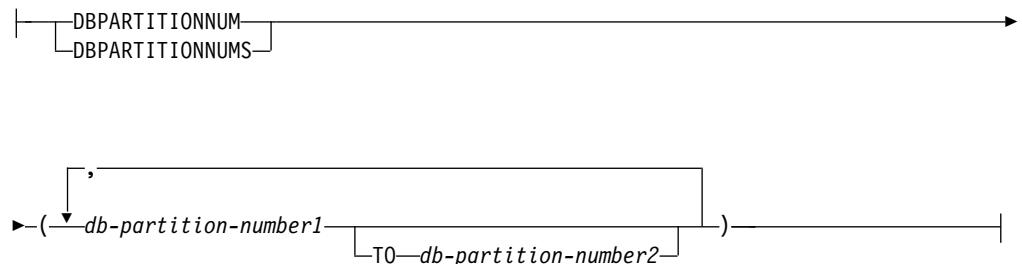
```
►►ROLLFORWARD [DATABASE database-alias] [DB DB] [USER username] [USING password]
```



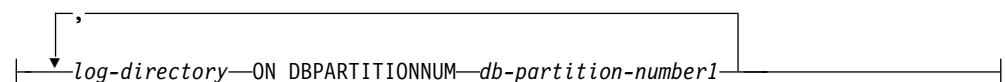
### **On Database Partition clause:**



### **Database Partition List clause:**



### **Log Overflow clause:**



## **Command parameters**

### **DATABASE database-alias**

The alias of the database that is to be rollforward recovered.

### **USER username**

The user name under which the database is to be rollforward recovered.

### **USING password**

The password used to authenticate the user name. If the password is omitted, you will be prompted to enter it.

*isotime*

The point in time to which all committed transactions are to be rolled forward (including the transaction committed precisely at that time, as well as all transactions committed previously). A rollforward operation to a point in time returns a success message only if there is a transaction with a larger timestamp value in the log files. Even if there is no transaction with a larger timestamp, you can still issue a rollforward operation with the **COMPLETE** option.

This value is specified as a time stamp, a 7-part character string that identifies a combined date and time. The format is *yyyy-mm-dd-hh.mm.ss* (year, month, day, hour, minutes, seconds), expressed in Coordinated Universal Time (UTC, formerly known as GMT). UTC helps to avoid having the same time stamp associated with different logs (because of a change in time associated with daylight saving time, for example). The time stamp in a backup image is based on the local time at which the backup operation started. The CURRENT TIMEZONE special register specifies the difference between UTC and local time at the application server. The difference is represented by a time duration (a decimal number in which the first two digits represent the number of hours, the next two digits represent the number of minutes, and the last two digits represent the number of seconds). Subtracting CURRENT TIMEZONE from a local time converts that local time to UTC.

**USING UTC TIME**

Allows you to rollforward to a point in time that is specified as UTC time. This is the default option.

**USING LOCAL TIME**

Allows you to rollforward to a point in time that is the server's local time rather than UTC time.

**Note:**

1. If you specify a local time for rollforward, all messages returned to you will also be in local time. All times are converted on the server, and in partitioned database environments, on the catalog database partition.
2. The timestamp string is converted to UTC on the server, so the time is local to the server's time zone, not the client's. If the client is in one time zone and the server in another, the server's local time should be used.
3. If the timestamp string is close to the time change of the clock due to daylight savings, it is important to know if the stop time is before or after the clock change, and specify it correctly.
4. Subsequent **ROLLFORWARD** commands that cannot specify the **USING LOCAL TIME** clause will have all messages returned to you in local time if this option is specified.
5. It is important to choose the **USING LOCAL TIME** or the **USING UTC TIME** (formerly known as GMT time) correctly. If not specified, the default is **USING UTC TIME**. Any mistake in the selection may cause rollforward to reach a different point in time than expected and truncate the logs after that point in time. Mistaking a local timestamp as a UTC timestamp may cause

- the required logs to be truncated undesirably and prevent further rollforwards to a point later than the mistaken time.
6. Specify a valid timestamp when recovering a database. A valid timestamp would be the time that the last backup in the partitioned database system was completed.
  7. When issuing multiple **ROLLFORWARD DATABASE** commands, the timestamp you specify for each subsequent command must be greater than the timestamp you specified in the previous command.

#### **END OF LOGS**

Specifies that all committed transactions from all online archive log files listed in the database configuration parameter **logpath** are to be applied.

If an **END OF LOGS** rollforward is attempted, you cannot switch to a point-in-time (PIT) rollforward. To rollforward to a PIT when a previous **END OF LOGS** rollforward is in progress, you must redo the restore and then run the rollforward command.

#### **END OF BACKUP**

Specifies that all partitions in the partitioned database, or all members in the Db2 pureScale environment, should be rolled forward to the *minimum recovery time*. See here for an example.

#### **ALL DBPARTITIONNUMS | ON ALL DBPARTITIONNUMS**

Specifies that transactions are to be rolled forward on all database partitions specified in the db2nodes.cfg file. This is the default if a database partition clause is not specified.

**EXCEPT** Specifies that transactions are to be rolled forward on all database partitions specified in the db2nodes.cfg file, except those specified in the database partition list.

#### **ON DBPARTITIONNUM | ON DBPARTITIONNUMS**

Roll the database forward on a set of database partitions.

##### *db-partition-number1*

Specifies a database partition number in the database partition list.

##### *db-partition-number2*

Specifies the second database partition number, so that all database partitions from *db-partition-number1* up to and including *db-partition-number2* are included in the database partition list.

#### **COMPLETE | STOP**

Stops the rolling forward of log records, and completes the rollforward recovery process by rolling back any incomplete transactions and turning off the rollforward pending state of the database. This allows access to the database or table spaces that are being rolled forward. These keywords are equivalent; specify one or the other, but not both. The keyword **AND** permits specification of multiple operations at once; for example, db2 rollforward db sample to end of logs and complete. When rolling table spaces forward to a point in time, the table spaces are placed in backup pending state.

**CANCEL** Cancels the rollforward recovery operation. This puts the database or one or more table spaces on all database partitions on which forward recovery has been started in restore pending state:

- If a *database* rollforward operation is not in progress (that is, the database is in rollforward pending state), this option puts the database in restore pending state.
- If a *table space* rollforward operation is not in progress (that is, the table spaces are in rollforward pending state), a table space list must be specified. All table spaces in the list are put in restore pending state.
- If a table space rollforward operation *is* in progress (that is, at least one table space is in rollforward in progress state), all table spaces that are in rollforward in progress state are put in restore pending state. If a table space list is specified, it must include all table spaces that are in rollforward in progress state. All table spaces on the list are put in restore pending state.
- If rolling forward to a point in time, any table space name that is passed in is ignored, and all table spaces that are in rollforward in progress state are put in restore pending state.
- If rolling forward to the end of the logs with a table space list, only the table spaces listed are put in restore pending state.

This option cannot be used to cancel a rollforward operation *that is actually running*. It can only be used to cancel a rollforward operation that is in progress but not actually running at the time. A rollforward operation can be in progress but not running if:

- It terminated abnormally.
- The **STOP** option was not specified.
- An error caused it to fail. Some errors, such as rolling forward through a non-recoverable load operation, can put a table space into restore pending state.

Use this option with caution, and only if the rollforward operation that is in progress cannot be completed because some of the table spaces have been put in rollforward pending state or in restore pending state. When in doubt, use the **LIST TABLESPACES** command to identify the table spaces that are in rollforward in progress state, or in rollforward pending state.

#### **QUERY STATUS**

Lists the log files that the database manager has processed, the next archive file required, and the time stamp (in UTC) of the last committed transaction since rollforward processing began. In a partitioned database environment and a Db2 pureScale environment, this status information is returned for each database partition or member. The information returned contains the following fields:

##### **Member number**

The member number or database partition number. In a single-partition environment, this is always 0.

##### **Rollforward status**

Status can be: database or table space rollforward pending, database or table space rollforward in progress, database or table space rollforward processing STOP, or not pending.

##### **Next log file to be read**

A string containing the name of the next required log file. In a partitioned database environment, use this information if the rollforward utility fails with a return code indicating that a log file is missing or that a log information mismatch has occurred.

### **Log files processed**

A string containing the names of processed log files that are no longer needed for recovery, and that can be removed from the directory. In a Db2 pureScale environment, this string lists all log files that have been processed by the **ROLLFORWARD** command on all Db2 members. If, for example, the oldest uncommitted transaction starts in log file  $x$ , the range of obsolete log files will not include  $x$ ; the range ends at  $x - 1$ . This field is not updated in case of a table space rollforward recovery operation.

### **Last committed transaction**

A string containing a time stamp in ISO format (*yyyy-mm-dd-hh.mm.ss*) suffixed by either "UTC" or "Local" (see **USING LOCAL TIME**). This time stamp marks the last transaction committed after the completion of rollforward recovery. The time stamp applies to the database. For table space rollforward recovery, it is the time stamp of the last transaction committed to the database.

**QUERY STATUS** is the default value if the **TO**, **STOP**, **COMPLETE**, or **CANCEL** clauses are omitted. If **TO**, **STOP**, or **COMPLETE** was specified, status information is displayed if the command has completed successfully. If individual table spaces are specified, they are ignored; the status request does not apply only to specified table spaces.

### **TABLESPACE**

This keyword is specified for table space-level rollforward recovery.

#### *tablespace-name*

Mandatory for table space-level rollforward recovery to a point in time. Allows a subset of table spaces to be specified for rollforward recovery to the end of the logs. In a partitioned database environment, each table space in the list does not have to exist at each database partition that is rolling forward. If it *does* exist, it must be in the correct state.

For partitioned tables, point in time roll forward of a table space containing any piece of a partitioned table must also roll forward all of the other table spaces in which that table resides to the same point in time. The table spaces containing the index partitions are included in the list of pieces of a partitioned table. Roll forward to the end of the logs for a single table space containing a piece of a partitioned table is still allowed.

If a partitioned table has any attached or detached data partitions, then PIT rollforward must include all table spaces for these data partitions as well. To determine if a partitioned table has any attached, detached, or dropped data partitions, query the Status field of the SYSDATAPARTITIONS catalog table.

Because a partitioned table can reside in multiple table spaces, it will generally be necessary to roll forward multiple table spaces. Data that is recovered via dropped table recovery is written to the export directory specified in the **ROLLFORWARD DATABASE** command. It is possible to roll forward all table spaces in one command, or do repeated roll forward operations for subsets of the table spaces involved. If the **ROLLFORWARD DATABASE** command is done for one or a few table spaces, then all data from the table that resided in those table spaces will be recovered. A warning will be written to the notify log if the **ROLLFORWARD DATABASE** command did not specify the full set of the table spaces necessary to recover all the data for the table. Allowing rollforward of a subset of the

table spaces makes it easier to deal with cases where there is more data to be recovered than can fit into a single export directory.

**ONLINE** This keyword is specified to allow table space-level rollforward recovery to be done online. This means that other agents are allowed to connect while rollforward recovery is in progress. To support concurrency with other applications in a Db2 pureScale environment, the table space-level rollforward operation might need to test for certain internal locks. A rollforward operation in this environment might fail with lock timeout even if **locktimeout** is set to -1.

#### **OVERFLOW LOG PATH** *log-directory*

Specifies an alternate log path to be searched for archived logs during recovery. Use this parameter if log files were moved to a location other than that specified by the **logpath** database configuration parameter. In a partitioned database environment, this is the (fully qualified) default overflow log path for all database partitions. A relative overflow log path can be specified for single-partition databases. The **OVERFLOW LOG PATH** command parameter will overwrite the value (if any) of the database configuration parameter **overflowlogpath**.

#### *log-directory* **ON DBPARTITIONNUM**

In a partitioned database environment, allows a different log path to override the default overflow log path for a specific database partition.

#### **NORETRIEVE**

Allows you to control which log files are to be rolled forward by disabling the retrieval of archived logs.

#### **RECOVER DROPPED TABLE** *drop-table-id*

Recovers a dropped table during the rollforward operation. The table ID can be obtained using the **LIST HISTORY** command, in the Backup ID column of the output listing. For partitioned tables, the *drop-table-id* identifies the table as a whole, so that all data partitions of the table can be recovered in a single rollforward command.

#### **TO** *export-directory*

Specifies a directory to which files containing the table data are to be written. The directory must be accessible to all database partitions.

## Examples

- The **ROLLFORWARD DATABASE** command permits specification of multiple operations at once, each being separated with the **AND** parameter. For example, to roll forward to the end of logs and complete, you can issue the following two commands:

```
db2 rollforward db sample to end of logs
db2 rollforward db sample complete
```

Alternatively, you can use the **AND** parameter to combine the two operations, as follows:

```
db2 rollforward db sample to end of logs and complete
```

However, you should perform the operations in two steps. Before you stop the rollforward operation, it is important to verify that it progressed as you expected and that no logs are missing. This is especially important if a bad log is found during rollforward recovery, and the bad log is interpreted to mean the "end of logs". In such cases, an undamaged backup copy of that log might be used to continue the rollforward operation through more logs. However, if the rollforward **AND STOP** option is used, and the rollforward encounters an error, the

error is returned to you. In this case, the only way to force the rollforward to stop and come online despite the error (that is, to come online at that point in the logs before the error) is to issue the **ROLLFORWARD STOP** command.

- *Example 2:* Roll forward to the end of the logs (two table spaces have been restored):

```
db2 rollforward db sample to end of logs
db2 rollforward db sample to end of logs and stop
```

These two statements are equivalent. Neither **AND STOP** or **AND COMPLETE** is needed for table space rollforward recovery to the end of the logs. Table space names are not required. If not specified, all table spaces requiring rollforward recovery will be included. If only a subset of these table spaces is to be rolled forward, their names must be specified.

- *Example 3:* After three table spaces have been restored, roll one forward to the end of the logs, and the other two to a point in time, both to be done online:

```
db2 rollforward db sample to end of logs tablespace(TBS1) online

db2 rollforward db sample to 1998-04-03-14.21.56 and stop
tablespace(TBS2, TBS3) online
```

Two rollforward operations cannot be run concurrently. The second command can only be invoked after the first rollforward operation completes successfully.

- *Example 4:* A database is restored. Next, a rollforward to a point in time is done, using the **OVERFLOW LOG PATH** parameter to specify the directory where the user exit saves archived logs:

```
db2 rollforward db sample to 1998-04-03-14.21.56 and stop
overflow log path (/logs)
```

- *Example 5 (partitioned database environments):* There are three database partitions: 0, 1, and 2. Table space TBS1 is defined on all database partitions, and table space TBS2 is defined on database partitions 0 and 2. After restoring the database on database partition 1, and TBS1 on database partitions 0 and 2, roll the database forward on database partition 1:

```
db2 rollforward db sample to end of logs and stop
```

This returns warning SQL1271 ("Database is recovered but one or more table spaces are offline on database partition(s) 0 and 2.").

```
db2 rollforward db sample to end of logs
```

This rolls TBS1 forward on database partitions 0 and 2. The clause **TABLESPACE(TBS1)** is optional in this case.

- *Example 6 (partitioned database environments):* Table space TBS1 is restored on database partitions 0 and 2 only. Next, TBS1 is rolled forward on database partitions 0 and 2:

```
db2 rollforward db sample to end of logs
```

Database partition 1 is ignored.

```
db2 rollforward db sample to end of logs tablespace(TBS1)
```

The following command fails because TBS1 is not ready for rollforward recovery on database partition 1. SQL4906N is issued.

```
db2 rollforward db sample to end of logs on dbpartitionnums (0, 2)
tablespace(TBS1)
```

The following command runs successfully:

```
db2 rollforward db sample to 1998-04-03-14.21.56 and stop
tablespace(TBS1)
```

The following command fails because TBS1 is not ready for rollforward recovery on database partition 1; all pieces must be rolled forward together. With table space rollforward recovery to a point in time, the database partition parameter is not accepted. The rollforward operation must take place on all the database partitions on which the table space is located.

```
db2 rollforward db sample to 1998-04-03-14.21.56 and stop
 tablespace(TBS1)
```

This completes successfully.

- *Example 7 (partitioned database environment):* After restoring a table space on all database partitions, roll forward to point in time 2, but do not specify **AND STOP**. The rollforward operation is still in progress. Cancel and roll forward to point in time 1:

```
db2 rollforward db sample to pit2 tablespace(TBS1)
db2 rollforward db sample cancel tablespace(TBS1)
```

```
** restore TBS1 on all database partitions **
```

```
db2 rollforward db sample to pit1 tablespace(TBS1)
db2 rollforward db sample stop tablespace(TBS1)
```

- *Example 8 (partitioned database environments):* A table space is located on multiple database partitions. The following command rolls forward the table space to the end of logs. The database partitions on which the table space is located do not have to be specified. By default, the command uses the db2nodes.cfg file.

```
db2 rollforward database dwtest to end of logs tablespace (tssprod)
```

This operation to the end of logs (not point in time) completes successfully. The database partitions on which the table space resides do not have to be specified. The utility defaults to the db2nodes.cfg file.

- *Example 9 (partitioned database environment):* Rollforward recover six small table spaces that reside on a single-partition database partition group (on database partition 6):

```
db2 rollforward database dwtest to end of logs on dbpartitionnum (6)
 tablespace(tsstore, tssbuyer, tsstime, tsswhse, tsslscat, tssvendor)
```

This operation to the end of logs (not point in time) completes successfully.

- *Example 10 (partitioned database environment or Db2 pureScale environment):* You can use the **TO END OF BACKUP** clause with the **ROLLFORWARD** command to roll forward all database partitions or members to the minimum recovery time. The minimum recovery time is the earliest point in time during a rollforward when a database is consistent (when the objects listed in the database catalogs match the objects that exist on disk). Manually determining the correct point in time to which to roll forward a database is difficult, particularly for a partitioned database or in a Db2 pureScale instance. The **END OF BACKUP** option makes it easy.

```
db2 rollforward db sample to end of backup and complete
```

- *Example 11 (partitioned database environment or Db2 pureScale environment):* The following command restores a database by using an online database backup that includes logs that are restored to the /backup\_logs directory:

```
db2 restore database dwtest ... logtarget /backup_logs ...
```

Then the user does a rollforward to end of backup using the logs from the backup through an overflow log path:

```
db2 rollforward database dwtest to end of backup
 and stop overflow log path (/backup_logs)
```

- *Example 12 (Db2 pureScale environment):* The user wants to provide an alternative set of log files for the rollforward using the overflow log path. Assume that

there are 3 log streams: 0, 1, and 2. To provide an alternative set of log files, the user must create the necessary set of directories:

```
mkdir -p /overflow/NODE0000/LOGSTREAM0000
mkdir -p /overflow/NODE0000/LOGSTREAM0001
mkdir -p /overflow/NODE0000/LOGSTREAM0002
```

Then the user must populate these directories with the log files that will be used.

**Note:** If any of the log files in the overflow log path is also present in the active log path, then the log file from the active log path will be used instead of the one in the overflow log path.

After the directories are populated, the user can issue a rollforward command such as:

```
rollforward database dwtest to end of logs overflow log path (/overflow)
```

After verifying that the rollforward was sufficiently completed, the user can complete the rollforward by issuing the command:

```
rollforward database dwtest to end of logs and stop overflow log path (/overflow)
```

## Usage notes

If restoring from an image that was created during an online backup operation, the specified point in time for the rollforward operation must be later than the time at which the online backup operation completed. If the rollforward operation is stopped before it passes this point, the database is left in rollforward pending state. If a table space is in the process of being rolled forward, it is left in rollforward in progress state.

If one or more table spaces are being rolled forward to a point in time, the rollforward operation must continue at least to the minimum recovery time, which is the last update to the system catalogs for this table space or its tables. The minimum recovery time (in Coordinated Universal Time, or UTC) for a table space can be retrieved using the **LIST TABLESPACES SHOW DETAIL** command. In a Db2 pureScale environment, the **LIST TABLESPACES** command is deprecated; use the following monitoring UDF: `SELECT * FROM TABLE(SYSPROC.MON_GET_TABLESPACE('TBSpace_1,0'))`

In a Db2 pureScale environment, ensure that there is adequate free disk space in the retrieval path before starting a rollforward operation. This allows the operation to retrieve the larger number of files from the archive, as required in a Db2 pureScale environment, without affecting performance. Use the following formula to calculate how much space you need to retrieve the value of the active log space for all members: **(logprimary + logsecond) \* number of members**.

If you want to roll forward a table space that contains a system-period temporal table or bitemporal table to a point in time, the **ROLLFORWARD DATABASE** command must include the name of the table space that contains the associated history table. You can roll forward the table space for the temporal table or the table space for the history table individually, but only to the end of logs.

Rolling databases forward might require a load recovery by using tape devices. If prompted for another tape, you can respond with one of the following inputs:

- c Continue. Continue to use the device that generated the warning message (for example, when a new tape was mounted)

- d** Device terminate. Stop using the device that generated the warning message (for example, when there are no more tapes)
- t** Terminate. Take all affected table spaces offline, but continue rollforward processing.

If the **ROLLFORWARD DATABASE** command cannot find the next log that it needs, the log name is returned in the SQLCA, and rollforward recovery stops. If no more logs are available, use the **STOP** parameter to terminate rollforward recovery. Incomplete transactions are rolled back to ensure that the database or table space is left in a consistent state.

If a database rollforward detects a log record for a table space schema transport, the corresponding transported table space is taken offline and moved into drop pending state. This occurs because of the absence of the complete logs of transported table spaces to rebuild transported table spaces and their contents. You can take a full backup of the target database after the transport is complete so that a subsequent rollforward operation does not pass the point of schema transport in the log stream.

**Note:** Rolling forward through a redistribute operation cannot restore the database content since log records are not recorded for data redistribution. See the “**REDISTRIBUTE DATABASE PARTITION GROUP** command”.

If you extracted log files from a database backup, and you plan to run the **ROLLFORWARD** command with the **TO END OF BACKUP** clause for that database, use the **NORETRIEVE** option. The **NORETRIEVE** option is needed because all the required log files are available and no files need to be retrieved from the archive location. Without using the **NORETRIEVE** option, some archived log files can be retrieved which are not needed for this rollforward. If the archive locations contain log files from other log chains, the **ROLLFORWARD** results in SQLCODE -1265.

## ROTATE MASTER KEY FOR STORAGE ACCESS

Rotates the master key of the keystore where remote storage credentials are stored for remote storage access aliases.

### Authorization

One of the following authorities:

- SYSADM
- SYSCTRL

### Required connection

None

### Command syntax

►►ROTATE MASTER KEY FOR STORAGE ACCESS—————►►

## RUNCMD

Executes a specified command from the CLP interactive mode command history.

## Scope

This command can only be run within CLP interactive mode. Specifically, it cannot be run from the CLP command mode or the CLP batch mode.

## Authorization

None

## Required connection

The required connection will depend on the command being executed.

## Command syntax

```
► [RUNCMD] [num]
```

## Command parameters

**num** If *num* is positive, executes the command corresponding to *num* in the command history. If *num* is negative, executes the command corresponding to *num*, counting backwards from the most recent command in the command history. Zero is not a valid value for *num*. If this parameter is not specified, executes the most recently run command. (This is equivalent to specifying a value of -1 for *num*).

## Usage notes

1. Typically, you would execute the **HISTORY** command to see a list of recently executed commands and then execute the **RUNCMD** to execute a command from this list.
2. The **RUNCMD** command is not recorded in the command history, but the command executed by the **RUNCMD** command is recorded in the command history.

# RUNSTATS

Updates statistics in the system catalog about the characteristics of a table, associated indexes, or statistical views. These characteristics include number of records, number of pages, and average record length. The optimizer uses these statistics to determine access paths to the data.

For a table, call the **RUNSTATS** command when the table had many updates, or after the table is reorganized. For a statistical view, call the **RUNSTATS** command when changes to underlying tables substantially affected the rows that are returned by the view. The view must be previously enabled for use in query optimization by using the **ALTER VIEW** statement.

## Scope

You can issue the **RUNSTATS** command from any database partition in the `db2nodes.cfg` file. You can use the command to update the catalogs on the catalog database partition.

For tables, this command collects statistics for a table on the database partition from which it is invoked. If the table does not exist on that database partition, the first database partition in the database partition group is selected.

For views, this command collects statistics by using data from tables on all participating database partitions.

## Authorization

For a table, you require one of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT
- DBADM
- SQLADM
- CONTROL privilege on the table
- LOAD authority

You do not need any explicit privilege to use this command on any declared temporary table that exists within its connection.

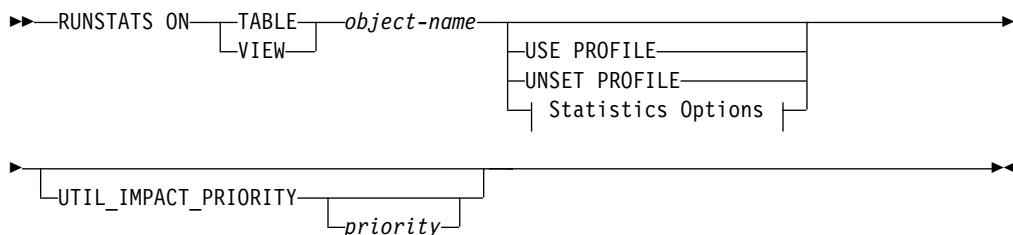
For statistical views, one of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT
- DBADM
- SQLADM
- CONTROL privilege on the statistical view
- LOAD authority

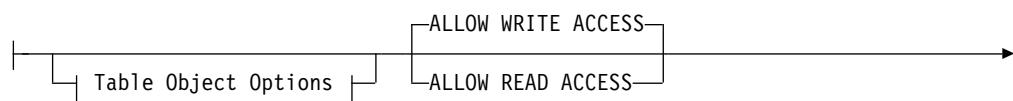
## Required connection

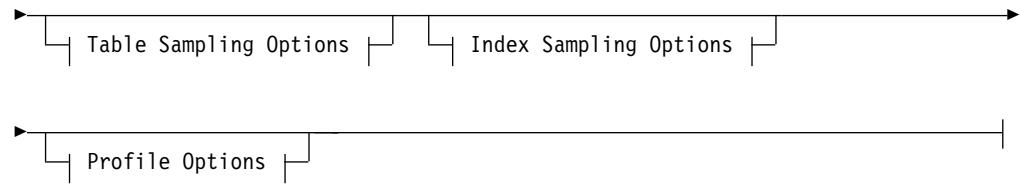
Database

## Command syntax

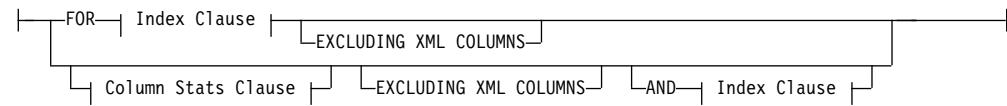


### Statistics Options:

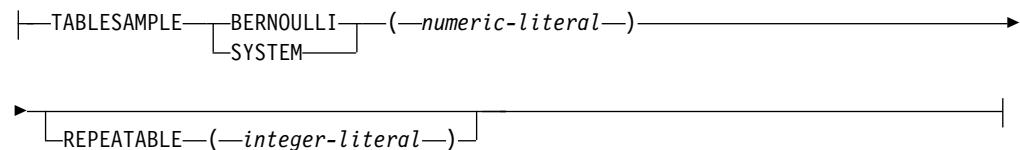




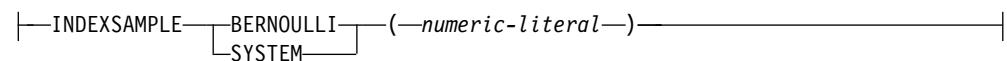
## Table Object Options:



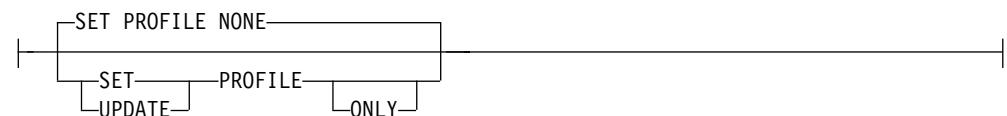
## Table Sampling Options:



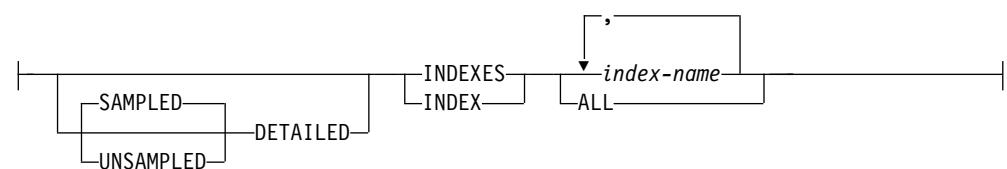
## **Index Sampling Options:**



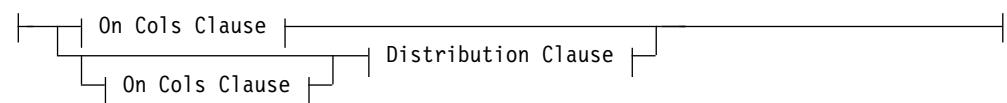
## **Profile Options:**



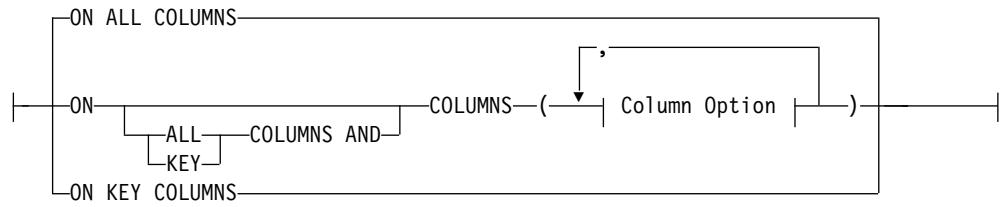
## **Index Clause:**



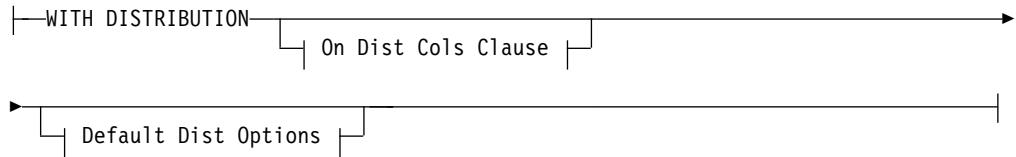
## Column Stats Clause:



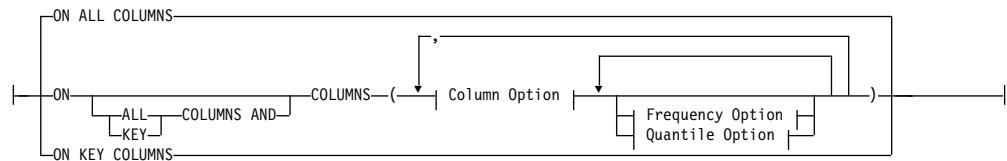
### **On Cols Clause:**



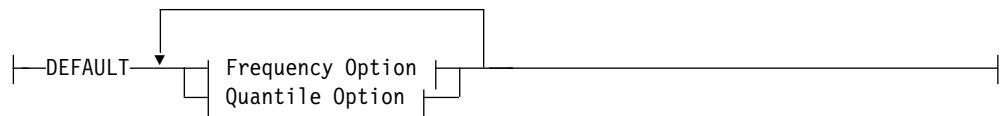
### **Distribution Clause:**



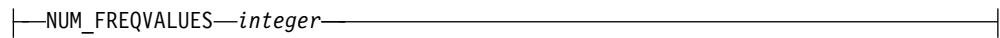
### **On Dist Cols Clause:**



### **Default Dist Option:**



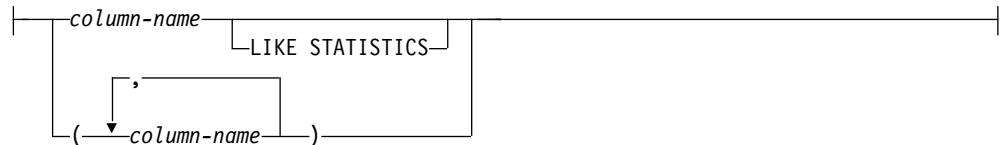
### **Frequency Option:**



### **Quantile Option:**



### **Column Option:**



## Command parameters

### *object-name*

Identifies the table or statistical view on which statistics are to be collected. This parameter must not be a table hierarchy. For typed tables, the value of the *object-name* parameter must be the name of the root table of the table hierarchy. The fully qualified name or alias in the form: *schema.object-name* must be used. The schema is the user name under which the table was created.

### USE PROFILE

This option allows **RUNSTATS** to employ a previously stored statistics profile to gather statistics for a table or statistical view. The statistics profile is created by using the **SET PROFILE** options and is updated by using the **UPDATE PROFILE** options.

### UNSET PROFILE

Removes a statistics profile. For example, the following command removes the profile for the *tablemyschema.mytable* table:

```
RUNSTATS ON tablemyschema.mytable UNSET PROFILE
```

### FOR INDEXES

Collects and updates statistics for the indexes only. If no table statistics was previously collected on the table, basic table statistics are also collected. Updates statistics for table cardinality (CARD), FPAGES, NPAGES, even when table statistics exists. These basic statistics do not include any distribution statistics. This option cannot be used for views. COLCARD of the leading column of the index might also be updated.

### SAMPLED

Used together only with the **DETAILED** parameter. Specifying this option does not change the default functionality from **DETAILED**. The **SAMPLED** parameter is left in for compatibility with previous versions of Db2. This parameter cannot be used for views.

### UNSAMPLED

This option, when used with the **DETAILED** option, forces **RUNSTATS** to examine every entry in the index to compute the extended index statistics. You cannot use the **UNSAMPLED** parameter for views and it cannot be used together with scan index sampling (**INDEXSAMPLE** keyword). This option significantly increases **RUNSTATS** resource consumption, while rarely providing significant improvement over the **DETAILED** or **SAMPLED DETAILED** options, which are equivalent.

### DETAILED

Calculates extended index statistics. The extended index statistics are the CLUSTERFACTOR and PAGE\_FETCH\_PAIRS statistics that are gathered for relatively large indexes. Not all index entries are examined. A CPU sampling technique is employed instead to improve performance. You cannot use this parameter for views.

### *index-name*

Identifies an existing index that is defined on the table. If you do not specify the fully qualified name in the form: *schema.index-name*, the default schema is assumed.

### EXCLUDING XML COLUMNS

Omits all XML-type columns from statistics collection. Using this clause facilitates the collection of statistics on non-XML columns because the inclusion of XML data can require greater system resources. The **EXCLUDING**

**XML COLUMNS** clause takes precedence over other clauses that specify XML columns for statistics collection. For example, if you use the **EXCLUDING XML COLUMNS** clause, and you also specify XML type columns with the **ON COLUMNS** clause or you use the **ON ALL COLUMNS** clause, all XML-type columns are ignored during statistics collection. For Db2 V9.7 Fix Pack 1 and later releases, distribution statistics over XML-type columns are not collected when you specify this parameter.

#### **AND INDEXES**

Collects and updates statistics for both the table and the indexes.

#### **ON ALL COLUMNS**

Collects statistics on all eligible columns. You can use this parameter with the **On Cols** clause or use this parameter with the **On Dist Cols** clause after the **WITH DISTRIBUTION** parameter. The **ON ALL COLUMNS** parameter is the default if you do not specify either of the column-specific clauses.

If it is specified in the **On Cols** clause, all columns have only basic column statistics collected unless specific columns are chosen as part of the **WITH DISTRIBUTION** clause. Those columns that are specified as part of the **WITH DISTRIBUTION** clause will also have basic and distribution statistics collected.

If the **WITH DISTRIBUTION ON ALL COLUMNS** is specified, both basic statistics and distribution statistics are collected for all eligible columns. Therefore, anything specified in the clause is redundant and **notOn Cols** necessary.

#### **ON COLUMNS**

To collect statistics on specific columns, column groups, or both, use the **ON COLUMNS**. A column group is a parenthesized comma-separated list of columns for which you want to collect combined statistics.

The column and column groups are specified as a parenthesized comma-separated list.

Running the **RUNSTATS** command on a table without gathering index statistics but specifying a subset of columns for which statistics are to be gathered has the following effects:

- Statistics are not reset for columns that you do not specify for the **RUNSTATS** command but are the first column in an index.
- Statistics are reset for all other columns that you do not specify for the **RUNSTATS** command.

You can use the **ON COLUMNS** parameter in the **On Cols** clause and the **On Dist Cols** clause. Collecting distribution statistics for a group of columns is not currently supported.

If you specify XML-type columns in a column group, the XML-type columns are ignored for collecting distinct values for the group. However, basic XML column statistics are collected for the XML-type columns in the column group.

#### **ON KEY COLUMNS**

Collects statistics on columns that make up all the indexes that are defined on the table. It is assumed that critical columns in queries are also those that are used to create indexes on the table. If no indexes on the table exist, no column statistics are collected.

You can use the **ON KEY COLUMNS** parameter in the **On Cols** clause or the **On Dist Cols** clause. Specifying the parameter in both clauses is redundant

because if you specify the `ON Dist Cols` clause (after the **WITH DISTRIBUTION** parameter), both basic and distribution statistics are collected.

XML-type columns are by definition not key columns and are not included for statistics collection by the **ON KEY COLUMNS** parameter. You cannot use this parameter for views.

#### *column-name*

Name of a column in the table or statistical view. If you specify the name of an ineligible column for statistics collection, such as a nonexistent column or a mistyped column name, error (-205) is returned. Two lists of columns can be specified, one without distribution and one with distribution. If the column is specified in the list that is not associated with the **WITH DISTRIBUTION** clause, only basic column statistics are collected. If the column appears in both lists, distribution statistics are collected (unless **NUM\_FREQVALUES** and **NUM\_QUANTILES** are set to zero).

#### **LIKE STATISTICS**

Collects additional column statistics for columns of type BINARY, VARBINARY, CHAR, or VARCHAR with a code page attribute of single-byte character set (SBCS), FOR BIT DATA, or UTF-8. The statistics are collected if the **runstats** utility determines that such statistics are appropriate after it analyzes column values. These statistics are shown in the `SUB_COUNT` and the `SUB_DELIM_LENGTH` columns in the `SYSSTAT.COLUMNS` views. The query optimizer uses these statistics to improve the selectivity estimates for predicates of the type "column LIKE '%xyz'" and "column LIKE '%xyz%'".

#### **WITH DISTRIBUTION**

Collects both basic statistics and distribution statistics on columns. If you do not specify the **ON COLUMNS** parameter, distribution statistics are collected on all the columns of the table or statistical view, excluding columns that are ineligible such as columns of type CLOB and LONG VARCHAR. If you specify the **ON COLUMNS** parameter, distribution statistics are collected only on the column list that you provide, excluding those columns that are ineligible for statistics collection.

If you specify the **WITH DISTRIBUTION** parameter followed by the **ON COLUMNS** parameter with column groups, distribution statistics are not collected for the column groups.

#### **DEFAULT**

If you specify the **NUM\_FREQVALUES** and **NUM\_QUANTILES** parameters, the values of the parameters are used to determine the maximum number of frequency and quantile statistics to be collected for the columns. The **NUM\_FREQVALUES** and **NUM\_QUANTILES** parameters are used if you do not specify values for individual columns in the **ON COLUMNS** clause. If you do not specify the **DEFAULT** parameter, the values that are used are the values in the corresponding database configuration parameters.

#### **NUM\_FREQVALUES**

Defines the **DEFAULT** parameter referred to frequency statistics. You can specify this parameter for an individual column after the **ON COLUMNS** parameter. If you instead specify the **NUM\_FREQVALUES** parameter after the **DEFAULT** parameter, the value for the **NUM\_FREQVALUES** parameter after the **DEFAULT** parameter is used. If the specified value is '-1' or you do not specify the **NUM\_FREQVALUES** parameter after either the **ON COLUMNS** or

**DEFAULT** parameter, the maximum number of frequency values is the value of the **num\_freqvalues** database configuration parameter.

#### **NUM\_QUANTILES**

Defines the maximum number of distribution quantile values to collect. It can be specified for an individual column in the **ON COLUMNS** clause. If the value is either not specified or is specified as '**-1**' for an individual column, the quantile limit value is picked up from the value specified in the **DEFAULT** clause. If it is not specified there either, the maximum number of quantile values to be collected are what is set in the **num\_quantiles** database configuration parameter.

For Db2 V9.7 Fix Pack 1 and later releases, distribution statistics for each index over XML data uses a maximum of 250 quantiles as the default. The default can be changed by specifying the **NUM\_QUANTILES** parameter in the **ON COLUMNS** or the **DEFAULT** clause. The **num\_quantiles** database configuration parameter is ignored while it collects XML distribution statistics.

#### **ALLOW WRITE ACCESS**

Specifies that other users can read from and write to the tables while statistics are calculated. For statistical views, these are the base tables that are referenced in the view definition.

The **ALLOW WRITE ACCESS** option is not recommended for tables that have numerous inserts, updates, or deletes occurring concurrently. The **RUNSTATS** command first collects table statistics and then performs index statistics. Changes in the table's state between the time that the table and index statistics are collected might result in inconsistencies. Although having up-to-date statistics is important for the optimization of queries, it is also important to have consistent statistics. Therefore, statistics must be collected at a time when inserts, updates, or deletes are at a minimum.

#### **ALLOW READ ACCESS**

Specifies that other users can have read-only access to the tables while statistics are calculated. For statistical views, these are the base tables that are referenced in the view definition.

#### **TABLESAMPLE BERNoulli**

Collects statistics on a sample of the rows from the table or statistical view. *Bernoulli sampling* considers each row individually, including the row with probability  $P/100$  (where  $P$  is the value of the *numeric-literal* parameter) and excluding it with probability  $1-P/100$ . Thus, if the value of the *numeric-literal* parameter is evaluated to be the value 10, representing a 10% sample, each row would be included with probability 0.1 and be excluded with probability 0.9. Unless you specify the optional **REPEATABLE** parameter, each execution of the **RUNSTATS** command usually yields a different sample of the table. All data pages are retrieved through a table scan, but only the percentage of rows that you specify by using the *numeric-literal* parameter is used for statistics collection.

#### **TABLESAMPLE SYSTEM**

Collects statistics on a sample of the data pages from the tables. *System sampling* considers each page individually, including the page with probability  $P/100$  (where  $P$  is the value of the *numeric-literal* parameter) and excluding it with probability  $1-P/100$ . Unless you specify the optional **REPEATABLE** parameter, each execution of the **RUNSTATS** command usually yields a different sample of the table. You control the size of the sample by specifying the *numeric-literal* parameter in parentheses, which represents an

approximate percentage  $P$  of the table to return. Only a percentage of the data pages, as specified by the *numeric-literal* parameter, is retrieved and used for statistics collection.

For a statistical view, you can apply system sampling to only a single base table that is referenced in the view definition. If the view contains multiple tables, system sampling is possible if a single table in the statistical view can be identified as being joined with all primary keys or unique index columns of the other tables that are used in the view. If the statistical view does not meet those conditions, Bernoulli sampling is to be used instead, and a warning is returned.

#### *numeric-literal*

Specifies the size of the sample to be obtained, as a percentage  $P$ . This value must be a positive number that is less than or equal to 100 and can be from 0 - 1. For example, a value of 0.01 represents one 1/100 of a percent, such that one row in 10,000 is sampled, on average. A value of 0 or 100 is treated as if you did not specify sampling, regardless of whether you specified the **TABLESAMPLE BERNoulli** or **TABLESAMPLE SYSTEM** parameter. A value greater than 100 or less than 0 is treated as an error (SQL1197N).

#### **REPEATABLE (integer-literal)**

When specified after the **TABLESAMPLE** parameter, ensures that repeated executions of the **RUNSTATS** command return the same sample. The *integer-literal* parameter specifies a non-negative integer that represents the seed to be used in sampling. Passing a negative seed results in an error (SQL1197N). The sample set might vary between repeatable **RUNSTATS** command invocations if activity against the table or statistical view that is resulted in changes to the table or statistical view data since the last time that you ran the command with the **TABLESAMPLE REPEATABLE** parameter. Also, to ensure consistent results, the method by which you obtained the sample (by using the **BERNOULLI** or **SYSTEM** parameter) must be the same.

#### **INDEXSAMPLE BERNoulli**

Collects index statistics on a sample of the rows in the index. *Bernoulli sampling* considers each row individually, including the row with probability  $P/100$  (where  $P$  is the value of the **numeric-literal** parameter) and excluding it with probability  $1-P/100$ . Thus, if the **numeric-literal** parameter has the value 10, representing 10%, each row would be included with probability 0.1 and be excluded with probability 0.9. Each execution of the **RUNSTATS** command is likely to yield a different sample of the index. All index pages are retrieved through an index scan, but only the percentage of rows as specified through the **numeric-literal** parameter is used for statistics collection. The **INDEXSAMPLE BERNoulli** parameter is not supported for statistical views.

#### **INDEXSAMPLE SYSTEM**

Collects statistics on a sample of the index pages. *System sampling* considers each page individually, including the page with probability  $P/100$  (where  $P$  is the value of the **numeric-literal** parameter) and excluding it with probability  $1-P/100$ . Each execution of the **RUNSTATS** command usually yields a different sample of the index. You control the size of the sample by specifying the **numeric-literal** parameter in parentheses, which represents an approximate percentage  $P$  of the index to return. Only a percentage of the index pages, as specified by the **numeric-literal** parameter, is retrieved and used for statistics collection. The **INDEXSAMPLE SYSTEM** parameter is not supported for statistical views.

**SET PROFILE NONE**

Specifies that no statistics profile is set for this **RUNSTATS** invocation.

**SET PROFILE**

Generates and stores a specific statistics profile in the system catalog tables and executes the **RUNSTATS** command options to gather statistics.

**SET PROFILE ONLY**

Generates and stores a specific statistics profile in the system catalog tables without running the **RUNSTATS** command options.

**UPDATE PROFILE**

Modifies a statistics profile in the system catalog tables and runs the **RUNSTATS** command options of the updated statistics profile to gather statistics. You cannot use the **UPDATE PROFILE** parameter to remove clauses that are in a statistics profile.

**UPDATE PROFILE ONLY**

Modifies a statistics profile in the system catalog tables without running the **RUNSTATS** command options of the updated statistics profile. You cannot use the **UPDATE PROFILE ONLY** parameter to remove clauses that are in a statistics profile.

**UTIL\_IMPACT\_PRIORITY *priority***

Specifies that **RUNSTATS** is going to be throttled at the level that is specified by *priority*. *priority* is a number in the range of 1 to 100, with 100 representing the highest priority and 1 representing the lowest. The priority specifies the amount of throttling to which the utility is subjected. All utilities at the same priority undergo the same amount of throttling, and utilities at lower priorities are throttled more than utilities at higher priorities. If *priority* is not specified, the **RUNSTATS** has the default priority of 50. Omitting the **UTIL\_IMPACT\_PRIORITY** keyword invokes the **RUNSTATS** utility without throttling support. If the **UTIL\_IMPACT\_PRIORITY** keyword is specified, but the **util\_impact\_lim** configuration parameter is set to 100, then the utility runs unthrottled.

When you use the **RUNSTATS** command on tables in a partitioned database, statistics are collected on only a single database partition. If the database partition from which you ran the **RUNSTATS** command has a partition of the table, the command runs on that database partition. Otherwise, the command runs on the first database partition in the database partition group across which the table is partitioned.

## Examples

- The following command collects basic statistics (no distribution statistics) on the table only, on all columns:

```
RUNSTATS ON TABLE employee
```

- The following command collects statistics on the table only, with distribution statistics on columns empid and empname:

```
RUNSTATS ON TABLE employee
 WITH DISTRIBUTION ON COLUMNS (empid, empname)
```

- The following command collects basic and distribution statistics on the table only, on all columns. The command specifies a maximum number of frequency values and uses the maximum number of distribution quantile values from the configuration setting.

```
RUNSTATS ON TABLE employee WITH DISTRIBUTION DEFAULT
 NUM_FREQVALUES 50
```

- The following command collects basic and distribution statistics on the table only, on all columns and on column group JOB, WORKDEPT, and SEX:
 

```
RUNSTATS ON TABLE employee ON ALL COLUMNS AND COLUMNS ((JOB, WORKDEPT, SEX))
 WITH DISTRIBUTION
```
- The following command collects statistics on a set of indexes:
 

```
RUNSTATS ON TABLE employee FOR INDEXES emp11, emp12
```
- The following command collects statistics on all indexes only:
 

```
RUNSTATS ON TABLE employee FOR INDEXES ALL
```
- The following command collects basic statistics on the table and all indexes, by using sampling for the detailed index statistics collection:
 

```
RUNSTATS ON TABLE employee AND SAMPLED DETAILED INDEXES ALL
```

This command is equivalent to the following one:

```
RUNSTATS ON TABLE employee AND DETAILED INDEXES ALL
```

- The following command collects basic statistics on the table, with distribution statistics on columns empid, empname, and empdept and the two indexes Xempid and Xempname. Distribution statistics limits are set individually for empdept, and the other two columns use a common default.

```
RUNSTATS ON TABLE employee
 WITH DISTRIBUTION ON COLUMNS (empid, empname, empdept NUM_FREQVALUES
 50 NUM_QUANTILES 100)
 DEFAULT NUM_FREQVALUES 5 NUM_QUANTILES 10
 AND INDEXES Xempid, Xempname
```

- The following command collects statistics on all columns that are used in indexes and on all indexes:

```
RUNSTATS ON TABLE employee ON KEY COLUMNS AND INDEXES ALL
```

- The following command collects statistics on all indexes and all columns with distribution and distribution statistics set individually for one of the columns. In this example, T1 contains columns c1, c2, ..., c8

```
RUNSTATS ON TABLE T1
 WITH DISTRIBUTION ON COLUMNS (c1, c2, c3 NUM_FREQVALUES 20
 NUM_QUANTILES 40, c4, c5, c6, c7, c8)
 DEFAULT NUM_FREQVALUES 0, NUM_QUANTILES 0 AND INDEXES ALL
```

```
RUNSTATS ON TABLE T1
 WITH DISTRIBUTION ON COLUMNS (c3 NUM_FREQVALUES 20 NUM_QUANTILES 40)
 AND INDEXES ALL
```

- The following command collects statistics on table T1 for the individual columns c1 and c5 and for the column groups (c2, c3) and (c2, c4). Multicolumn cardinality is useful to the query optimizer when it estimates filter factors for predicates on columns in which the data is correlated.

```
RUNSTATS ON TABLE T1 ON COLUMNS (c1, (c2, c3),
 (c2, c4), c5)
```

- The following command collects statistics on table T1 for the individual columns c1 and c2. For column c1, the command also collects LIKE predicate statistics.

```
RUNSTATS ON TABLE T1 ON COLUMNS (c1 LIKE STATISTICS, c2)
```

- The following command registers a statistics profile to collect basic and distribution statistics on the table only, on all columns. The command specifies a maximum number of frequency values and uses the maximum number of distribution quantile values from the configuration setting.

```
RUNSTATS ON TABLE employee WITH DISTRIBUTION DEFAULT
 NUM_FREQVALUES 50 SET PROFILE
```

- The following command registers a statistics profile to collect basic and distribution statistics on the table only, on all columns. The command specifies a

maximum number of frequency values and uses the maximum number of distribution quantile values from the configuration setting. Statistics are not collected.

```
RUNSTATS ON TABLE employee WITH DISTRIBUTION
 DEFAULT NUM_FREQVALUES 50 SET PROFILE ONLY
```

- The following command modifies the previously registered statistics profile by changing the maximum number of frequency values in the range 50 - 30. The command also updates the statistics as specified.

```
RUNSTATS ON TABLE employee WITH DISTRIBUTION
 DEFAULT NUM_FREQVALUES 30 UPDATE PROFILE
```

- The following command modifies the previously registered statistics profile by changing the maximum number of frequency values in the range 50 - 30. Statistics are not collected.

```
RUNSTATS ON TABLE employee WITH DISTRIBUTION
 DEFAULT NUM_FREQVALUES 30 UPDATE PROFILE ONLY
```

- The following command modifies the previously registered statistics profile by adding column empl\_address and column group (empl\_title, empl\_salary) options. The command also updates the statistics as specified.

```
RUNSTATS ON TABLE employee
 ON COLUMNS (empl_address, (empl_title, empl_salary))
 UPDATE PROFILE
```

- The following command modifies the previously registered statistics profile by adding column empl\_address and column group (empl\_title, empl\_salary) options. Statistics are not collected.

```
RUNSTATS ON TABLE employee
 ON COLUMNS (empl_address, (empl_title, empl_salary))
 UPDATE PROFILE ONLY
```

- The following command collects statistics on a table by using the options that are recorded in the statistics profile for that table:

```
RUNSTATS ON TABLE employee USE PROFILE
```

- The following command queries the **RUNSTATS** command options corresponding to the previously registered statistics profile in the catalogs of the table:

```
SELECT STATISTICS_PROFILE FROM SYSCAT.TABLES WHERE TABNAME =
 'EMPLOYEE'
```

- The following command collects statistics, including distribution statistics, on 30% of the rows:

```
RUNSTATS ON TABLE employee WITH DISTRIBUTION
 TABLESAMPLE BERNOULLI(30)
```

- To control the sample set on which statistics are collected and to be able to repeatedly use the same sample set, you can do so as follows:

```
RUNSTATS ON TABLE employee WITH DISTRIBUTION
 TABLESAMPLE BERNOULLI(30) REPEATABLE(4196)
```

The command results in the same set of statistics if the data is not changed in the interim.

- The following command collects index statistics and table statistics on 1.5% of the data pages. Only table data pages, not index pages, are sampled. In this example, 1.5% of table data pages are used for the collection of table statistics, and all index pages are used for index statistics.

```
RUNSTATS ON TABLE employee AND INDEXES ALL TABLESAMPLE SYSTEM(1.5)
```

- The following command collects table statistics on 1.5% of the data pages and index statistics on 2.5% of the index pages. Both table data pages and index pages are sampled.

```
RUNSTATS ON TABLE employee AND INDEXES ALL TAMPLESAMPLE SYSTEM(1.5)
 INDEXSAMPLE SYSTEM(2.5)
```

- The following command collects statistics for a statistical view, on all columns, without distribution statistics:

```
RUNSTATS ON VIEW product_sales_view
```

- The following command collects basic statistics for a statistical view, with distribution statistics on the category, type and product\_key columns. Distribution statistics limits are set for the category column, and the other columns use a common default.

```
RUNSTATS ON VIEW product_sales_view
 WITH DISTRIBUTION ON COLUMNS (category NUM_FREQVALUES 100 NUM_QUANTILES 100,
 type, product_key) DEFAULT NUM_FREQVALUES 50 NUM_QUANTILES 50
```

- The following command collects basic and distribution statistics for a statistical view on 10% of the rows, by using row-level sampling:

```
RUNSTATS ON VIEW product_sales_view
 WITH DISTRIBUTION TABLESAMPLE BERNoulli (10)
```

- The following command collects basic and distribution statistics for a statistical view on 2.5% of the rows, by using data-page-level sampling. Additionally, this command specifies the repeated use of the same sample set. For this command to succeed, the query must be such that the Db2 database system can successfully push data-page sampling down to one or more tables. Otherwise, an error (SQL 20288N) is issued.

```
RUNSTATS ON VIEW product_sales_view
 WITH DISTRIBUTION TABLESAMPLE SYSTEM (2.5) REPEATABLE(4196)
```

- The following command registers a statistics profile to collect statistics on the view and on all columns with distribution statistics as specified:

```
RUNSTATS ON VIEW product_sales_view
 WITH DISTRIBUTION DEFAULT NUM_FREQVALUES 50 NUM_QUANTILES 50
 SET PROFILE
```

- The following command modifies the previously registered statistics profile. This command also updates the statistics as specified:

```
RUNSTATS ON VIEW salesdb.product_sales_view
 WITH DISTRIBUTION DEFAULT NUM_FREQVALUES 25 NUM_QUANTILES 25
 UPDATE PROFILE
```

## Usage notes

- You should run the **RUNSTATS** command in the following cases:
  - On tables that were modified considerably: For example, if many updates were made, if a significant amount of data was inserted or deleted, or if you ran the **LOAD** command without the statistics option during **LOAD**.
  - On tables that were reorganized by using the **REORG** or **REDISTRIBUTE DATABASE PARTITION GROUP** command.
  - On tables that were row compressed.
  - After you create a new index.
  - Before binding applications whose performance is critical.
  - When the prefetch quantity is changed.
  - On statistical views whose underlying tables that were modified substantially to change the rows that are returned by the view.
  - After you run the **LOAD** command with the **STATISTICS** option, if XML columns exist. Use the **RUNSTATS** utility to collect statistics on XML columns because the **LOAD** command does not collect statistics on these columns, even if you use the **STATISTICS** option. When you use the **RUNSTATS** command to collect statistics for XML columns only, statistics for non-XML columns that

were collected by the **LOAD** command or a previous execution of the **RUNSTATS** utility are retained. If you previously collected statistics on an XML column, those statistics are either dropped if the current command does not collect statistics on that column or are replaced if the current command does collect statistics on that column.

- The options that you choose depend on the specific table and the application. In general, the following guidelines apply:
    - If the table is a critical table in critical queries, is relatively small, or does not change too much and there is not too much activity on the system itself, it might be worth spending the effort on collecting statistics in as much detail as possible.
    - If the time to collect statistics is limited, if the table is relatively large, or if the table is updated frequently, it might be beneficial to run the **RUNSTATS** command on just the set of columns that are used in predicates. This way, you can run the **RUNSTATS** command more often.
    - If time to collect statistics is limited and the effort to tailor the **RUNSTATS** command on a table-by-table basis is a major issue, consider collecting statistics for the KEY columns only. It is assumed that the index contains the set of columns that are critical to the table and are most likely to appear in predicates.
    - If time to collect statistics is limited and table statistics are to be gathered, consider using the **TABLESAMPLE** option to collect statistics on a subset of the table data.
    - If time to collect statistics is limited and index statistics are to be gathered, consider using the **INDEXSAMPLE** option to collect statistics on a subset of the index data.
    - If skew exists in certain columns and predicates of the type "column = constant", it might be beneficial to specify a larger **NUM\_FREQVALUES** value for the columns.
    - Collect distribution statistics for all columns that you use in equality predicates and for which the distribution of values might be skewed.
    - For columns that have range predicates (for example "column >= constant" or "column BETWEEN constant1 AND constant2") or are of the type "column LIKE '%xyz'", it might be beneficial to specify a larger **NUM\_QUANTILES** value.
    - If storage space is a concern and you do not have much time to collect statistics, do not specify high **NUM\_FREQVALUES** or **NUM\_QUANTILES** values for columns that you do not use in predicates.
    - If you need index statistics, and statistics were never collected on the table that contains the index, statistics on both the table and indexes are calculated.
    - If you do not require statistics for XML columns in the table, you can use the **EXCLUDING XML COLUMNS** parameter to exclude all XML columns. This parameter takes precedence over all other parameters that specify XML columns for statistics collection.
  - After the command is run, note the following:
    - To release the locks, you must issue a **COMMIT**.
    - To allow new access plans to be generated, you must rebind the packages that reference the target table.
    - Running the command on portions of the table can result in inconsistencies as a result of activity on the table since you last issued the command. In this case, a warning message is returned.
- If you issue the **RUNSTATS** command on the table only, you might make table-level and index-level statistics inconsistent. For example, you might

collect index-level statistics on a table and later delete a significant number of rows from the table. If you then issue the **RUNSTATS** command on the table only, the table cardinality might be less than the value of FIRSTKEYCARD, which is an inconsistency. Similarly, if you collect statistics on a new index when you create it, the table-level statistics might be inconsistent.

- The **RUNSTATS** command drops previously collected distribution statistics if you request table statistics. For example, the **RUNSTATS ON TABLE** and **RUNSTATS ON TABLE ... AND INDEXES ALL** commands cause previously collected distribution statistics to be dropped. If you run the command on indexes only, previously collected distribution statistics are retained. For example, the **RUNSTATS ON TABLE ... FOR INDEXES ALL** command causes the previously collected distribution statistics to be retained. If you run the **RUNSTATS** command on XML columns only, previously collected basic column statistics and distribution statistics are retained. If you previously collected statistics on an XML column, those statistics are either dropped if the current command does not collect statistics on that column or are replaced if the current command does collects statistics on that column.
- When detached partitions exist on a partitioned table, index keys that still belong to detached data partitions that require cleanup are not counted as part of the keys in the statistics. These keys are not counted because they are invisible and no longer part of the table. They will eventually get removed from the index by asynchronous index cleanup. As a result, statistics that are collected before asynchronous index cleanup is run are misleading. If the **RUNSTATS** command is issued before asynchronous index cleanup completes, it might generate a false alarm for index reorganization or index cleanup based on the inaccurate statistics. After asynchronous index cleanup is run, all the index keys that still belong to detached data partitions that require cleanup is removed and this might eliminate the need for index reorganization.

For partitioned tables, you are encouraged to issue the **RUNSTATS** command after an asynchronous index cleanup is completed to generate accurate index statistics in the presence of detached data partitions. To determine whether detached data partitions exist in the table, you can check the status field in the **SYSCAT.DATAPARTITIONS** catalog view and look for the value L (logically detached), I (index cleanup), or D (detached with dependent MQT).

The **RUNSTATS** command collects statistics for all index partitions of a partitioned index. Statistics in the **SYSSTAT.INDEXES** view for the partitioned index represent an index partition, except for FIRSTKEYCARD, FIRST2KEYCARD, FIRST3KEYCARD, FIRST4KEYCARD, and FULLKEYCARD statistics. Because these statistics are used in cardinality estimates, they are for the entire index and not for an index partition. Distribution statistics (frequent values and quantiles) are not collected for partitioned indexes, but are gathered if **RUNSTATS** is run on the table. Statistics on the leading columns of a partitioned index might not be as accurate as statistics on the leading columns of a nonpartitioned index.

- When the **RUNSTATS** command is run on a table with an expression-based index, and the **RUNSTATS** command includes that index in the **AND INDEXES** or **FOR INDEXES** clause, statistics for expression-based key columns within that index is also collected and will be associated with the system-generated statistical view associated with the index. Expressions cannot be specified as columns in the **RUNSTATS** command (SQL0205N). To collect customized statistics on expression-based index key columns, you can define a statistics profile on the statistical view that is associated with the index by using the column names as they appear in the statistics view. You also need to define a statistics profile on the base table that includes the index in its **INDEXES** clause.

**Note:** When you define a statistics profile on the expression that is based index's statistical view, an automatically generated statistics profile is also associated with the base table, if one does not exist already. After the statistics profiles are defined, a **RUNSTATS** command on the base table with the **USE PROFILE** clause results in the customized statistics being gathered on the expression-based key columns in the index.

- Distribution statistics are collected on indexes over XML data that is defined on an XML column. If you run the **RUNSTATS** command on a table with the **WITH DISTRIBUTION** parameter, collection of distribution statistics on a column of type XML occurs as follows:

- The **RUNSTATS** command must collect both distribution statistics and table statistics to collect distribution statistics for indexes over XML data that is defined on an XML column. Table statistics must be gathered in order for distribution statistics to be collected since XML distribution statistics are stored with table statistics.

An index clause is not required to collect XML distribution statistics.

Specifying only an index clause does not collect XML distribution statistics.

By default, XML distribution statistics use a maximum of 250 quantiles for each index over XML data. When you collect distribution statistics on an XML column, you can change the maximum number of quantiles by specifying a value for the **NUM\_QUANTILES** parameter in the **ON COLUMNS** or the **DEFAULT** clause.

- Distribution statistics are collected for indexes over XML data of type VARCHAR, DOUBLE, TIMESTAMP, and DATE. Distribution statistics are not collected over indexes of type VARCHAR HASHED.
  - Distribution statistics are not collected for partitioned indexes over XML data that is defined on a partitioned table.
- A special system-generated index in the catalog tables represents the range-ordering property of range-clustered tables. When you collect statistics on this type of table, statistics are also collected for the system-generated index. The statistics reflect the fast access of the range lookups by representing the index as a two-level index with as many pages as the base data table and by clustering the base data perfectly along the index order.
- In the **On Dist Cols** clause of the command, the Frequency Option and Quantile Option parameters are not supported for column groups. These parameters are supported for single columns.
- Three types of prefetch statistics cannot be computed in DMS mode. In the index statistics in the index catalogs, you will see a -1 value for the following statistics:
  - **AVERAGE\_SEQUENCE\_FETCH\_PAGES**
  - **AVERAGE\_SEQUENCE\_FETCH\_GAP**
  - **AVERAGE\_RANDOM\_FETCH\_PAGES**
- The statistics profile is stored in a visible string format, which represents the **RUNSTATS** command, in the **STATISTICS\_PROFILE** column of the **SYSCAT.TABLES** system catalog table.
- Statistics collection on XML-type columns is governed by two Db2 registry variables: **DB2\_XML\_RUNSTATS\_PATHID\_K** and **DB2\_XML\_RUNSTATS\_PATHVALUE\_K**. These two registry variables are similar to the **NUM\_FREQVALUES** parameter in that they specify the number of frequency values to collect. If you do not set the parameters, a default of 200 is used.
- When you start running the **RUNSTATS** command, it acquires an IX table lock on the SYSTABLES table and a U lock on the row of the table on which you are gathering statistics. Operations can still read from the SYSTABLES table,

including the row in the table with the U lock. Write operations are also possible if they do not occur against the row with the U lock. However, another reader or writer cannot acquire an S lock on the SYSTABLES table because of the IX lock that the **RUNSTATS** command acquired.

- Statistics are not collected for columns with structured types. If they are specified, columns with these data types are ignored.
- Only AVGCOLLEN and NUMNULLS are collected for columns with LOB or LONG data types. AVGCOLLEN represents the average space in bytes when the column is stored in database memory or a temporary table. This value represents the length of the data descriptor for LOB or LONG data types, except when LOB data is inlined on the data page. The average space that is required to store the column on disk can be different than the value represented by this statistic.
- The **UNSAMPLED DETAILED** option is available to change the way index statistics are collected, but it should be used only in cases where it is clear that the default or **DETAILED** doesn't work.
- When you use the **INDEXSAMPLE** parameter, you cannot specify different index sampling rates for different indexes within a single command. For example, the following command is invalid:

```
runstats on table orders and index o_ck indexsample system(5),
 index o_ok indexsample system(10)
```

You can use the following two **RUNSTATS** commands to achieve the required result:

```
runstats on table orders and index o_ck indexsample system(5)
runstats on table orders for index o_ok indexsample system(10)
```

- If you modified the table since statistics were last collected on the table or its indexes, you must run **RUNSTATS ON TABLE ... AND INDEXES ALL**. If you use **RUNSTATS ON TABLE ... FOR INDEXES ALL**, the resulting statistics might be inconsistent.

## SET CLIENT

Specifies connection settings for the back-end process.

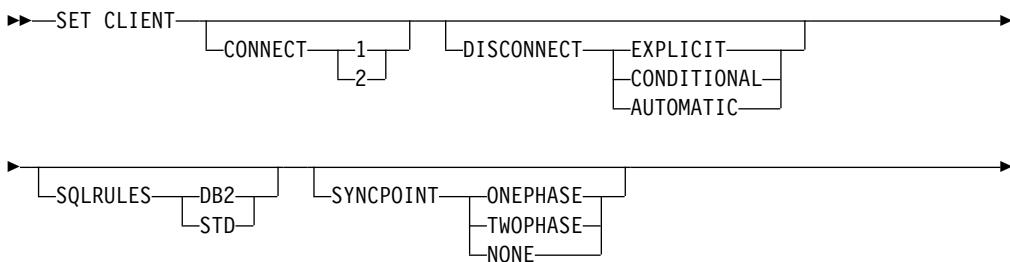
### Authorization

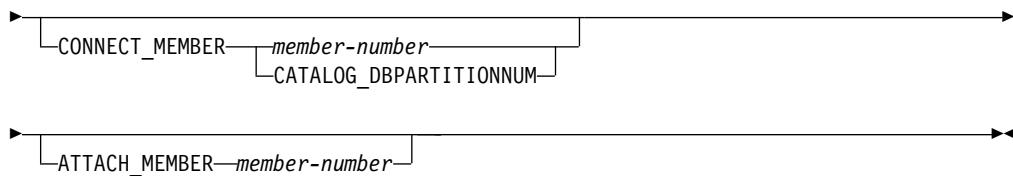
None

### Required connection

None

### Command syntax





## Command parameters

### CONNECT

- 1 Specifies that a CONNECT statement is to be processed as a type 1 CONNECT.
- 2 Specifies that a CONNECT statement is to be processed as a type 2 CONNECT.

### DISCONNECT

#### EXPLICIT

Specifies that only database connections that have been explicitly marked for release by the RELEASE statement are to be disconnected at commit.

#### CONDITIONAL

Specifies that the database connections that have been marked RELEASE or have no open WITH HOLD cursors are to be disconnected at commit.

#### AUTOMATIC

Specifies that all database connections are to be disconnected at commit.

### SQLRULES

- Db2** Specifies that a type 2 CONNECT is to be processed according to the Db2 rules.
- STD** Specifies that a type 2 CONNECT is to be processed according to the Standard (STD) rules based on ISO/ANS SQL92.

### SYNCPOINT

Specifies how commits or rollbacks are to be coordinated among multiple database connections. This command parameter is ignored and is only included here for backward compatibility.

### ONEPHASE

Specifies that no transaction manager (TM) is to be used to perform a two-phase commit. A one-phase commit is to be used to commit the work done by each database in multiple database transactions.

### TWOPHASE

Specifies that the TM is required to coordinate two-phase commits among those databases that support this protocol.

### NONE

Specifies that no TM is to be used to perform a two-phase commit, and does not enforce single updatable, multiple reader. A COMMIT is sent to each participating database. The application is responsible for recovery if any of the commits fail.

## CONNECT\_MEMBER (partitioned database or Db2 pureScale environments)

*member-number*

Specifies the member to which a connect is to be made. For a partitioned database environment, valid values are between zero and 999, inclusive; for a Db2 pureScale environment, valid values are between 0 and 127, inclusive. Overrides the value of the **DB2NODE** environment variable.

**CATALOG\_DBPARTITIONNUM**

In a partitioned database environment, specifying this value permits the client to connect to the catalog database partition of the database without knowing the identity of that database partition in advance. In a Db2 pureScale environment, specifying this option is not permitted (SQLSTATE 56038).

**ATTACH\_MEMBER** *member-number* (partitioned database or Db2 pureScale environments)

Specifies the member to which an attach is to be made. For a change to **ATTACH\_MEMBER** to take effect, you must first detach from the instance using the **DETACH** command, then attach to the instance using the **ATTACH** command. For a partitioned database environment, valid values are between zero and 999, inclusive; for a Db2 pureScale environment, valid values are between 0 and 127, inclusive. Overrides the value of the **DB2NODE** environment variable .

## Examples

To set specific values:

```
db2 set client connect 2 disconnect automatic sqlrules std
syncpoint twophase
```

To change **SQLRULES** back to Db2 rules, but keep the other settings:

```
db2 set client sqlrules db2
```

The connection settings revert to default values after the **TERMINATE** command is issued.

## Usage notes

**SET CLIENT** cannot be issued if one or more connections are active.

If **SET CLIENT** is successful, the connections in the subsequent units of work will use the connection settings specified. If **SET CLIENT** is unsuccessful, the connection settings of the back-end process are unchanged.

In partitioned databases or Db2 pureScale environments, the connection settings could have an impact on acquiring trusted connections. For example, if the **CONNECT\_MEMBER** option is set to a node such that the establishment of a connection on that node requires going through an intermediate node (a hop node), it is the IP address of that intermediate node and the communication protocol used to communicate between the hop node and the connection node that are considered when evaluating this connection in order to determine whether or not it can be marked as a trusted connection. In other words, it is not the original node from which the connection was initiated that is considered. Rather, it is the hop node that is considered.

In partitioned databases or Db2 pureScale environments, the connection settings could have an impact on how the connection is assigned to a member subset. For

example, if the **CONNECT\_MEMBER** option is set to a node such that the establishment of the connection on that node requires going through an intermediate node (a hop node), it is the actual database name that is used by the hop node to establish a connection at the connection node. The actual database name provided by the hop node is considered when assigning the connection to a member subset. It is not the database alias that the original connection targeted that is considered for member subset assignment. It is the database name that is considered for member subset assignment.

## Compatibilities

For compatibility with previous versions:

- **CONNECT\_DBPARTITIONNUM** or **CONNECT\_NODE** can be substituted for **CONNECT\_MEMBER**, except when the **DB2\_ENFORCE\_MEMBER\_SYNTAX** registry variable is set to ON.
- **CATALOG\_NODE** can be substituted for **CATALOG\_DBPARTITIONNUM**.
- **ATTACH\_DBPARTITIONNUM** or **ATTACH\_NODE** can be substituted for **ATTACH\_MEMBER**, except when the **DB2\_ENFORCE\_MEMBER\_SYNTAX** registry variable is set to ON.

## SET RUNTIME DEGREE

Sets the maximum run time degree of intra-partition parallelism for SQL statements for specified active applications.

### Scope

This command affects all database partitions that are listed in the \$HOME/sql11ib/db2nodes.cfg file.

### Authorization

One of the following authorities:

- SYSADM
- SYSCTRL

### Required connection

Instance. To change the maximum run time degree of intra-partition parallelism on a remote server, it is first necessary to attach to that server. If no attachment exists, the **SET RUNTIME DEGREE** command fails.

### Command syntax

```
>>> SET RUNTIME DEGREE FOR ALL [,] (application-handle) TO degree >>>
```

### Command parameters

FOR

**ALL** The specified degree will apply to all applications.

**application-handle**

Specifies the agent to which the new degree applies. List the values using the **LIST APPLICATIONS** command.

### **TO *degree***

The maximum run time degree of intra-partition parallelism.

## **Examples**

The following example sets the maximum run time degree of parallelism for two users, with *application-handle* values of 41408 and 55458, to 4:

```
db2 SET RUNTIME DEGREE FOR (41408, 55458) TO 4
```

## **Usage notes**

This command provides a mechanism to modify the maximum degree of parallelism for active applications. It can be used to override the value that was determined at SQL statement compilation time.

The run time degree of intra-partition parallelism specifies the maximum number of parallel operations that will be used when the statement is executed. The degree of intra-partition parallelism for an SQL statement can be specified at statement compilation time using the CURRENT DEGREE special register or the **DEGREE** bind option. The maximum run time degree of intrapartition parallelism for an active application can be specified using the **SET RUNTIME DEGREE** command. The **max\_querydegree** database manager configuration parameter specifies the maximum run time degree for any SQL statement executing on this instance of the database manager.

The actual run time degree will be the lowest of:

- the **max\_querydegree** configuration parameter
- the application run time degree
- the SQL statement compilation degree.

The value in the CURRENT DEGREE special register and the **intra\_parallel** setting can be overridden in a workload by setting the MAXIMUM DEGREE workload attribute.

## **SET SERVEROUTPUT**

Specifies whether output from the DBMS\_OUTPUT message buffer is redirected to standard output.

### **Authorization**

EXECUTE privilege on the DBMS\_OUTPUT module.

### **Required connection**

Database

### **Command syntax**

```
►—SET SERVEROUTPUT [OFF] [ON]—►
```

### **Command parameters**

**ON** Specifies that messages in the message buffer are redirected to standard output.

**OFF**

Specifies that messages in the message buffer are not redirected to standard output.

## Examples

To redirect messages in the DBMS\_OUTPUT message buffer to standard output, specify SET SERVEROUTPUT ON. In this example, the PUT procedure adds partial lines to the DBMS\_OUTPUT message buffer. When proc1 runs, because SET SERVEROUTPUT ON is specified, the text stored in the DBMS\_OUTPUT message buffer is displayed.

```
SET SERVEROUTPUT ON@

DROP PROCEDURE proc1@

CREATE PROCEDURE proc1()
BEGIN
 CALL DBMS_OUTPUT.PUT('p1 = ' || p1);
 CALL DBMS_OUTPUT.PUT('p2 = ' || p2);
 CALL DBMS_OUTPUT.NEW_LINE;
END@

CALL proc1(10, 'Peter')@

SET SERVEROUTPUT OFF@
```

This example results in the following output:

```
SET SERVEROUTPUT ON
DB20000I The SET SERVEROUTPUT command completed successfully.

DROP PROCEDURE PROC1
DB20000I The SQL command completed successfully.

CREATE PROCEDURE proc1()
BEGIN
 CALL DBMS_OUTPUT.PUT('p1 = ' || p1);
 CALL DBMS_OUTPUT.PUT('p2 = ' || p2);
 CALL DBMS_OUTPUT.NEW_LINE;
END@
DB20000I The SQL command completed successfully.

CALL proc1(10, 'Peter')@

Return Status = 0

p1 = 10
p2 = Peter

SET SERVEROUTPUT OFF
DB20000I The SET SERVEROUTPUT command completed successfully.
```

## Usage notes

Messages are added to the DBMS\_OUTPUT message buffer by the PUT, PUT\_LINE, and NEW\_LINE procedures.

When the command SET SERVEROUTPUT ON executes, it calls the DBMS\_OUTPUT.ENABLE procedure with the default buffer size of 20000 bytes and sets an internal flag in the command line processor (CLP) or command line processor plus (CLPPlus). When this flag is enabled, the application calls the GET\_LINES procedure after executing each SELECT or CALL statement, and

redirects the messages from the message buffer to standard output. To increase the DBMS\_OUTPUT buffer size, call DBMS\_OUTPUT.ENABLE procedure with a larger buffer size after executing SET SERVER OUTPUT ON, for example: CALL DBMS\_OUTPUT.ENABLE( 50000 );

When the command SET SERVEROUTPUT OFF executes: it calls the DBMS\_OUTPUT.DISABLE procedure, messages that are in the message buffer are discarded, and calls to PUT, PUT\_LINE, and NEW\_LINE procedures are ignored. The DBMS\_OUTPUT.GET\_LINES procedure will not be called after each SELECT or CALL statement.

## SET STOGROUP PATHS

Sets the storage paths of a storage group during a redirected restore operation.

A redirected restore is a restore where the storage (table space containers or storage group paths) for the restored database is different from the storage for the source database at the time that you did the backup. Using this command, you can add, change, or remove storage group paths during a redirected restore operation.

### Authorization

One of the following authorities:

- *sysadm*
- *sysctrl*

### Required connection

Database

### Command syntax

```
►►—SET STOGROUP PATHS FOR—storagegroup_name—ON—storage_path—►►
```

### Command parameters

#### FOR *storagegroup\_name*

Identifies the storage group that is used by the database that you are restoring. The storage group name is a one-part name. If you renamed the storage group since you produced the backup image, the storage group name that you specify for this parameter must be the name in the backup image, not the more recent name.

#### ON *storage\_path*

Specifies a new path for an existing storage group that is defined in the database you are restoring. *storage\_path* is a string that specifies one of the following types of paths:

- An absolute path in which containers for automatic storage table spaces are to be created. The maximum length of a path is 175 characters.
- For Windows operating systems, the letter name of the drive on which containers for automatic storage table spaces are to be created must be specified.

The storage path must exist and be accessible on each database partition unless database partition expressions are used.

### Usage notes

- This command cannot be run outside of a database redirected restore process. An error (SQL1638N; SQLSTATE 5U057) results if it is issued at any other time, including if all table spaces associated with the storage group are being restored during a table space restore.
- This command can only be issued on the catalog database partition.
- A backup of a database keeps a record of all the storage group paths in use by the database being backed up. During a restore, all storage paths listed in the backup are checked to see if they currently exist and are accessible. If one or more of the storage paths is inaccessible for any reason, the restore will fail. In order to allow a restore in such a case, the redirecting of storage group paths is supported during the restore.
- Any storage groups that have their paths redefined during a restore operation will not have any changes to their storage paths or media attributes replayed during a subsequent roll forward operation.

## SET TABLESPACE CONTAINERS

Sets the table space container during a redirected restore operation.

A redirected restore is a restore where the storage (table space containers or storage group paths) for the restored database is different from the storage for the source database at the time the backup was done. Using this command you can add, change, or remove table space containers during a redirected restore operation. If, for example, one or more containers become inaccessible for any reason, the restore fails if it is not redirected to different table space containers.

This command can be used to convert existing regular or large database managed table spaces to use automatic storage. It can also be used to re-stripe existing automatic storage table spaces more evenly over the storage paths available to the database.

### Authorization

One of the following authorities:

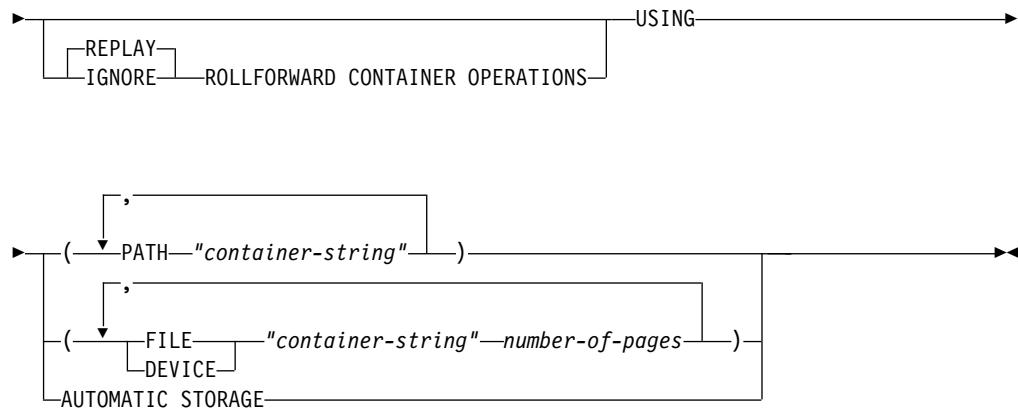
- SYSADM
- SYSCTRL

### Required connection

Database

### Command syntax

►►SET TABLESPACE CONTAINERS FOR—*tablespace-id*—►



## Command parameters

### FOR *tablespace-id*

An integer that uniquely represents a table space used by the database being restored.

### REPLAY ROLLFORWARD CONTAINER OPERATIONS

Specifies that any ALTER TABLESPACE operation issued against this table space since the database was backed up is to be redone during a subsequent roll forward of the database.

### IGNORE ROLLFORWARD CONTAINER OPERATIONS

Specifies that ALTER TABLESPACE operations in the log are to be ignored when performing a roll forward.

### USING PATH "*container-string*"

For an SMS table space, identifies one or more containers that will belong to the table space and into which the table space data will be stored. It is an absolute or relative directory name. If the directory name is not absolute, it is relative to the database directory. The string cannot exceed 240 bytes in length.

### USING FILE | DEVICE "*container-string*" *number-of-pages*

For a DMS table space, identifies one or more containers that will belong to the table space and into which the table space data will be stored. The container type (either **FILE** or **DEVICE**) and its size are specified. A mixture of file and device containers can be specified. The string cannot exceed 254 bytes in length.

For a file container, the string must be an absolute or relative file name. If the file name is not absolute, it is relative to the database directory.

For a device container, the string must be a device name. The device must already exist.

### USING AUTOMATIC STORAGE

Specifies that the table space should be converted to use automatic storage and will be associated with the default storage group. The database will create new containers on the storage paths of the default storage group. Once a table space has been redirected to use automatic storage, no container operations can be applied to the table space.

This option can be used to provide better striping across existing storage paths by redefining the containers of table spaces that are already managed by automatic storage.

**Note:** The table space will be offline while being restored.

This option is not supported for system managed table spaces.

This is the only **USING** clause that can be specified in a Db2 pureScale environment.

## Examples

See the example in **RESTORE DATABASE**.

## Usage notes

A backup of a database, or one or more table spaces, keeps a record of all the table space containers in use by the table spaces being backed up. During a restore, all containers listed in the backup are checked to see if they currently exist and are accessible. If one or more of the containers is inaccessible for any reason, the restore will fail. In order to allow a restore in such a case, the redirecting of table space containers is supported during the restore. This support includes adding, changing, or removing of table space containers. It is this command that allows the user to add, change or remove those containers.

The **IGNORE/REPLAY ROLLFORWARD CONTAINER OPERATIONS** option is ignored when specified with the **USING AUTOMATIC STORAGE** option.

A redirected restore of a table space in a multi-partition environment using the **USING AUTOMATIC STORAGE** option of the **SET TABLESPACE CONTAINERS** command will only convert the table space to automatic storage on the partition being restored. It will not redefine the containers on any other database partition.

By not redefining the containers on other database partitions, the definition of the table space differs on each partition. Later, when adding a database partition, use the **ADD DBPARTITIONNUM** command with the **LIKE DBPARTITIONNUM** option.

Depending on the database partition chosen in this option, the new database partition will have either the table space defined with automatic storage or the table space defined without automatic storage. To remove both the inconsistency in the definitions of the table spaces and the need to decide between the definitions each time a new database partition is added, ensure that the table space definition is the same on all database partitions. For example, if all of the database partitions were subject to a redirected restore followed by using the **USING AUTOMATIC STORAGE** option of the **SET TABLESPACE CONTAINERS** command, then the table space will be converted to automatic storage on all the database partitions. Adding another database partition later will have the same definition for the table space as that found on the other database partitions.

In a partitioned database environment, if a single table space had been redirected on only a subset of the database partitions using the **SET TABLESPACE CONTAINERS** command to alter storage types, then a single table space can be defined as DMS on some database partitions, automatic storage on other database partitions, and a combination of DMS and automatic storage on yet another database partition.

Once you restore a table space, run a subsequent **ALTER TABLESPACE** statement to update the table space's storage group ID in the catalog views.

## SET TAPE POSITION

Sets the positions of tapes for backup and restore operations to streaming tape devices. This command is only supported on Windows operating systems.

### Authorization

One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT

### Required connection

None

### Command syntax

```
►—SET TAPE POSITION—ON—device—T0—position—►
```

### Command parameters

#### ON *device*

Specifies a valid tape device name. The default value is \\.\TAPE0.

#### T0 *position*

Specifies the mark at which the tape is to be positioned. Db2 for Windows writes a tape mark after every backup image. A value of 1 specifies the first position, 2 specifies the second position, and so on. If the tape is positioned at tape mark 1, for example, archive 2 is positioned to be restored.

## SET UTIL\_IMPACT\_PRIORITY

Changes the impact setting for a running utility.

Using this command, you can:

- Throttle a utility that was invoked in unthrottled mode
- Unthrottle a throttled utility (disable throttling)
- Reprioritize a throttled utility (useful if running multiple simultaneous throttled utilities)

### Scope

### Authorization

One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT
- SYSMON

## Required connection

Instance. If there is more than one partition on the local machine, the attachment should be made to the correct partition. For example, suppose there are two partitions and a **LIST UTILITIES** command resulted in the following output:

```
ID = 2
Type = BACKUP
Database Name = IWZ
Partition Number = 1
Description = online db
Start Time = 07/19/2007 17:32:09.622395
State = Executing
Invocation Type = User
Throttling:
Priority = Unthrottled
Progress Monitoring:
Estimated Percentage Complete = 10
Total Work = 97867649689 bytes
Completed Work = 10124388481 bytes
```

The instance attachment must be made to partition 1 in order to issue a **SET UTIL\_IMPACT\_PRIORITY** command against the utility with ID 2. To do this, set DB2NODE=1 in the environment and then issue the instance attachment command.

## Command syntax

```
►—SET UTIL_IMPACT_PRIORITY FOR—utility-id—TO—priority—————►
```

## Command parameters

### *utility-id*

ID of the utility whose impact setting will be updated. IDs of running utilities can be obtained with the **LIST UTILITIES** command.

### *TO priority*

Specifies an instance-level limit on the impact associated with running a utility. A value of 100 represents the highest priority and 1 represents the lowest priority. Setting *priority* to 0 will force a throttled utility to continue unthrottled. Setting *priority* to a non-zero value will force an unthrottled utility to continue in throttled mode.

## Examples

The following example unthrottles the utility with ID 2.

```
SET UTIL_IMPACT_PRIORITY FOR 2 TO 0
```

The following example throttles the utility with ID 3 to priority 10. If the priority was 0 before the change then a previously unthrottled utility is now throttled. If the utility was previously throttled (priority had been set to a value greater than zero), then the utility has been reprioritized.

```
SET UTIL_IMPACT_PRIORITY FOR 3 TO 10
```

## Relationship between UTIL\_IMPACT\_LIM and UTIL\_IMPACT\_PRIORITY settings

The database manager configuration parameter **util\_impact\_lim** sets the limit on the impact throttled utilities can have on the overall workload of the machine. 0-99 is a throttled percentage, 100 is no throttling.

The **SET UTIL\_IMPACT\_PRIORITY** command sets the priority that a particular utility has over the resources available to throttled utilities as defined by the **util\_impact\_lim** configuration parameter. (0 = unthrottled)

Using the backup utility as an example, if the **util\_impact\_lim**=10, all utilities can have no more than a 10% average impact upon the total workload as judged by the throttling algorithm. Using two throttled utilities as an example:

- Backup with **util\_impact\_priority** 70
- Runstats with **util\_impact\_priority** 50

Both utilities combined should have no more than a 10% average impact on the total workload, and the utility with the higher priority will get more of the available workload resources. For both the backup and **RUNSTATS** operations, it is also possible to declare the impact priority within the command line of that utility. If you do not issue the **SET UTIL\_IMPACT\_PRIORITY** command, the utility will run unthrottled (irrespective of the setting of **util\_impact\_lim**).

To view the current priority setting for the utilities that are running, you can use the **LIST UTILITIES** command.

### **Usage notes**

Throttling requires having an impact policy defined by setting the **util\_impact\_lim** configuration parameter.

## **SET WORKLOAD**

Specifies the workload to which the database connection is to be assigned.

This command can be issued before connecting to a database or it can be used to reassign the current connection once the connection has been established. If the connection has been established, the workload reassignment will be performed at the beginning of the next unit of work.

### **Authorization**

None

### **Required connection**

None

### **Command syntax**

```
►► SET WORKLOAD TO [AUTOMATIC | SYSDEFAULTADMWORKLOAD] ►►
```

### **Command parameters**

#### **AUTOMATIC**

Specifies that the database connection will be assigned to a workload chosen by the workload evaluation that is performed automatically by the server.

#### **SYSDEFAULTADMWORKLOAD**

Specifies that the database connection will be assigned to the

**SYSDEFAULTADMWORKLOAD**, allowing users with *accessctrl*, *dataaccess*, *wlmaadm*, *secadm* or *dbadm* authority to bypass the normal workload evaluation.

## Examples

To assign the connection to the **SYSDEFAULTADMWORKLOAD**:

```
SET WORKLOAD TO SYSDEFAULTADMWORKLOAD
```

To reset the workload assignment so that it uses the workload that is chosen by the workload evaluation performed by the server:

```
SET WORKLOAD TO AUTOMATIC
```

## Usage notes

If the session authorization ID of the database connection does not have *accessctrl*, *dataaccess*, *wlmaadm*, *secadm* or *dbadm* authority, the connection cannot be assigned to the **SYSDEFAULTADMWORKLOAD** and an SQL0552N error will be returned. If the **SET WORKLOAD TO SYSDEFAULTADMWORKLOAD** command is issued before connecting to a database, the SQL0552N error will be returned after the database connection has been established, at the beginning of the first unit of work. If the command is issued when the database connection has been established, the SQL0552N error will be returned at the beginning of the next unit of work, when the workload reassignment is supposed to take place.

## SET WRITE

The **SET WRITE** command allows a user to suspend I/O write operations or to resume I/O write operations for a database.

Typical use of this command is for splitting a mirrored database. This type of mirroring is achieved through a disk storage system.

This new state, SUSPEND\_WRITE, is visible from the Snapshot Monitor. This state guarantees that the existing write operations are completed and no new write operations can be performed. All table spaces need not be in NORMAL state for the command to execute successfully.

## Scope

This command only affects the database partition where the command is issued. In partitioned database environments, you must issue it on all the database partitions. In Db2 pureScale environments, you can issue it from any member to suspend I/O write operations for all the members, or to resume I/O write operations for all the suspended members.

## Authorization

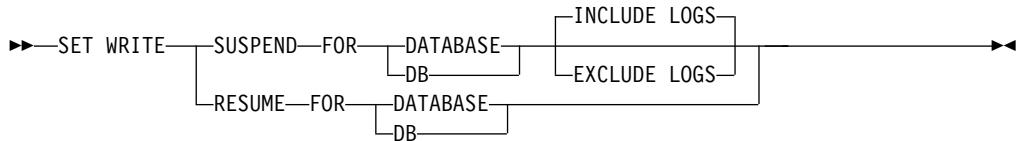
The authorization of this command requires the issuer to have one of the following privileges:

- SYSADM
- SYSCTRL
- SYSMAINT

## Required Connection

Database

## Command Syntax



## Command Parameters

### SUSPEND

Suspends the I/O write operations, such as writing to the logs, extending a table, and any subsequent I/O write actions/functions. All database operations, apart from online backup and restore, function normally while I/O write operations are suspended. However, some operations might wait while attempting to flush dirty pages from the buffer pool or log buffers to the logs. These operations continue after you resume the I/O write operations for the database.

### RESUME

Resumes the I/O write operations. In Db2 pureScale environments, this parameter resumes the I/O write operations for all suspended members.

### INCLUDE LOGS

Specifies that writes to the log files are not allowed when the database is in a write-suspended state. This is the default.

### EXCLUDE LOGS

Specifies that writes to the log files (but not to log file header and mirror log file header files) can occur when the database is in a write-suspended state. This provides a window during which update transactions running against the database can still complete. This can help to reduce the impact on the workload that would normally occur while the database is write suspended. Any copies of the database that are taken while it is write suspended and the EXCLUDE LOGS option is specified must not include log files in the copy.

**Note:** There are some situations in which logged operations can still be blocked from proceeding. This can happen, for example, if the current active log file is full.

## Usage notes

Starting in Db2 V10.1, certain commands like **db2 list tablespaces show detail** might hang during a **set write suspend**. This hang is an expected behavior, and is due to changes to the Db2 latching protocol between V9.7 and V10.1; which is used to get the most up to date used page data. Since the Db2 V9.7 **db2 list tablespaces** command is deprecated, it is suggested that you use the **db2pd -d dbname -tablespaces** command to retrieve the same information.

You can determine whether the I/O write operations are suspended by viewing the setting of the **suspend\_io** database configuration parameter. To view database

configuration information, you can use the **GET DATABASE CONFIGURATION** command, the DBCFG administrative view, the **db2pd** command with the **-dbcfg** parameter, or the db2CfgGet API.

You can use the FLUSH BUFFERPOOLS statement before using the **SET WRITE** command to minimize the recovery time of a split-mirror database. Issuing the statement can be useful if you plan on using a split-mirror database as a backup image or if you plan to create a backup image using the split-mirror database.

A connection attempt will fail if dirty pages must be flushed from the buffer pool to disk but it is impossible to resume I/O write operations by using the **SET WRITE** command. To resolve the connection failure, issue the **RESTART DATABASE** command with the **WRITE RESUME** parameter. In this scenario, the **RESTART DATABASE** command resumes write operations without performing crash recovery. The **RESTART DATABASE** command with the **WRITE RESUME** parameter performs crash recovery only when you use the command after a database crash.

The table spaces can be in transient states such as SQLB\_MOVE\_IN\_PROGRESS or SQLB\_BACKUP\_IN\_PROGRESS for this command to succeed.

## **START DATABASE MANAGER**

Starts the database manager on the target member or all members. In a Db2 pureScale environment, this command also starts the cluster caching facility (CF).

This command is not valid on a client.

### **Scope**

In a multi-partitioned database environment, this command affects all database partitions that are listed in the \$HOME/sql1lib/db2nodes.cfg file, unless the **DBPARTITIONNUM** parameter is used.

### **Authorization**

One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT

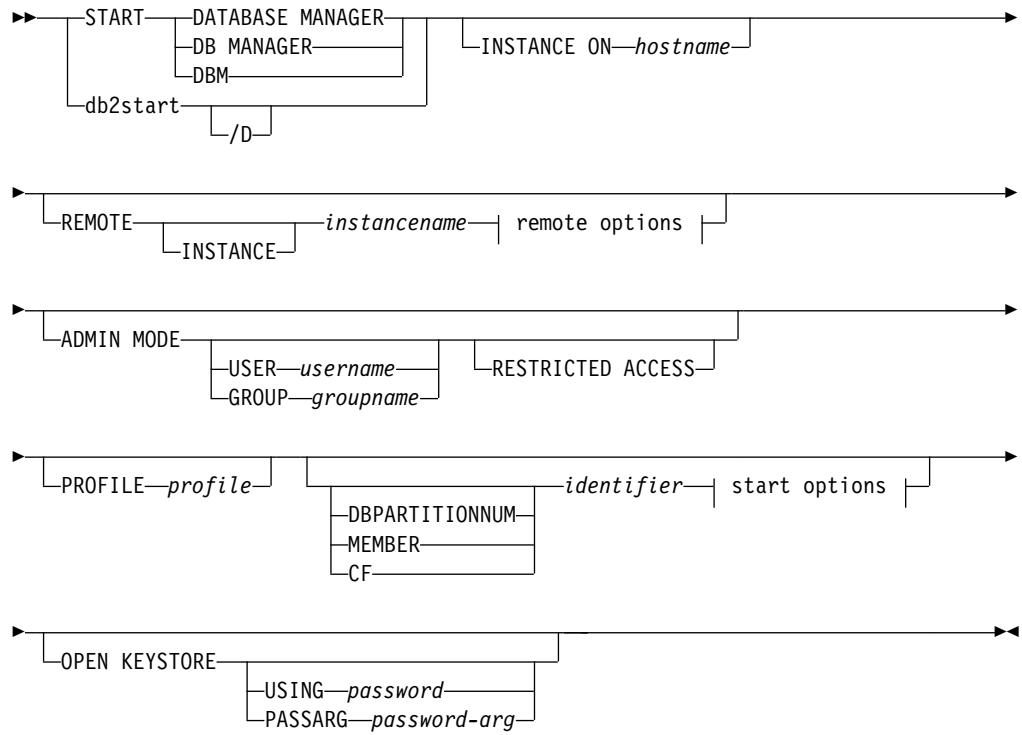
The **ADD DBPARTITIONNUM** start option requires either SYSADM or SYSCTRL authority.

You must meet Windows operating system requirements for starting a service. If Extended Security is disabled, you must be a member of the Administrators, Server Operators, or Power Users group. If Extended Security is enabled, you must be a member of either the Administrators group or the DB2ADMNS group to start the database.

### **Required connection**

None

## Command syntax



### remote options:

```

 |---- ADMINNODE nodename
 |---- HOSTNAME hostname
 |---- USER username
 |---- USING password

```

### start options:

```

 |---- ADD DBPARTITIONNUM |---- add dbpartitionnum options
 |---- STANDALONE
 |---- RESTART |---- restart options

```

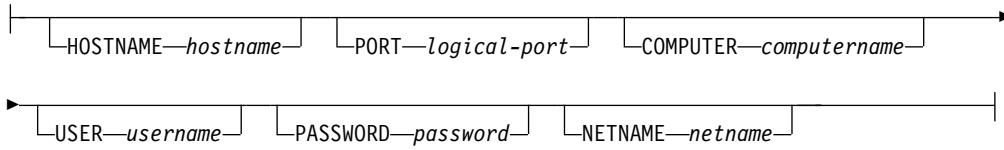
### add dbpartitionnum options:

```

 |---- HOSTNAME hostname |---- PORT logical-port |---- COMPUTER computer-name
 |---- USER username |---- PASSWORD password |---- NETNAME netname
 |---- LIKE DBPARTITIONNUM db-partition-number
 |---- WITHOUT TABLESPACES

```

### restart options:



## Command parameters

**/D** Allows the Db2 product installation on Windows to be run as a process. Note that you cannot use the **/D** parameter to start a Db2 instance as a process in a partitioned database environment.

### **INSTANCE ON** *hostname*

Specifies to start the Db2 instance on a particular host of the Db2 pureScale instance after maintenance operations have been completed. If used outside of a Db2 pureScale environment, an SQL1695N error is returned.

### **REMOTE** [**INSTANCE**] *instancename*

Specifies the name of the remote instance you want to start.

### **ADMINNODE** *nodename*

With **REMOTE**, or **REMOTE INSTANCE**, specifies the name of the administration node.

### **HOSTNAME** *hostname*

With **REMOTE**, or **REMOTE INSTANCE**, specifies the name of the host node.

### **USER** *username*

With **REMOTE**, or **REMOTE INSTANCE**, specifies the name of the user.

### **USING** *password*

With **REMOTE**, or **REMOTE INSTANCE**, and **USER**, specifies the password of the user.

### **ADMIN MODE**

Starts the instance in quiesced mode for administration purposes. This parameter is equivalent to the **QUIESCE INSTANCE** command except in this case the instance is not already “up”, and therefore there is no need to force the connections OFF.

If the **ADMIN MODE** option is specified alone, the databases within the quiesced instance will be activated to do authorization checking for all connect attempts to the database. This is necessary to determine if the connecting user ID has DBADM authority; this authority is stored in the database catalog and the database must be activated to determine if the user ID has it. To prevent this authorization checking from happening, specify the **RESTRICTED ACCESS** option.

### **USER** *username*

With **ADMIN MODE**, specifies the name of the user.

### **GROUP** *groupname*

With **ADMIN MODE**, specifies the name of the group.

### **RESTRICTED ACCESS**

Specify this option to prevent authorization checking for all connect attempts to the databases of a quiesced instance to determine if the user ID has DBADM authority. Instance-level

authorization checking can still occur; checking a user ID for SYSADM, SYSCTRL, or SYSMAINT authority does not require a database to be activated.

All of the following parameters are valid in an Enterprise Server Edition (ESE) environment only.

**PROFILE** *profile*

Specifies the name of the profile file to be executed at each database partition to define the Db2 environment. This file is executed before the database partitions are started. The profile file must reside in the `sql1ib` directory of the instance owner. The environment variables in the profile file are not necessarily all defined in the user session.

*identifier*

Specifies the numeric identifier without having to specify the **DBPARTITIONNUM**, **MEMBER**, or **CF** parameters.

**DBPARTITIONNUM** *identifier*

This parameter option is valid only in a partitioned database environment. Specifies the member to be started. If no identifier is specified, a normal startup is done on the local database partition. Valid values are from 0 to 999 inclusive.

**MEMBER** *identifier*

Specifies the member to be started. In a Db2 pureScale environment, valid values are from 0 to 127 inclusive.

**CF** *identifier*

This parameter option is valid only in a Db2 pureScale environment. Specifies the cluster caching facility (CF) to be started. Valid values are 128 and 129. If used outside of a Db2 pureScale environment, an SQL1695N error is returned.

**ADD DBPARTITIONNUM**

Specifies that the new database partition server is added to the `db2nodes.cfg` file of the instance owner with the **HOSTNAME** and **PORT** parameter values. This option is valid in only a partitioned database environment.

Ensure that the combination of the **HOSTNAME** and **PORT** parameter values is unique.

The add database partition server utility is executed internally to create all existing databases on the database server partition being added. The new database partition server is automatically added to the `db2nodes.cfg` file.

**Note:** Any uncataloged database is not recognized when adding a new database partition. The uncataloged database will not be present on the new database partition. An attempt to connect to the database on the new database partition returns the error message SQL1013N.

If the ADD request is made in an environment that has two or more active database partition servers, the new database partition server is visible to the environment when the ADD processing completes.

If the ADD request is made in an environment that has one database partition server and it is active, after ADD processing completes, the new database partition server is inactive. The instance must be restarted by using **db2stop** and **db2start** before the new database partition server can participate in the partitioned database environment. If the ADD request is

made in an environment that has one database partition server and it is inactive, after ADD processing completes, the new database partition server (or servers, if more than one is added) is active. Only the original database partition server needs to be started.

A newly added database partition is configured during ADD processing as follows:

1. In a multi-partition environment, the new database partition is configured using the database configuration parameter values from a noncatalog database partition.
2. In a single-partition environment, the new database partition is configured using the database configuration parameter values from the catalog partition.
3. If a problem occurs in copying the database configuration parameter values to the new database partition, the new database partition is configured using the default database configuration parameter values.

**HOSTNAME** *hostname*

With the **ADD DBPARTITIONNUM** parameter, specifies the host name to be added to the db2nodes.cfg file.

**PORT** *logical-port*

With **ADD DBPARTITIONNUM**, specifies the logical port to be added to the db2nodes.cfg file. Valid values are from 0 to 999.

**COMPUTER** *computername*

The computer name for the machine on which the new database partition is created. This parameter is mandatory on Windows, but is ignored on other operating systems.

**USER** *username*

The user name for the account on the new database partition. This parameter is mandatory on Windows, but is ignored on other operating systems.

**PASSWORD** *password*

The password for the account on the new database partition. This parameter is mandatory on Windows, but is ignored on other operating systems.

**NETNAME** *netname*

Specifies the netname to be added to the db2nodes.cfg file. If not specified, this parameter defaults to the value specified for the **HOSTNAME** parameter.

**LIKE DBPARTITIONNUM** *db-partition-number*

Specifies that the containers for the system temporary table spaces are the same as the containers on the specified db-partition-number value for each database in the instance. The database partition specified must be a database partition that is already in the db2nodes.cfg file. For system temporary table spaces that use automatic storage, the containers might not necessarily match those containers from the partition specified. Instead, containers are automatically assigned by the database manager based on the storage paths that are associated with the database. This automatic assignment might result in the same containers being used on these two partitions.

**WITHOUT TABLESPACES**

Specifies that containers for the system temporary table spaces are

not created for any of the databases. The ALTER TABLESPACE statement must be used to add system temporary table space containers to each database before the database can be used. This option is ignored for system temporary table spaces that are defined to use automatic storage (this refers to system temporary table spaces that were created with the MANAGED BY AUTOMATIC STORAGE clause of the CREATE TABLESPACE statement or where no MANAGED BY CLAUSE was specified at all). For these table spaces, there is no way to defer container creation. Containers are automatically assigned by the database manager based on the storage paths that are associated with the database.

#### **STANDALONE**

This option is valid only in a partitioned database environment. Specifies that the database partition is to be started in stand-alone mode. FCM does not attempt to establish a connection to any other database partition. This option is used when adding a database partition.

#### **RESTART**

This option is valid only in a partitioned database environment. Starts the database manager after a failure. Other database partitions are still operating, and this database partition attempts to connect to the others. If the **HOSTNAME** and the **LOGICAL-PORT** parameters are not specified, the database manager is restarted using the host name and port values specified for the partition in db2nodes.cfg. If either value is specified, the new values are sent to the other database partitions when a connection is established. The db2nodes.cfg file is updated with this information. When using the RESTART option to update the db2nodes.cfg file, do not remove the database partition entry with port 0 until the other database partitions with higher port numbers are removed.

##### **HOSTNAME *hostname***

You can use the **HOSTNAME** parameter with the **RESTART** parameter to restart a database partition on a different machine than is specified in the database partition configuration file, db2nodes.cfg.

##### **Restriction:**

When you are using the Db2 High Availability Feature, do not use the **HOSTNAME** option with the **RESTART** parameter to restart a database partition on a different machine. To restart or move a database partition from one machine in a Db2 pureScale instance to another machine, use the Db2 high availability instance configuration utility (**db2haicu**).

##### **PORT *logical-port***

With **RESTART**, specifies the logical port number to be used to override that in the database partition configuration file. If not specified, this parameter defaults to the logical port number for the database partition as specified in the db2nodes.cfg file. Valid values are from 0 to 999.

##### **COMPUTER *computename***

The computer name for the machine on which the new database partition is created. This parameter is mandatory on Windows, but is ignored on other operating systems.

**USER** *username*

The user name for the account on the new database partition. This parameter is mandatory on Windows, but is ignored on other operating systems.

**PASSWORD** *password*

The password for the account on the new database partition. This parameter is mandatory on Windows, but is ignored on other operating systems.

**NETNAME** *netname*

Specifies a *netname* value to override that specified in the db2nodes.cfg file. If not specified, this parameter defaults to the *netname* value that corresponds to the logical database partition number in the db2nodes.cfg file.

**OPEN KEYSTORE**

Opens the keystore that is configured for the Db2 instance.

If the password has not been stashed and the database manager was started without the password or the password has changed, you can reissue the **db2start** command with the OPEN KEYSTORE option to update the keystore password. This command returns the new keystore password without requiring a **db2stop** command.

**USING** *password*

Specifies the password to use when opening the keystore. If this option is not specified, the user is prompted for a password.

**PASSARG** *password-arg*

Specifies the password arguments. If this option is not specified, the user is prompted for a password. The *password-arg* parameter can have one of two values:

**fd:*file-descriptor***

A file descriptor that identifies an open and readable file or pipe that contains the password to use.

***filename:filename***

Identifies the name of the file that contains the password to use.

## Examples

The following example is sample output from **db2start** issued against a Db2 instance with members 10, 20, and 30:

```
04-07-1997 10:33:05 10 0 SQL1063N DB2START processing was successful.
04-07-1997 10:33:07 20 0 SQL1063N DB2START processing was successful.
04-07-1997 10:33:07 30 0 SQL1063N DB2START processing was successful.
SQL1063N DB2START processing was successful.
```

## Usage notes

On Microsoft Windows, when using an id that has local or domain administrator authority, you must execute this command from a Db2 command window running with full administrator privileges.

It is not necessary to issue this command on a client node. It is provided for compatibility with older clients, but it has no effect on the database manager.

Once started, the database manager instance runs until the user stops it, even if all application programs that were using it have ended.

If the database manager starts successfully, a successful completion message is sent to the standard output device. If an error occurs, processing stops, and an error message is sent to the standard output device. In a partitioned database environment, messages are returned on the database partition that issued the **START DATABASE MANAGER** command.

If no parameters are specified in a partitioned database environment, the database manager is started on all database partitions using the parameters specified in the database partition configuration file.

If a **START DATABASE MANAGER** command is in progress, ensure that the applicable database partitions have started *before* issuing a request to the database.

The db2cshrc file is not supported and cannot be used to define the environment.

You can start an instance in a quiesced state. You can do this by using one of the following choices:

```
db2start admin mode
```

or

```
db2start admin mode user username
```

or

```
db2start admin mode group groupname
```

The **RESTRICTED ACCESS** option will prevent the databases within the quiesced instance from being activated to do authorization checking. Any user ID trying to connect to a database, which has DBADM authority or QUIESCE\_CONNECT privilege on the database, will not be allowed to connect. Only user IDs which have SYSADM, SYSCTRL, or SYSMAINT authority and the user or group specified with the command will be allowed to connect to the database.

The **RESTRICTED ACCESS** option should be used when there is a need to have exclusive connections to a database within the quiesced instance. Such cases can include making an offline backup or performing other maintenance activities.

When adding a new database partition server, **START DATABASE MANAGER** must determine whether each database in the instance is enabled for automatic storage. This is done by communicating with the catalog partition for each database. If automatic storage is enabled then the storage path definitions are retrieved as part of that communication. Likewise, if system temporary table spaces are to be created with the database partitions, **START DATABASE MANAGER** might have to communicate with another database partition server to retrieve the table space definitions for the database partitions that reside on that server. The **start\_stop\_time** database manager configuration parameter is used to specify the time, in minutes, by which the other database partition server must respond with the automatic storage and table space definitions. If this time is exceeded, the command fails. If this situation occurs, increase the value of **start\_stop\_time**, and reissue the command.

A new database partition server cannot be added when any of the following commands, statements, or operations are in progress. Otherwise SQL6074N is returned.

- **QUIESCE INSTANCE**
- **UNQUIESCE INSTANCE**
- **STOP Db2 (db2stop)**
- **STOP DATABASE MANAGER DBPARTITIONNUM**
- **START Db2 (db2start)**
- **START DATABASE MANAGER DBPARTITIONNUM**
- **START DATABASE MANAGER** with restart options
- **CREATE DATABASE**
- **DROP DATABASE**
- **QUIESCE DATABASE**
- **UNQUIESCE DATABASE**
- **ACTIVATE DATABASE**
- **DEACTIVATE DATABASE**
- A Z lock on a database object
- Backing up the database on all database partition servers
- Restoring the database
- **ALTER**, **ALTER**, or **DROP** of a table space
- Updating of automatic storage paths

On UNIX operating systems, the **START DATABASE MANAGER** command supports the SIGINT signal. It is issued if CTRL+C is pressed. If this signal occurs, all in-progress startups are interrupted and a message (SQL1044N) is returned to the \$HOME/sql1lib/log/db2start.timestamp.log error log file. Members that are already started are not affected. If CTRL+C is issued on a member that is starting, **db2stop** must be issued on that member before an attempt is made to start it again.

On Windows operating systems, the **db2start** command and the **NET START** command do not return warnings if any communication subsystem failed to start. The database manager in a Windows environment is implemented as a service, and does not return an error if the service is started successfully. Be sure to examine the Event Log or the db2diag log file for any errors that might have occurred during the running of **db2start**.

## Compatibilities

For compatibility with previous versions:

- **LIKE DBPARTITIONNUM** or **LIKE NODE** can be substituted for **LIKE MEMBER**, except when the **DB2\_ENFORCE\_MEMBER\_SYNTAX** registry variable is set to ON.
- **ADD DBPARTITIONNUM** or **ADD NODE** can be substituted for **ADD MEMBER**, except when the **DB2\_ENFORCE\_MEMBER\_SYNTAX** registry variable is set to ON.
- **DBPARTITIONNUM** or **NODENUM** can be substituted for **MEMBER**, except when the **DB2\_ENFORCE\_MEMBER\_SYNTAX** registry variable is set to ON. If **DBPARTITIONNUM** is specified in a Db2 pureScale environment and the **DB2\_ENFORCE\_MEMBER\_SYNTAX** registry variable is set to ON, an SQL1694N error is returned.

## START HADR

Starts HADR operations for a database. This is a cluster-wide command in a Db2 pureScale environment, so you can issue it on any member.

### Authorization

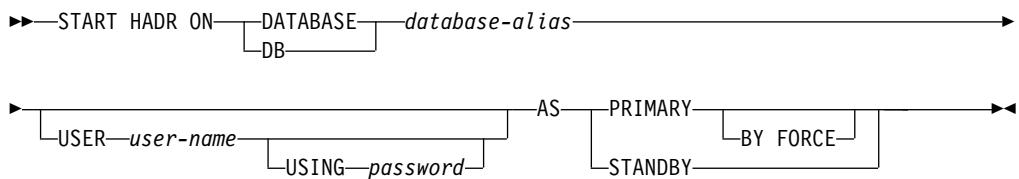
One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT

### Required connection

Instance. The command establishes a database connection if one does not exist, and closes the database connection when the command completes.

### Command syntax



### Command parameters

#### DATABASE *database-alias*

Identifies the database on which HADR operations are to start.

#### USER *user-name*

Identifies the user name under which the HADR operations are to be started.

#### USING *password*

The password used to authenticate *user-name*.

#### AS PRIMARY

Specifies that HADR primary operations are to be started on the database. If the primary database cannot connect to the HADR standby database within the time specified by the **hadr\_timeout** database configuration parameter, the primary will not start.

#### BY FORCE

Specifies that the HADR primary database will not wait for the standby database to connect to it. After a start **BY FORCE**, the primary database will still accept valid connections from the standby database whenever the standby later becomes available. When **BY FORCE** is used, the database will perform crash recovery if necessary, regardless of the value of database configuration parameter **autorestart**. Other methods of starting a primary database (such as non-forced **START HADR** command, **ACTIVATE DATABASE** command, or client connection) will respect the **autorestart** setting.

**Caution:** Use the **START HADR** command with the **AS PRIMARY BY FORCE** option with caution. If the standby database has been

changed to a primary and the original primary database is restarted by issuing the **START HADR** command with the **AS PRIMARY BY FORCE** option, both copies of your database will be operating independently as primaries. (This is sometimes referred to as *split brain* or *dual primary*.) In this case, each primary database can accept connections and perform transactions, and neither receives and replays the updates made by the other. As a result, the two copies of the database will become inconsistent with each other.

#### **AS STANDBY**

Specifies that HADR standby operations are to be started on the database. The standby database will attempt to connect to the HADR primary database until a connection is successfully established, or until the connection attempt is explicitly rejected by the primary. (The connection might be rejected by the primary database if an HADR configuration parameter is set incorrectly or if the database copies are inconsistent, both conditions for which continuing to retry the connection is not appropriate.)

#### **Usage notes**

The following table shows database behavior in various conditions:

<b>Database status</b>	<b>Behavior upon START HADR command with the AS PRIMARY option</b>	<b>Behavior upon START HADR command with the AS STANDBY option</b>
Inactive standard database	Activated as HADR primary database. In a Db2 pureScale environment, only the local member is started.	Database starts as an standby database if it is in rollforward-pending mode (which can be the result of a restore or a split mirror) or in rollforward in-progress mode. Otherwise, an error is returned.
Active standard database	Database enters HADR primary role.	Error message returned.
Inactive primary database	Activated as HADR primary database. In a Db2 pureScale environment, only the local member is started.	After a failover, this reintegrates the failed primary into the HADR pair as the new standby database. Some restrictions apply.
Active primary database	Warning message issued.	Error message returned.
Inactive standby database	Error message returned.	Starts the database as the standby database.
Active standby database	Error message returned.	Warning message issued.

#### **Preferred replay member**

In a Db2 pureScale environment, whichever member you issue the **START HADR** command on is designated as the *preferred replay member*. This member is the first choice for replaying logs on the HADR standby database (only one standby member replays logs generated on all primary members). For a member on the primary cluster, this designation is relevant only if the primary becomes a standby database. For a member on the standby cluster, this designation means that when the standby database starts, replay service attempts to start on this member. Although the preferred replay member status is persistent (that is, it remains until the next **START HADR** command), the member can still be designated as a preferred replay member again.

command), if replay has moved to another standby member, replay does not automatically revert back to the preferred replay member when that member is available.

If the **START HADR** command returns success, the preferred replay member is updated. If the **START HADR** command returns failure, the preferred member might or might not have been updated, depending on how far the command execution went. You can rerun the command to make sure. If a database is already active and in the desired role, the **START HADR** command is a nop (no operation performed). It returns an error and the preferred replay member is not updated. To redesignate the preferred replay member when a database is already online, use the procedure described in "Changing the preferred replay member".

#### Licensing errors

When the **START HADR** command is issued, the corresponding error codes might be generated: SQL1767N, SQL1769N, or SQL1770N with a reason code of 98. The reason code indicates that there is no installed license for HADR on the server where the command was issued. To correct the problem, install a valid HADR license using the **db2licm** or install a version of the server that contains a valid HADR license as part of its distribution.

## STOP DATABASE MANAGER

Stops the database manager on the target member or all members. In a Db2 pureScale environment, it is also used to stop the cluster caching facility (CF).

#### Scope

In a Db2 pureScale environment or, a partitioned database environment, this command affects all members that are listed in the `db2nodes.cfg` file, unless either a **DBPARTITIONNUM**, **MEMBER**, or **CF** parameter is specified.

The command does not shut down the member if there are active database connections. If there are no active database connections, but there are instance attachments, then the instance attachments are forced off first and then the member is stopped. This command also deactivates any outstanding database activations before stopping the member. This command can also be used to stop instance services on a given host.

This command is not valid on a client.

#### Authorization

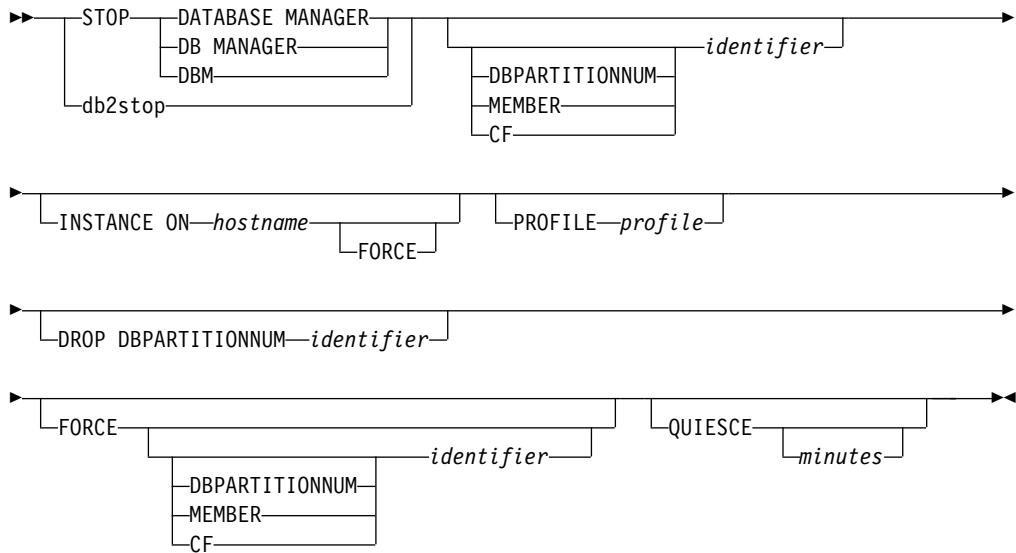
One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT

#### Required connection

None

## Command syntax



## Command parameters

### INSTANCE ON *hostname*

Specifies to stop the Db2 instance on a particular host of the Db2 pureScale instance for maintenance operations. This command temporarily prevents the host from being restarted with the global **db2start** command. The host can no longer act as guest host for a restart light situation.

To restart the Db2 instance on the host after maintenance operations have been completed, issue the **START DBM INSTANCE ON *hostname*** command. This command fails if active members or active cluster caching facilities (CFs) are running on the host. If used outside of a Db2 pureScale environment, an SQL1695N error is returned.

**FORCE** When specified, the **FORCE** parameter immediately stops the Db2 instance on the host. Any active member running on the host fails over to other active hosts, or any active cluster caching facility (CF) is forced to stop. A member that is failed over to another host is known as a *restart light member*, meaning that it uses minimal resources on the host and does not accept database connections. For more information, see "Restart light."

### *identifier*

Specifies the numeric identifier without having to specify the **DBPARTITIONNUM**, **MEMBER**, or **CF** parameters.

### **DBPARTITIONNUM** *identifier*

This parameter option is valid only in a partitioned database environment. Specifies the member to be stopped. Valid values are from 0 to 999 inclusive.

**Note:** If the **FORCE** option is used without this parameter, all applications on all database partitions are forced before all the database partitions are stopped.

**Note:** The *identifier* value must exist in the db2nodes.cfg file of the instance owner. If no database partition number is specified, all database partitions defined in the configuration file are stopped.

**MEMBER** *identifier*

Specifies the member to be stopped. In a Db2 pureScale environment, valid values are from 0 to 127 inclusive.

**CF** *identifier*

This parameter option is valid only in a Db2 pureScale environment. Specifies the cluster caching facility (CF) to be stopped. Valid values are 128 and 129. If used outside of a Db2 pureScale, an SQL1695N error is returned.

**PROFILE** *profile*

This parameter option is valid only in a partitioned database environment. Specifies the name of the profile file that was executed at startup to define the Db2 environment for those database partitions that were started. If a profile for the **START DATABASE MANAGER** command was specified, the same profile must be specified here. The profile file must reside in the sql1ib directory of the instance owner.

**DROP DBPARTITIONNUM** *identifier*

This parameter option is valid only in a partitioned database environment. Specifies the database partition to be dropped from the db2nodes.cfg configuration file.

**Note:** Before using the **DROP DBPARTITIONNUM** parameter, run the **DROP DBPARTITIONNUM VERIFY** command to ensure that there is no user data on this database partition environment.

**FORCE** Specifies to use **FORCE APPLICATION ALL** when stopping the database manager at each database partition.

**QUIESCE** *minutes*

This parameter option is valid only in a Db2 pureScale environment and valid only for the **MEMBER** parameter clause. It is used to stop active workload on a given member before the member is shut down (it cannot be used against a cluster caching facility). As opposed to a **db2stop FORCE** command where active applications are interrupted immediately, quiesce affords them a graceful exit by waiting until all applications on the member have completed their active transactions. The optional *minutes* parameter value specifies how long the command waits before it tells applications to disconnect from the given member. Once this timeout is reached, any active units of work remaining at the time are interrupted. If no timeout is specified the command waits indefinitely until all active applications have ended their unit of work before proceeding with shutting down the member.

**Important:** To bring the member back online, you need to issue the **db2start** command against the member.

Valid values for the *minutes* parameter value are from -1 to 1440 inclusive. The default value is -1 which means the specified member waits indefinitely until all active workload has ended. If a value of 0 is specified then active applications are interrupted immediately and, once they end, the member is shut down.

**Note:** A **db2stop QUIESCE** command is not interruptible. After you issue the command, no further Db2 commands may be run directly against that member. If you want to query information about the quiesced member, you need to issue the **LIST APPLICATIONS GLOBAL SHOW DETAIL** command from another active member. If you want to stop an application that is running on a quiesced member, you need to issue the **FORCE APPLICATION** '(*<app handle>*)' command from another active member.

## Examples

The following example is sample output from **db2stop** issued against a Db2 instance with members 10, 20, and 30:

```
04-07-1997 10:32:53 10 0 SQL1064N DB2STOP processing was successful.
04-07-1997 10:32:54 20 0 SQL1064N DB2STOP processing was successful.
04-07-1997 10:32:55 30 0 SQL1064N DB2STOP processing was successful.
SQL1064N DB2STOP processing was successful.
```

## Usage notes

On Microsoft Windows, you must execute this command from a Db2 command window running with full administrator privileges.

It is not necessary to issue this command on a client node. It is provided for compatibility with older clients, but it has no effect on the database manager.

Once started, the database manager instance runs until the user stops it, even if all application programs that were using it have ended.

If the database manager is stopped, a successful completion message is sent to the standard output device. If an error occurs, processing stops, and an error message is sent to the standard output device.

If the database manager cannot be stopped because application programs are still connected to databases, use the **FORCE APPLICATION** command to disconnect all users first, or reissue the **STOP DATABASE MANAGER** command with the **FORCE** option.

The following information applies to partitioned database environments only:

- If no parameters are specified, the database manager is stopped on each database partition listed in the configuration file. The administration notification log might contain messages to indicate that other database partitions are shutting down.
- Any database partitions added to the partitioned database environment since the previous **STOP DATABASE MANAGER** command was issued are updated in the **db2nodes.cfg** file.
- On UNIX operating systems, if the value specified for the **start\_stop\_time** database manager configuration parameter is reached, all in-progress stops are interrupted, and message SQL6037N is returned from each interrupted database partition to the **\$HOME/sql11ib/log/db2stop.timestamp.log** error log file. Database partitions that are already stopped are not affected.
- The **db2cshrc** file is not supported and cannot be specified as the value for the **PROFILE** parameter.

**Attention:** Do not use the UNIX **kill** command to terminate the database manager because the command abruptly ends database manager processes without controlled termination and cleanup processing.

## STOP HADR

Stops HADR operations for a database. This is a cluster-wide command in a Db2 pureScale environment, so you can issue it on any member, including non-replay members on the standby database.

### Authorization

One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT

### Required connection

Instance. The command establishes a database connection if one does not exist, and closes the database connection when the command completes.

### Command syntax

```
►--STOP HADR ON [DATABASE database-alias] [DB]
[USER user-name] [USING password]
```

### Command parameters

#### DATABASE *database-alias*

Identifies the database on which HADR operations are to stop.

#### USER *user-name*

Identifies the user name under which the HADR operations are to be stopped.

#### USING *password*

The password used to authenticate *user-name*.

### Usage notes

The following table shows database behavior in various conditions:

Database status	Behavior upon STOP HADR command
Inactive standard database	Error message returned.
Active standard database	Error message returned.
Inactive primary database	Database role changes to standard. Database configuration parameter <b>hadr_db_role</b> is updated to STANDARD. Database remains offline. At the next restart, enters standard role.

Database status	Behavior upon STOP HADR command
Active primary database	Stops shipping logs to the HADR standby database and shuts down all HADR EDUs on the HADR primary database. Database role changes to standard and database remains online. Database remains in standard role until an explicit <b>START HADR</b> command with the <b>AS PRIMARY</b> option is issued. Open sessions and transactions are not affected by the <b>STOP HADR</b> command. You can repeatedly issue <b>STOP HADR</b> and <b>START HADR</b> commands while the database remains online. These commands take effect dynamically.
Inactive standby database	Database role changes to standard. Database configuration parameter <b>hadr_db_role</b> is updated to <b>STANDARD</b> . Database remains offline. Database is put into rollforward pending mode.
Active standby database	Error message returned: Deactivate the standby database before attempting to convert it to a standard database.

When issuing the **STOP HADR** command, the corresponding error codes might be generated: SQL1767N, SQL1769N, or SQL1770N with a reason code of 98. The reason code indicates that there is no installed license for HADR on the server where the command was issued. To correct the problem, install a valid HADR license using the **db2licm** or install a version of the server that contains a valid HADR license as part of its distribution.

## TAKOVER HADR

Instructs an HADR standby database to take over as the new HADR primary database for the HADR pair. This is a cluster-wide command in a Db2 pureScale environment, so you can issue it on any member on the standby, including non-replay members.

### Authorization

One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT

### Required connection

Instance. The command establishes a database connection if one does not exist, and closes the database connection when the command completes.

### Command syntax

```
►►—TAKEOVER HADR ON—DATABASE—database-alias—►►
 |DB—►►
```

```
►►—USER—user-name—USING—password—BY FORCE—PEER WINDOW ONLY—►►
```

## Command parameters

### **DATABASE** *database-alias*

Identifies the current HADR standby database that should take over as the HADR primary database.

### **USER** *user-name*

Identifies the user name under which the takeover operation is to be started.

### **USING** *password*

The password used to authenticate *user-name*.

### **BY FORCE**

Specifies that the database is not to wait for confirmation that the original HADR primary database has been shut down. Unless you are using SUPERASYNC synchronization mode, this option is required if the HADR pair is not in peer state.

### **PEER WINDOW ONLY**

When this option is specified, there is not any committed transaction loss if the command succeeds and the primary database is brought down before the end of the peer window period (set the database configuration parameter **hadr\_peer\_window** to a non-zero value). Not bringing down the primary database, before the peer window expires, results in a *split brain*. If the **TAKEOVER BY FORCE PEER WINDOW ONLY** command is executed when the HADR pair is not in a peer or disconnected peer state (the peer window has expired), an error is returned.

You cannot use the **PEER WINDOW ONLY** option when the synchronization mode is set to ASYNC or SUPERASYNC.

**Note:** The takeover operation with the **PEER WINDOW ONLY** option can behave incorrectly if the primary database clock and the standby database clock are not synchronized to within 5 seconds of each other. That is, the operation may succeed when it should fail, or fail when it should succeed. You should use a time synchronization service (for example, NTP) to keep the clocks synchronized to the same source.

## Usage notes

Table 46 and Table 47 on page 585 show the behavior of the **TAKEOVER HADR** command when issued on an active standby database for each possible state and option combination. An error message is returned if this command is issued on an inactive standby database.

*Table 46. Takeover operation without the BY FORCE option*

Standby state	Takeover behavior
Disconnected peer	Takeover fails and an error message is returned.
Local catchup	Takeover fails and an error message is returned.

*Table 46. Takeover operation without the BY FORCE option (continued)*

Standby state	Takeover behavior
Peer	<p>The primary database and standby database switch roles.</p> <p>If no failure is encountered during takeover, there is no data loss. However, if failures are encountered during takeover, data loss might occur and the roles of the primary and standby might or might not have been changed. The following is a guideline for handling failures during a takeover in which the primary and standby switch roles:</p> <ol style="list-style-type: none"> <li>1. If a failure occurs during a takeover operation, the roles of the HADR databases might or might not have been changed. If possible, make sure both databases are online. Check the HADR role of the available database or databases using the Snapshot Monitor, or by checking the value of the database configuration parameter <code>hadr_db_role</code>.</li> <li>2. If the intended new primary is still in standby role, and takeover is still required, re-issue the <b>TAKEOVER HADR</b> command (see the next guideline regarding the <b>BY FORCE</b> option).</li> <li>3. It is possible to end up with both databases in standby role. In that case, the <b>TAKEOVER HADR</b> command with the <b>BY FORCE</b> option can be issued at whichever node should now become the primary. The <b>BY FORCE</b> option is required in this case because the two standbys cannot establish the usual HADR primary-standby connection.</li> </ol>
Remote catchup	<p>Non-forced takeover is allowed in remote catchup state only if one of the following is true:</p> <ul style="list-style-type: none"> <li>• The HADR synchronization mode is SUPERASYNC</li> <li>• In a Db2 pureScale environment, a stream is in assisted remote catchup, regardless of the synchronization mode</li> </ul> <p>Before starting a non-forced takeover operation, check the log gap between the primary and standby databases. Because the standby database must retrieve the logs in the gap and replay them, a large gap causes a long elapsed time for the takeover operation. It is recommended that you perform non-forced takeover operations only when the log gap is small. To reduce the log gap between the primary and the standby databases, consider stopping or reducing the workload on the primary database.</p>

*Table 46. Takeover operation without the BY FORCE option (continued)*

Standby state	Takeover behavior
Remote catchup pending	Takeover fails and an error message is returned.

*Table 47. Takeover operation specifying the BY FORCE option*

Standby state	Takeover behavior
Disconnected peer (without the <b>PEER WINDOW ONLY</b> option)	<p>The standby database becomes the primary database, but there is no assurance of data consistency.</p> <p><b>Note:</b> A “no transaction loss” takeover is also possible using the <b>TAKEOVER BY FORCE</b> command without the <b>PEER WINDOW ONLY</b> option, that is, unconditional failover, as long as the necessary conditions hold. Such a failover can be executed even long after the expiration of the peer window that was in effect when the primary failed.</p>
Disconnected peer (with the <b>PEER WINDOW ONLY</b> option)	<p>The standby database becomes the primary database, and there is a greater assurance of data consistency than if you did not specify the <b>PEER WINDOW ONLY</b> option. There are situations in which data loss can still happen:</p> <ul style="list-style-type: none"> <li>• If the primary database remains active past the time when the peer window expires, and if the primary database still has no connection to the standby database, the primary database moves out of disconnected peer state and resume processing transactions independently.</li> <li>• In NEARSYNC mode, if the standby database fails after acknowledging receipt of transaction logs from the primary database but before writing that transaction log information to disk, then that transaction log information, in the log receive buffer, might be lost.</li> </ul>
Local catchup	In most cases, takeover fails and an error message is returned. The exception is when primary reintegration is in progress; during the reintegration, forced a takeover is allowed on a standby in local catchup state.
Peer	The standby database becomes the primary database, but there is no assurance of data consistency. Even with SYNC and NEARSYNC mode, the primary can fall out of peer state and commit more transactions, with the standby still in peer state and not aware of the primary's state change (the primary and standby may not notice network connection breakage at the same time).
Remote catchup	The standby database becomes the primary database, but there is a risk of data loss.

Table 47. Takeover operation specifying the BY FORCE option (continued)

Standby state	Takeover behavior
Remote catchup pending	The standby database becomes the primary database, but there is a risk of data loss. If log retrieval is in progress (retrieval only happens in remote catchup pending state), retrieval is stopped as part of the takeover process.

When issuing the **TAKEOVER HADR** command, the corresponding error codes might be generated: SQL1767N, SQL1769N, or SQL1770N with a reason code of 98. The reason code indicates that there is no installed license for HADR on the server where the command was issued. To correct the problem, install a valid HADR license using the **db2licm** or install a version of the server that contains a valid HADR license as part of its distribution.

When issuing the **TAKEOVER HADR** command, error code SQL1770N with a reason code of 15 might be generated. The reason code indicates that a takeover (either forced or unforced) is not allowed on the HADR standby database that is upgrade in progress. To correct the problem, do one of the following:

- If you do not have an immediate need to connect to the standby database, wait for the **UPGRADE DATABASE** command to complete on the primary database and the standby database to replay all upgrade log records that were sent from the primary database then reissue the command.
- If you need to connect to this standby database immediately, issue the **STOP HADR** command to turn the HADR role to STANDARD.

When you issue the **TAKEOVER BY FORCE PEER WINDOW ONLY** command, and it succeeds (you called it while the primary was disconnected from the standby, but still within the peer window), then there is not any transaction information about the primary database that was not already copied to the standby database.

**Note:** On forced takeovers that specify the **PEER WINDOW ONLY** option, the following occur:

- Forced takeover stops log shipping or log retrieval on the standby. Log replay continues to the end of received or retrieved logs.
- During a forced takeover, if the standby is connected to the old primary, it sends a *poison pill*, or a disabling message, to the old primary. This is done on a best effort basis; due to network, hardware, or software problems, the old primary might not receive the disabling message or correctly process it. Once the disabling message is received, the old primary should persist the poison pill to disk and shut itself down. As long as the pill is in effect, the old primary cannot be restarted. The pill is cleared only when one of the following commands is issued on the old primary:
  - **START HADR** with the **AS STANDBY** option (that is, the old primary is reintegrated as a new standby)
  - **START HADR** with the **AS PRIMARY** and **BY FORCE** options (the old primary is explicitly restarted as the primary, for reasons such as: the new primary failed to serve as the primary, so the user switches back to old primary; the user wants a clone of the database)
  - **STOP HADR** (that is, the database is no longer an HADR database)
  - **DROP DATABASE**

## – RESTORE DATABASE

### Takeover and reads on standby

If you have reads on standby enabled, any user application currently connected to the standby is disconnected to allow the takeover to proceed. Depending on the number of readers that are active on the standby, the takeover operation can take slightly longer to complete than it would if there were no readers on the standby. New connections are not allowed during the role switch. Any attempt to connect to the HADR standby during the role switch on takeover receives an error (SQL1776N).

### Takeover and log spooling

If you are using a high value for `hadr_spool_limit`, you should consider that if there is a large gap between the log position of the primary and log replay on the standby, which might lead to a longer takeover time because the standby cannot assume the role of the new standby until the replay of the spooled logs finishes.

### Takeover and delayed replay

If you have configured `hadr_replay_delay` to a non-zero value, you cannot issue the command on that standby (SQL1770N).

### Takeover in a Db2 pureScale environment

The following considerations apply to Db2 pureScale environments:

- All log streams must pass the check to allow a takeover command to proceed. However, the streams do not need to be in the same state.
- When a primary database changes role into a standby database, a member that has a direct connection to the old standby is chosen as the replay member, with preference given to the preferred replay member (the preferred member is not chosen if it has no direct connection to the standby). Non-replay members are deactivated.
- When a standby database changes role into a primary database, only the old replay member stays active; other members on the new primary are not activated.
- Non-forced takeover is not allowed if any member on the primary is in member crash recovery (MCR) pending or in progress state.
- Non-forced takeover is not allowed if the primary database is in group crash recovery because the streams cannot be in the required state.

## TERMINATE

Explicitly terminates the back-end process of the command line processor.

### Authorization

None

### Required connection

None

### Command syntax

►►TERMINATE————►►

## Command parameters

None

## Usage notes

If an application is connected to a database, or a process is in the middle of a unit of work, **TERMINATE** causes the database connection to be lost. An internal commit is then performed.

Although **TERMINATE** and **CONNECT RESET** both break the connection to a database, only **TERMINATE** results in termination of the back-end process.

It is recommended that **TERMINATE** be issued before executing the **db2stop** command. This prevents the back-end process from maintaining an attachment to a database manager instance that is no longer available.

Back-end processes in MPP systems must also be terminated when the **DB2NODE** environment variable is updated in the session. This environment variable is used to specify the coordinator database partition number within an MPP multiple logical database partition configuration.

## UNCATALOG DATABASE

Deletes a database entry from the database directory.

### Authorization

One of the following authorities:

- SYSADM
- SYSCTRL

### Required connection

None. Directory operations affect the local directory only.

## Command syntax

```
►--UNCATALOG--[DATABASE [database-alias]]--►
```

## Command parameters

### DATABASE *database-alias*

Specifies the alias of the database to uncatalog.

## Usage notes

Only entries in the local database directory can be uncataloged. Entries in the system database directory can be deleted using the **DROP DATABASE** command.

To recatalog the database on the instance, use the **UNCATALOG DATABASE** and **CATALOG DATABASE** commands. To list the databases that are cataloged on a node, use the **LIST DATABASE DIRECTORY** command.

The authentication type of a database, used when communicating with an earlier server, can be changed by first uncataloging the database, and then cataloging it again with a different type.

If directory caching is enabled, database, node, and DCS directory files are cached in memory. See the information for the configuration parameter **dir\_cache** in the **GET DATABASE MANAGER CONFIGURATION** command. An application's directory cache is created during its first directory lookup. Because the cache is only refreshed when the application modifies any of the directory files, directory changes made by other applications might not be effective until the application has restarted.

To refresh the CLP's directory cache, use the **TERMINATE** command. To refresh the database manager's shared cache, stop (**db2stop**) and then restart (**db2start**) the database manager. To refresh the directory cache for another application, stop and then restart that application.

**Note:** When you add a database partition to the system, all existing databases in the instance are expanded to the new database partition. However, any uncataloged database is not recognized when adding a new database partition. The uncataloged database will not be present on the new database partition. An attempt to connect to the database on the new database partition returns the error message SQL1013N.

## UNCATALOG DCS DATABASE

Deletes an entry from the Database Connection Services (DCS) directory.

### Authorization

One of the following authorities:

- SYSADM
- SYSCTRL

### Required connection

None. Directory operations affect the local directory only.

### Command syntax

```
►—UNCATALOG DCS—[DATABASE—]database-alias—►
```

### Command parameters

#### DATABASE *database-alias*

Specifies the alias of the DCS database to uncatalog.

### Usage notes

DCS databases are also cataloged in the system database directory as remote databases and can be uncataloged using the **UNCATALOG DATABASE** command.

To recatalog a database in the DCS directory, use the **UNCATALOG DCS DATABASE** and **CATALOG DCS DATABASE** commands. To list the DCS databases that are cataloged on a node, use the **LIST DCS DIRECTORY** command.

If directory caching is enabled, database, node, and DCS directory files are cached in memory. See the information provided for the configuration parameter **dir\_cache** in the output of the **GET DATABASE MANAGER CONFIGURATION** command. An application's directory cache is created during its first directory lookup. Since the cache is only refreshed when the application modifies any of the directory files, directory changes made by other applications might not be effective until the application has restarted.

To refresh the CLP's directory cache, use the **TERMINATE** command. To refresh the shared cache in Db2, stop (**db2stop**) and then restart (**db2start**) the database. To refresh the directory cache for another application, stop and then restart that application.

## UNCATALOG LDAP DATABASE

Deregisters the database from Lightweight Directory Access Protocol (LDAP).

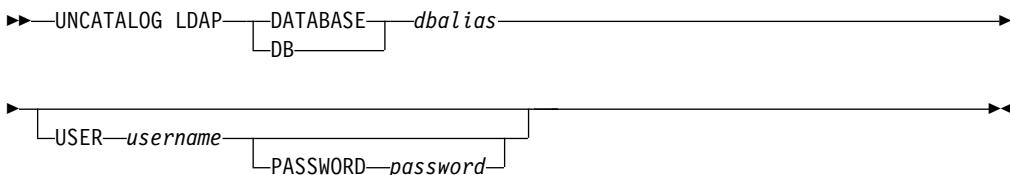
### Authorization

None

### Required connection

None

### Command syntax



### Command parameters

#### **DATABASE *dbalias***

Specifies the alias of the LDAP database to uncatalog.

#### **USER *username***

Specifies the user's LDAP distinguished name (DN). The LDAP user DN must have sufficient authority to delete the object from the LDAP directory. If the user's LDAP DN is not specified, the credentials of the current logon user will be used.

#### **PASSWORD *password***

Account password.

### Usage notes

When a database is dropped, the database object is removed from LDAP. The database is also automatically deregistered from LDAP when the database server that manages the database is deregistered from LDAP. It might, however, be necessary to manually uncatalog the database from LDAP if:

- The database server does not support LDAP. The administrator must manually uncatalog each database from LDAP after the database is dropped.

- During **DROP DATABASE**, the database object cannot be removed from LDAP (because LDAP cannot be accessed). In this case, the database is still removed from the local machine, but the existing entry in LDAP is not deleted.

## **UNCATALOG LDAP NODE**

Uncatalogs a node entry in Lightweight Directory Access Protocol (LDAP).

## Authorization

None

## Required connection

None

## Command syntax

## Command parameters

**NODE** *nodename*

Specifies the name of the node to uncatalog.

**USER** *username*

Specifies the user's LDAP distinguished name (DN). The LDAP user DN must have sufficient authority to delete the object from the LDAP directory. If the user's LDAP DN is not specified, the credentials of the current logon user will be used.

**PASSWORD** *password*

Account password.

## Usage notes

The LDAP node is automatically uncataloged when the Db2 server is deregistered from LDAP.

## **UNCATALOG NODE**

**Deletes an entry from the node directory.**

## **Authorization**

One of the following authorities:

- SYSADM
  - SYSCTRL

## Required connection

None. Directory operations affect the local directory only.

## Command syntax

```
►►UNCATALOG NODE—nodename►►
```

## Command parameters

### NODE *nodename*

Specifies the node entry being uncataloged.

## Usage notes

**UNCATALOG NODE** can be executed on any type of node, but only the local directory is affected, even if there is an attachment to a remote instance, or a different local instance.

If directory caching is enabled, database, node, and DCS directory files are cached in memory. To see if directory caching is enabled, check the value for the **dir\_cache** directory cache support configuration parameter in the output from the **GET DATABASE MANAGER CONFIGURATION** command. An application's directory cache is created during its first directory lookup. Since the cache is only refreshed when the application modifies any of the directory files, directory changes made by other applications might not be effective until the application has restarted.

To refresh the CLP's directory cache, use the **TERMINATE** command. To refresh the database manager's shared cache, stop (**db2stop**) and then restart (**db2start**) the database manager. To refresh the directory cache for another application, stop and then restart that application.

## UNCATALOG ODBC DATA SOURCE

Uncatalogs a user or system ODBC data source.

A *data source*, in ODBC (Open Database Connectivity) terminology, is a user-defined name for a specific database. That name is used to access the database through ODBC APIs. On Windows, either user or system data sources can be uncataloged. A user data source is only visible to the user who cataloged it, whereas a system data source is visible to and can be used by all other users.

This command is available on Windows only.

## Authorization

None

## Required connection

None

## Command syntax

```
►►UNCATALOG [USER|SYSTEM] ODBC DATA SOURCE—data-source-name►►
```

## Command parameters

**USER** Uncatalog a user data source. This is the default if no keyword is specified.

### SYSTEM

Uncatalog a system data source.

### ODBC DATA SOURCE *data-source-name*

Specifies the name of the data source to be uncataloged. Maximum length is 32 characters.

## Usage notes

On Microsoft Windows operating systems, you must execute the **UNCATALOG SYSTEM ODBC DATA SOURCE** command from a Db2 command window running with full administrator privileges.

## UNCATALOG STORAGE ACCESS

Removes a storage access alias.

### Authorization

One of the following authorities:

- SYSADM
- SYSCTRL

### Required connection

None

### Command syntax

►—UNCATALOG STORAGE ACCESS ALIAS—*alias-name*—►

## Command parameters

### ALIAS *alias-name*

Specifies the name of the access alias to remove.

## UNQUIESCE

Restores user access to instances or databases which have been quiesced for maintenance or other reasons. The **UNQUIESCE** command restores user access without necessitating a shutdown and database restart.

### Scope

**UNQUIESCE DB** restores user access to all objects in the quiesced database.

**UNQUIESCE INSTANCE** *instance-name* restores user access to the instance and all databases in the instance *instance-name*.

To stop the instance and unquiesce it and all its databases, issue the **db2stop** command. Stopping and restarting Db2 will unquiesce all instances and databases.

## Authorization

One of the following authorities:

For database level unquiesce:

- SYSADM
- DBADM

For instance level unquiesce:

- SYSADM
- SYSCTRL

## Command syntax

►►UNQUIESCE [DB] INSTANCE-*instance-name*►►

## Required connection

Database

(Database connection is not required for an instance unquiesce.)

## Command parameters

**DB** Unquiesce the database. User access will be restored to all objects in the database.

**INSTANCE** *instance-name*

Access is restored to the instance *instance-name* and all databases in the instance.

## Example : Unquiescing a database

The following command unquiesces the database that had previously been quiesced.

```
db2 unquiesce db
```

## Unquiescing an instance

The following command will unquiesce the instance instA that had previously been quiesced.

```
db2 unquiesce instance instA
```

## Usage notes

- In a Db2 pureScale environment, after quiescing a database and restarting the instance, the database will remain quiesced across all members. An explicit **UNQUIESCE DATABASE** command is required to remove the quiesce state.

## UPDATE ADMIN CONFIGURATION

Modifies specified entries in the Db2 Administration Server (DAS) configuration file. The DAS is a special administrative tool that enables remote administration of Db2 servers.

**Important:** The Db2 Administration Server (DAS) has been deprecated in Version 9.7 and might be removed in a future release. The DAS is not supported in Db2 pureScale environments. Use software programs that use the Secure Shell protocol for remote administration. For more information, see “Db2 administration server (DAS) has been deprecated” at .

When you install the DAS, a blank copy of the configuration file is stored on each physical database partition. You must create entries in each copy. You can specify the following DAS configuration parameters to be used the next time you start the DAS:

- Name of the Db2 Server System - **db2system**
- DAS Administration Authority Group Name - **dasadm\_group**
- Scheduler Mode - **sched\_enable**
- Tools Catalog Database Instance - **toolscat\_inst**
- Tools Catalog Database - **toolscat\_db**
- Tools Catalog Database Schema - **toolscat\_schema**
- Execute Expired Tasks - **exec\_exp\_task**
- Scheduler User ID - **sched\_userid**
- Authentication Type DAS - **authentication**

The following DAS configuration parameters can be specified originally and then later changed while the DAS is online:

- DAS Discovery Mode - **discover**
- SMTP Server - **smtp\_server**
- Java Development Kit Installation Path DAS - **jdk\_path**
- Location of Contact List - **contact\_host**
- DAS Code Page - **das\_codepage**
- DAS Territory - **das\_territory**
- Diagnostic error capture level - **diaglevel**

For more information about these parameters, see individual parameter descriptions.

## Scope

Issue this command from each administration node to specify or change parameter settings for that node.

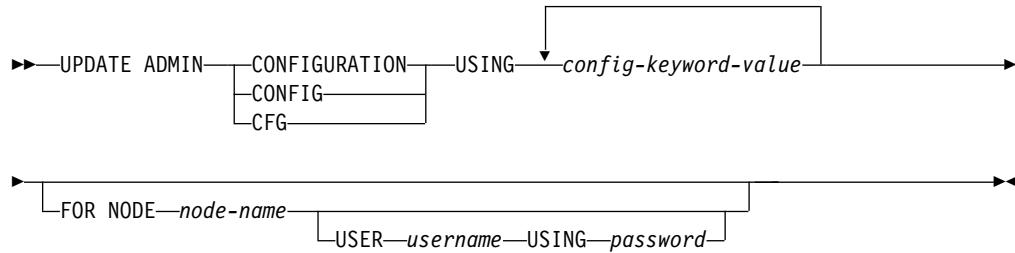
## Authorization

DASADM

## Required connection

Node. To update the DAS configuration for a remote system, use the **FOR NODE** option with the administrator node name.

## Command syntax



## Command parameters

**USING *config-keyword-value***

Specifies the admin configuration parameter to be updated.

**FOR NODE**

Enter the name of an administration node to update the DAS configuration parameters there.

**USER *username* USING *password***

If connection to the administration node requires user name and password authorization, enter this information.

## Usage notes

To view or print a list of the DAS configuration parameters, use **GET ADMIN CONFIGURATION**. To reset the DAS configuration parameters to the recommended DAS defaults, use **RESET ADMIN CONFIGURATION**.

When configuration parameters take effect depends on whether you change a standard configuration parameter or one of the parameters that can be reset online. Standard configuration parameter values are reset when you execute the **db2admin** command.

If an error occurs, the DAS configuration file is not changed.

In order to update the DAS configuration using **UPDATE ADMIN CONFIGURATION**, you must use the command line processor from an instance that is at the same installed level as the DAS.

The DAS configuration file cannot be updated if the checksum is invalid. This might occur if you change the DAS configuration file manually, without using the appropriate command. If this happens, you must drop and re-create the DAS to reset its configuration file.

## UPDATE ALERT CONFIGURATION

Updates the alert configuration settings for health indicators.

**Important:** This command or API has been deprecated and might be removed in a future release because the health monitor has been deprecated in Version 9.7. It is not supported in Db2 pureScale environments. For more information, see “Health monitor has been deprecated” at [http://www.ibm.com/support/knowledgecenter/SSEPGG\\_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0055045.html](http://www.ibm.com/support/knowledgecenter/SSEPGG_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0055045.html).

## Authorization

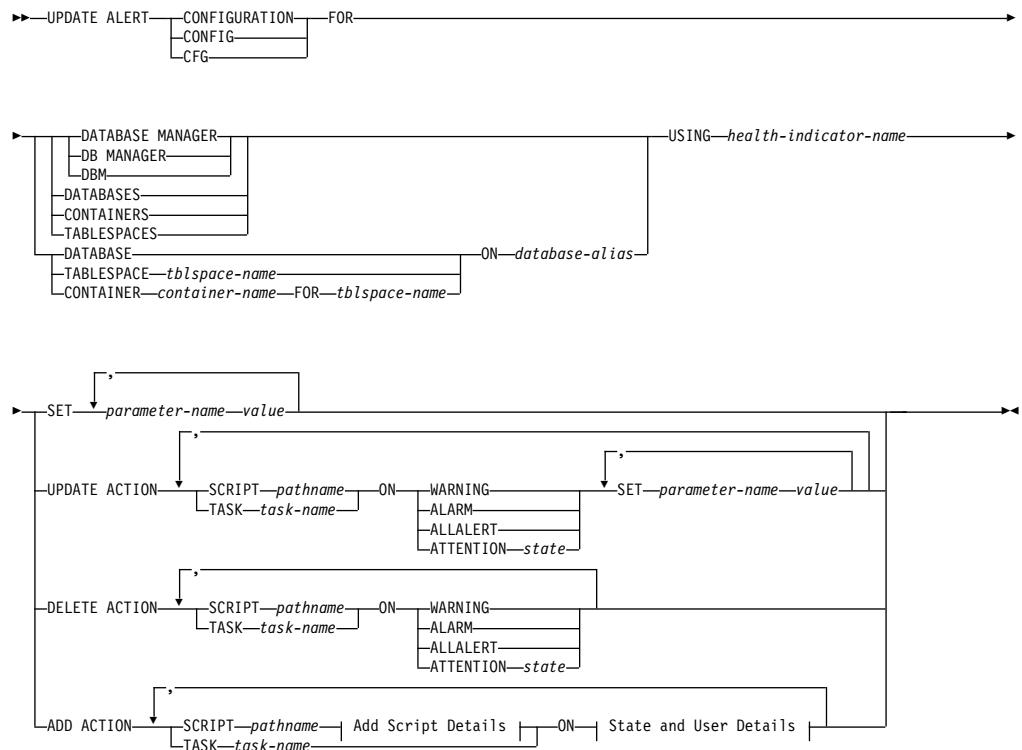
One of the following authorities:

- SYSADM
- SYSMAINT
- SYSCTRL

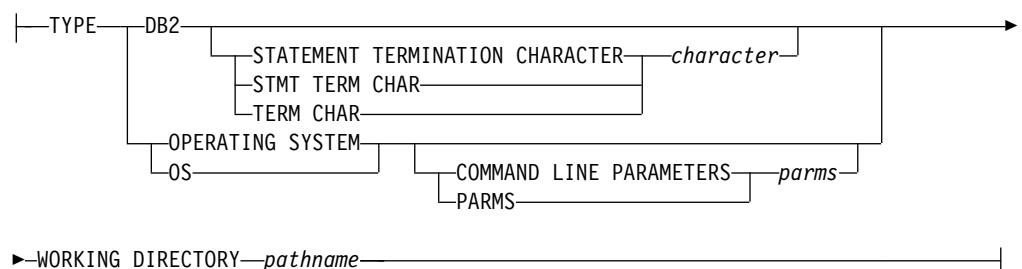
## Required Connection

Instance. An explicit attachment is not required.

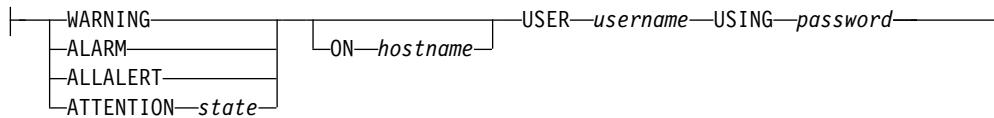
## Command Syntax



### Add Script Details:



## State and User Details:



## Command Parameters

### DATABASE MANAGER

Updates alert settings for the database manager.

### DATABASES

Updates alert settings for all databases managed by the database manager. These are the settings that apply to all databases that do not have custom settings. Custom settings are defined using the **DATABASE ON database-alias** clause.

### CONTAINERS

Updates alert settings for all table space containers managed by the database manager. These are the settings that apply to all table space containers that do not have custom settings. Custom settings are defined using the **CONTAINER container-name ON database-alias** clause.

### TABLESPACES

Updates alert settings for all table spaces managed by the database manager. These are the settings that apply to all table spaces that do not have custom settings. Custom settings are defined using the **TABLESPACE tblspace-name ON database-alias** clause.

### DATABASE ON database-alias

Updates the alert settings for the database specified using the **ON database-alias** clause. If this database has custom settings, then they override the settings for all databases for the instance, which is specified using the **DATABASES** parameter.

### CONTAINER container-name FOR tblspace-name ON database-alias

Updates the alert settings for the table space container called *container-name*, for the table space specified using the **FOR tblspace-name** clause, on the database specified using the **ON database-alias** clause. If this table space container has custom settings, then they override the settings for all table space containers for the database, which is specified using the **CONTAINERS** parameter.

### TABLESPACE tblspace-name ON database-alias

Updates the alert settings for the table space called *name*, on the database specified using the **ON database-alias** clause. If this table space has custom settings, then they override the settings for all table spaces for the database, which is specified using the **TABLESPACES** parameter.

### USING health-indicator-name

Specifies the set of health indicators for which alert configuration will be updated. Health indicator names consist of a two-letter object identifier followed by a name which describes what the indicator measures. For example:

```
db.sort_privmem_util
```

**SET *parameter-name* *value***

Updates the alert configuration element, *parameter-name*, of the health indicator to the specified value. *parameter-name* must be one of the following values:

- ALARM: the *value* is a health indicator unit.
- WARNING: the *value* is a health indicator unit.
- SENSITIVITY: the *value* is in seconds.
- ACTIONENABLED: the *value* can be either YES or NO.
- THRESHOLDSCHECKED: the *value* can be either YES or NO.

**UPDATE ACTION SCRIPT *pathname* ON [WARNING | ALARM | ALLALERT | ATTENTION *state*]**  
Specifies that the script attributes of the predefined script with absolute path name *pathname* will be updated according to the following clause:**SET *parameter-name* *value***

Updates the script attribute, *parameter-name*, to the specified value. *parameter-name* must be one of the following values:

- SCRIPTTYPE  
OS or DB2 are the valid types.
- WORKINGDIR
- TERMCHAR
- CMDLINEPARMS

The command line parameters that you specify for the operating system script will precede the default supplied parameters. The parameters that are sent to the operating system script are:

- List of user supplied parameters
- Health indicator short name
- Fully qualified object name
- Health indicator value
- Alert state
- USERID
- PASSWORD
- SYSTEM

**UPDATE ACTION TASK *task-name* ON [WARNING | ALARM | ALLALERT | ATTENTION *state*]**

Specifies that the task attributes of the task with name *name* will be updated according to the following clause:

**SET *parameter-name* *value***

Updates the task attribute, *parameter-name*, to the specified value. *parameter-name* must be one of the following values:

- USERID
- PASSWORD
- SYSTEM

**DELETE ACTION SCRIPT *pathname* ON [WARNING | ALARM | ALLALERT | ATTENTION *state*]**

Removes the action script with absolute path name *pathname* from the list of alert action scripts.

**DELETE ACTION TASK *task-name* ON [WARNING | ALARM | ALLALERT | ATTENTION *state*]**

Removes the action task called *name* from the list of alert action tasks.

**ADD ACTION SCRIPT *pathname* ON [WARNING | ALARM | ALLALERT | ATTENTION *state*]**

Specifies that a new action script with absolute path name *pathname* is to be added, the attributes of which are given by the following:

**TYPE** An action script must be either a Db2 Command script or an operating system script:

- DB2
- OPERATING SYSTEM

If it is a Db2 Command script, then the following clause allows one to optionally specify the character, *character*, that is used in the script to terminate statements:

STATEMENT TERMINATION CHARACTER ;

If it is an operating system script, then the following clause allows one to optionally specify the command-line parameters, *parms*, that would be passed to the script upon invocation: **COMMAND LINE PARAMETERS** *parms*

**WORKING DIRECTORY** *pathname*

Specifies the absolute path name, *pathname*, of the directory in which the script will be executed.

**USER** *username* **USING** *password*

Specifies the user account, *username*, and associated password, *password*, under which the script will be executed.

**ADD ACTION TASK** *name* **ON** [WARNING | ALARM | ALLALERT | ATTENTION *state*]

Specifies that a new task, called *name*, is to be added to be run **ON** the specified condition.

**ON** [WARNING | ALARM | ALLALERT | ATTENTION *state*]

Specifies the condition on which the action or task will run. For threshold-based health indicators (HIs), this is **WARNING** or **ALARM**. For state-based HIs, this will be a numeric state as documented for each state-based HI (for example, for the ts.ts\_op\_status health indicator, refer to the **tablespace\_state** monitor element for table space states). **ALLALERTS** handles any changes in the state for threshold-based HIs and state-based HIs (for example, the state changes from warning to normal).

**ATTENTION** *state*

Valid numeric values for some of the database health indicator states are given in the following section, as an example for the **ADD ACTION SCRIPT** CLP command option:

- 0 - Active; Normal (ACTIVE)
- 1 - Quiesce pending (QUIESCE\_PEND)
- 2 - Quiesced (QUIESCED)
- 3 - Rollforward (ROLLFWD)

Additional state-based health indicators are defined in the header files `sqlmon.h` and `sqlutil.h`.

## Usage notes

For the **ADD ACTION** option, the supplied *username* and *password* may be exposed in various places where SQL statement text is captured:

- the network (username/password are passed over the wire unencrypted)
- **db2diag** log file
- trace files
- dump file
- snapshot monitor (dynamic SQL snapshot)

- system monitor snapshots
- a number of event monitors (statement, deadlock)
- explain tables
- **db2pd** output (package cache and lock timeout mechanisms, among others)
- Db2 audit records

## **UPDATE ALTERNATE SERVER FOR DATABASE**

Updates the alternate server for a database alias in the system database directory.

### **Scope**

This command only affects the database partition on which it is executed.

### **Authorization**

One of the following authorities:

- SYSADM
- SYSCTRL

### **Required connection**

None

### **Command syntax**

```
►—UPDATE ALTERNATE SERVER FOR—DATABASE—database-alias—USING————→
 |DB|—————
—————►—HOSTNAME—hostname—PORT—port-number—————►
```

### **Command parameters**

#### **DATABASE *database-alias***

Specifies the alias of the database where the alternate server is to be updated.

#### **HOSTNAME *hostname***

Specifies a fully qualified host name or the IP address of the node where the alternate server for the database resides.

#### **PORT *port-number***

Specifies the port number of the alternate server of the database manager instance.

### **Examples**

The following example updates the alternate server for the SAMPLE database using host name montero and port 20396:

```
db2 update alternate server for database sample using hostname montero port 20396
```

The following two examples reset the alternate server for the SAMPLE database:

```
db2 update alternate server for database sample using hostname NULL port NULL
```

or

```
db2 update alternate server for database sample using hostname "" port NULL
```

## Usage notes

- This command is only applied to the system database directory.
  - This command should only be used on a server instance. If it is issued on a client instance, it is ignored and message SQL1889W is returned.
  - If Lightweight Directory Access Protocol (LDAP) support is enabled on the machine on which the command is issued, the alternate server for the database will be automatically registered in the LDAP directory.

## UPDATE ALTERNATE SERVER FOR LDAP DATABASE

Updates the alternate server for a database in Lightweight Directory Access Protocol (LDAP).

## Authorization

Read/write access to the LDAP server.

## Required connection

None

## Command syntax

```
►► UPDATE ALTERNATE SERVER FOR LDAP [DATABASE database-alias] [DB]
 ►► USING NODE node [GWNODE gwnode] [USER username] [PASSWORD password]
```

## Command parameters

## **DATABASE** *database-alias*

Specifies the alias of the database to be updated.

**NODE** *node*

Specifies the node name where the alternate server for the database resides.

## GNODE *gnode*

Specifies the node name where the alternate gateway for the database resides.

## USER *username*

Specifies the user's LDAP distinguished name (DN). The LDAP user DN must have sufficient authority to create the object in the LDAP directory. If the user's LDAP DN is not specified, the credentials of the current logon user will be used.

If the user's LDAP DN and password have been specified using `db21dcfg`, the user name and password do not have to be specified here.

**PASSWORD** *password*

Account password.

If the user's LDAP DN and password have been specified using `db21dcfg`, the user name and password do not have to be specified here.

## UPDATE CLI CONFIGURATION

Updates the contents of a specified section in the db2cli.ini file.

The db2cli.ini file is used as the Db2 Call Level Interface (CLI) configuration file. It contains various keywords and values that can be used to modify the behavior of the CLI and the applications using it. The file is divided into sections, each section corresponding to a database alias name.

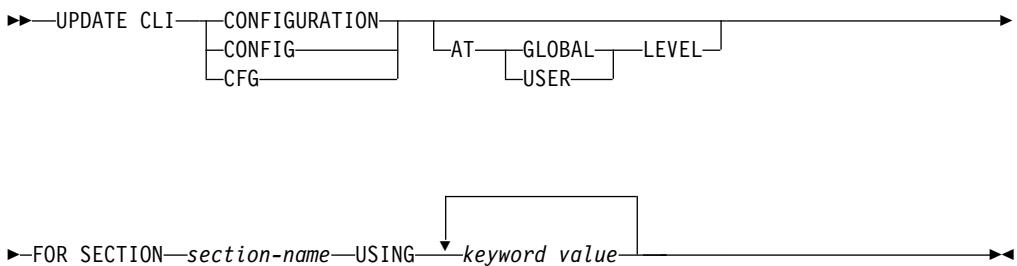
### Authorization

None

### Required connection

None

### Command syntax



### Command parameters

#### AT GLOBAL LEVEL

Specifies that the CLI configuration parameter is to be updated at the global level. A user ID must have the "System" Active Directory authorization to update the CLI configuration parameter at the global level; otherwise, the update fails with error SQL3267N. This parameter is only applicable when LDAP support is enabled.

#### AT USER LEVEL

Specifies that the CLI configuration parameter is to be updated at the user level. If LDAP support is enabled, this setting will be consistent when logging on to different machines with the same LDAP user ID. If LDAP support is disabled, this setting will be consistent only when logging on to the same machine with the same operating system user ID.

#### FOR SECTION *section-name*

Name of the section whose keywords are to be updated. If the specified section does not exist, a new section is created.

#### USING *keyword value*

Specifies the CLI/ODBC parameter to be updated.

### Usage notes

The section name and the keywords specified on this command are not case sensitive. However, the keyword values *are* case sensitive.

If a keyword value is a string containing single quotation marks or imbedded blanks, the entire string must be delimited by double quotation marks. For example:

```
db2 update cli cfg for section tstcli1x
 using TableType "'TABLE','VIEW','SYSTEM TABLE'"
```

When the **AT USER LEVEL** keywords are specified, the CLI configuration parameters for the specified section are updated only for the current user; otherwise, they are updated for all users on the local machine. The CLI configuration at the user level is maintained in the LDAP directory and cached on the local machine. When reading the CLI configuration, Db2 always reads from the cache. The cache is refreshed when:

- The user updates the CLI configuration.
- The user explicitly forces a refresh of the CLI configuration using the **REFRESH LDAP** command.

In an LDAP environment, users can configure a set of default CLI settings for a database catalogued in the LDAP directory. When an LDAP cataloged database is added as a DSN (Data Source Name), by using the ODBC configuration utility, any default CLI settings, if they exist in the LDAP directory, will be configured for that DSN on the local machine. The **AT GLOBAL LEVEL** clause must be specified to configure a CLI parameter as a default setting.

To delete CLI configuration parameters in an LDAP environment, your user ID must have DELETE authorization within the "System/IBM" Active Directory container. A user ID with WRITE and CREATE ALL CHILD OBJECTS authorizations can deactivate CLI configuration parameters, but not delete them.

## UPDATE COMMAND OPTIONS

Sets one or more command options during an interactive session, or from a batch input file. The settings revert to system defaults (or the system default overrides in **DB2OPTIONS**) when the interactive session or batch input file ends.

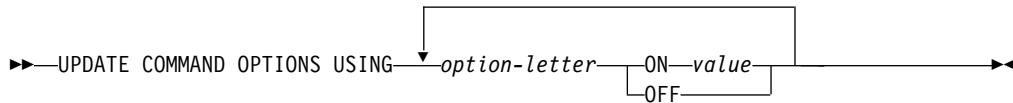
### Authorization

None

### Required connection

None

### Command syntax



### Command parameters

#### USING *option-letter*

The following option-letters can be set:

**a**      Display SQLCA

- b** Autobind missing or invalid packages that are required to run SQL statements.
- c** Autocommit SQL statements.
- d** Display the XML declarations of XML data.
- e** Display SQLCODE and SQLSTATE.
- i** Display XQuery results with proper indentation.
- l** Log commands in a history file.
- m** Display the number of rows affected by INSERT, DELETE, UPDATE or MERGE statements.
- n** Remove new line character.
- o** Display to standard output
- p** Display Db2 interactive prompt
- q** Preserve whitespace and line feeds in strings delimited with single or double quotation marks.
- r** Save output report to a file
- s** Stop execution on command error
- v** Echo current command
- w** Show SQL statement warning messages
- y** Get SQL message text from connected database server.
- z** Redirect all output to a file.

#### ON *value*

The **e**, **l**, **r**, and **z** options require a value if they are turned on. For the **e** option, *value* can be **c** to display the SQLCODE, or **s** to display the SQLSTATE. For the **l**, **r**, and **z** options, *value* represents the name to be used for the history file or the report file. No other options accept a value.

#### Usage notes

These settings override system defaults, settings in **DB2OPTIONS**, and options specified using the command line option flags.

The file input option (-f) and the statement termination option (-t) cannot be updated using this command.

To view the current option settings, use the **LIST COMMAND OPTIONS** command.

## UPDATE CONTACT

Updates the attributes of a contact that is defined on the local system. A contact is a user to whom the Scheduler and Health Monitor send messages.

To create a contact, use the **ADD CONTACT** command. The setting of the Database Administration Server (DAS) **contact\_host** configuration parameter determines whether the list is local or global.

#### Authorization

None

## Required connection

None. Local execution only: this command cannot be used with a remote connection.

## Command syntax

```
►►UPDATE CONTACT—name—USING []
 ↓
 keyword—value————→
```

## Command parameters

### UPDATE CONTACT *name*

The name of the contact that will be updated.

### USING *keyword value*

Specifies the contact parameter to be updated (*keyword*) and the value to which it will be set (*value*). The valid set of keywords is:

#### ADDRESS

The email address that is used by the SMTP server to send the notification.

#### TYPE

Whether the address is for an email address or a pager.

#### MAXPAGELEN

The maximum number of characters that the pager can accept.

#### DESCRIPTION

A textual description of the contact. This has a maximum length of 128 characters.

## UPDATE CONTACTGROUP

Updates the attributes of a contact group that is defined on the local system. A contact group is a list of users who should be notified by the Scheduler and the Health Monitor.

The setting of the Database Administration Server (DAS) **contact\_host** configuration parameter determines whether the list is local or global.

## Authorization

None

## Required Connection

None

## Command Syntax

```
►►UPDATE CONTACTGROUP—name—[]
 ↓
 ADD—DROP————CONTACT—name————→
```



## Command Parameters

### **CONTACTGROUP** *name*

Name of the contact group which will be updated.

### **ADD CONTACT** *name*

Specifies the name of the new contact to be added to the group. A contact can be defined with the **ADD CONTACT** command after it has been added to a group.

### **DROP CONTACT** *name*

Specifies the name of a contact in the group that will be dropped from the group.

### **ADD GROUP** *name*

Specifies the name of the new contact group to be added to the group.

### **DROP GROUP** *name*

Specifies the name of a contact group that will be dropped from the group.

### **DESCRIPTION** *new description*

Optional. A new textual description for the contact group.

## UPDATE DATABASE CONFIGURATION

Modifies individual entries in a specific database configuration file. A database configuration file resides on every database partition on which the database has been created.

### Scope

This command updates all database partitions or members by default, except when the following optional clause is specified:

- **MEMBER** to update only one database member for a Db2 pureScale environment, or to update only one database partition in a partitioned database environment.

### Authorization

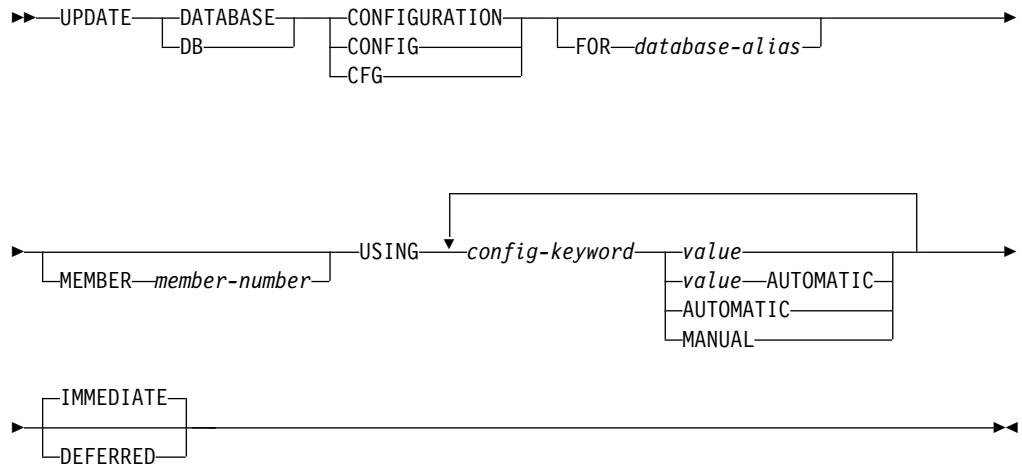
One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT

### Required connection

Instance. An explicit attachment is not required, but a database connection is recommended when the database is active. If the database is listed as remote, an instance attachment to the remote node is established for the duration of the command. To change a parameter online, you must be connected to the database.

## Command syntax



## Command parameters

### FOR *database-alias*

Specifies the alias of the database whose configuration is to be updated. Specifying the database alias is not required when a database connection has already been established. You can update the configuration file for another database residing under the same database instance. For example, if you are connected only to database db11, and issue update db config for alias db22 using .... immediate:

- If there is no active connection on db22, the update will be successful because only the configuration file needs to be updated. A new connection (which will activate the database) will see the new change in memory.
- If there are active connections on db22 from other applications, the update will work on disk but not in memory. You will receive a warning saying that the database needs to be restarted.

### MEMBER *member-number*

The **MEMBER** clause specifies to which member the change should be applied. Omission of this clause results in the change being applied to all the members.

### USING *config-keyword value*

*config-keyword* specifies the database configuration parameter to be updated. *value* specifies the value to be assigned to the parameter.

### AUTOMATIC

Some configuration parameters can be set to **AUTOMATIC**, allowing Db2 database systems to automatically adjust these parameters to reflect the current resource requirements. For a list of configuration parameters that support the **AUTOMATIC** keyword, refer to the configuration parameters summary. If a value is specified along with the **AUTOMATIC** keyword, it might influence the automatic calculations. For specific details about this behavior, refer to the documentation for the configuration parameter.

**MANUAL** Disables automatic tuning for the configuration parameter. The parameter is set to its current internal value and is no longer updated automatically.

#### **IMMEDIATE**

Make the changes immediately, while the database is running. **IMMEDIATE** is the default action, but it requires a database connection to be effective.

This is a default clause when operating in the CLPPlus interface as well. **IMMEDIATE** need not be called when using CLPPlus processor.

#### **DEFERRED**

Make the changes only in the configuration file, so that the changes take effect the next time you reactivate the database.

## **Examples**

### **Update database configuration on a multi-partition instance**

This example demonstrates how to update database configuration parameter **MAXAPPLS** from 10 to 50 for a database named SAMPLE.

A user has a multi-partition instance that has 4 partitions as defined in the db2nodes.cfg:

```
10 gilera 0
20 gilera 1
30 motobi 0
40 motobi 1
```

The user has created the SAMPLE database on the instance. The catalog partition for SAMPLE is on member 10. Let us assume the user is logged on to system motobi.

Since the default behavior for a multi-partition instance is to update the database configurations on all database partitions, the following command issued by users will result in the same value for **MAXAPPLS** across all database partitions:

```
db2 update db cfg for sample using maxappls 50
```

To update **MAXAPPLS** only on member 30, the following commands may be issued:

```
db2 update db cfg for sample member 30 using maxappls 50
```

## **Usage notes**

To view or print a list of the database configuration parameters, use the **GET DATABASE CONFIGURATION** command.

To reset all the database configuration parameters to the recommended defaults, use the **RESET DATABASE CONFIGURATION** command.

To change a database configuration parameter, use the **UPDATE DATABASE CONFIGURATION** command. For example, to change the logging mode to “archival logging” on a single-partition database environment containing a database called ZELLMART, use:

```
db2 update db cfg for zellmart using logarchmeth1 logretain
```

To check that the **logarchmeth1** configuration parameter has changed, use:

```
db2 get db cfg for zellmart
```

For example, to change the logging mode to “archival logging” on all partitions (provided the registry variable **DB2\_UPDDBCFG\_SINGLE\_DBPARTITION** is set, by default, to NULL or FALSE) in a multiple-partitioned database environment containing a database called “zellmart”, use:

```
db2 update db cfg for zellmart using logarchmeth1 logretain
```

To check that the **logarchmeth1** configuration parameter has changed on all database partitions, use:

```
db2_all ";"db2 get db cfg for zellmart"
```

Using the previous example, but to update the logging mode to only one specific partition (30), use:

```
db2 update db cfg for zellmart member 30 using logarchmeth1 logretain
```

Optionally, you can leverage the **SYSIBADM.DBCFG** view to get data from all partitions without having to use **db2\_all**.

If you are working on a UNIX operating system, and you have the **grep** command, you can use the following command to view only the **logarchmeth1** values:

```
db2_all ";"db2 get db cfg for zellmart | grep -i logarchmeth1"
```

For more information about Db2 database configuration parameters and the values available for each type of database node, see the individual configuration parameter descriptions. The values of these parameters differ for each type of database node configured (server, client, or server with remote clients).

Not all parameters can be updated.

Some changes to the database configuration file become effective only after they are loaded into memory. All applications must disconnect from the database before this can occur. For more information about which parameters are configurable online and which ones are not, see summary list of configuration parameters.

For example, to change the **sortheap** database configuration parameter online for the **SALES** database, enter the following commands:

```
db2 connect to sales
db2 update db cfg using sortheap 1000
db2 connect reset
```

If an error occurs, the database configuration file does not change. The database configuration file cannot be updated if the checksum is invalid. This might occur if the database configuration file is changed without using the appropriate command. If this happens, the database must be restored to reset the database configuration file.

## Compatibilities

For compatibility with previous versions:

- **DBPARTITIONNUM** can be substituted for **MEMBER**, except when the **DB2\_ENFORCE\_MEMBER\_SYNTAX** registry variable is set to ON.

## UPDATE DATABASE MANAGER CONFIGURATION

Modifies individual entries in the database manager configuration file.

## **Authorization**

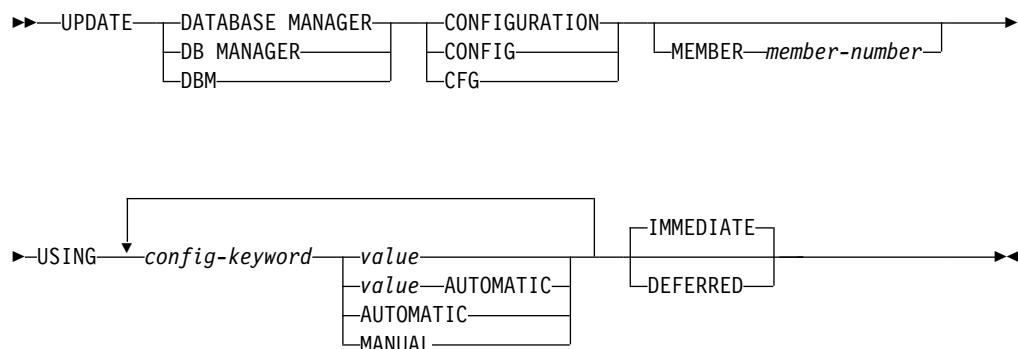
One of the following:

- SYSADM
  - Member of Local Administrator Group on Windows operating system
  - Instance Owner on UNIX or Linux operating system

## Required connection

None or instance. An instance attachment is not required to perform local DBM configuration operations, but is required to perform remote DBM configuration operations. To update the database manager configuration for a remote instance, it is necessary to first attach to that instance. To update a configuration parameter online, it is also necessary to first attach to the instance.

## Command syntax



## Command parameters

**MEMBER** *member-number*

The **MEMBER** clause specifies to which member the change should be applied. Omission of this clause results in the change being applied to all the members.

**USING** *config-keyword value*

Specifies the database manager configuration parameter to be updated. For a list of configuration parameters, refer to the configuration parameters summary. *value* specifies the value to be assigned to the parameter.

## AUTOMATIC

Some configuration parameters can be set to AUTOMATIC, allowing Db2 to automatically adjust these parameters to reflect the current resource requirements. For a list of configuration parameters that support the **AUTOMATIC** keyword, refer to the configuration parameters summary. If a value is specified along with the **AUTOMATIC** keyword, it might influence the automatic calculations. For specific details about this behavior, refer to the documentation for the configuration parameter.

Note:

**MANUAL** Disables automatic tuning for the configuration parameter. The parameter is set to its current internal value and is no longer updated automatically.

#### **IMMEDIATE**

Make the changes right now, dynamically, while the instance is running. **IMMEDIATE** is the default, but it requires an instance attachment to be effective.

#### **DEFERRED**

Make the changes only in the configuration file, so that the changes take effect when the instance is restarted.

This is a default clause when operating in the CLPPlus interface. **DEFERRED** need not be called when using CLPPlus processor.

### **Usage notes**

To view or print a list of the database manager configuration parameters, use the **GET DATABASE MANAGER CONFIGURATION** command. To reset the database manager configuration parameters to the recommended database manager defaults, use the **RESET DATABASE MANAGER CONFIGURATION** command. For more information about database manager configuration parameters and the values of these parameters appropriate for each type of database node configured (server, client, or server with remote clients), see individual configuration parameter descriptions.

Not all parameters can be updated.

Some changes to the database manager configuration file become effective only after they are loaded into memory. For more information about which parameters are configurable online and which ones are not, see the configuration parameter summary. Server configuration parameters that are not reset immediately are reset during execution of **db2start**. For a client configuration parameter, parameters are reset the next time you restart the application. If the client is the command line processor, it is necessary to invoke **TERMINATE**.

For example, to change the **DIALEVEL** database manager configuration parameter online for the eastern instance of the database manager, enter the following command:

```
db2 attach to eastern
db2 update dbm cfg using DIALEVEL 1
db2 detach
```

If an error occurs, the database manager configuration file does not change.

The database manager configuration file cannot be updated if the checksum is invalid. This can occur if you edit database manager configuration file and do not use the appropriate command. If the checksum is invalid, you must reinstall the database manager to reset the database manager configuration file.

When you update the **SVCENAME**, or **TPNAME** database manager configuration parameters for the current instance, if LDAP support is enabled and there is an LDAP server registered for this instance, the LDAP server is updated with the new value or values.

## **UPDATE HEALTH NOTIFICATION CONTACT LIST**

Updates the contact list for notification about health alerts issued by an instance.

## Authorization

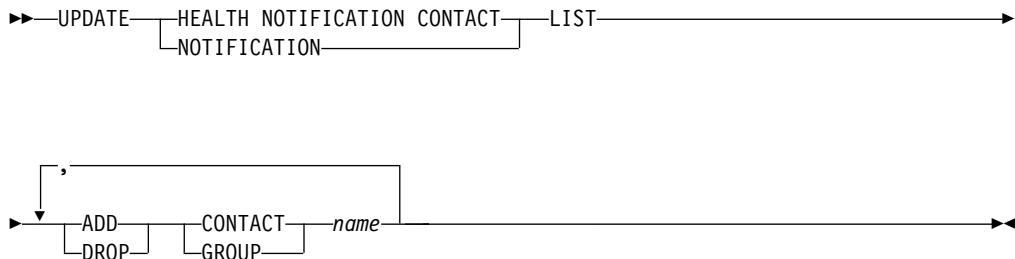
One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT

## Required Connection

Instance. An explicit attachment is not required.

## Command Syntax



## Command Parameters

### **ADD GROUP *name***

Add a new contact group that will be notified of the health of the instance.

### **ADD CONTACT *name***

Add a new contact that will be notified of the health of the instance.

### **DROP GROUP *name***

Removes the contact group from the list of contacts that will be notified of the health of the instance.

### **DROP CONTACT *name***

Removes the contact from the list of contacts that will be notified of the health of the instance.

## UPDATE HISTORY

Updates the location, device type, comment, or status in a database history records entry.

## Authorization

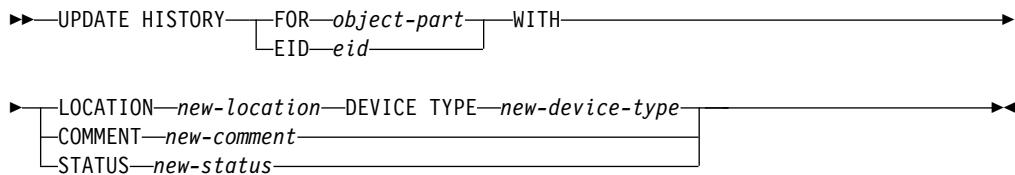
One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT
- DBADM

## Required connection

Database

## Command syntax



## Command parameters

### **FOR** *object-part*

Specifies the identifier for the history entry to be updated. It is a time stamp with an optional sequence number from 001 to 999. This parameter cannot be used to update the entry status. To update the entry status, specify an EID instead.

### **EID** *eid*

Specifies the history entry ID.

### **LOCATION** *new-location*

Specifies the new physical location of a backup image. The interpretation of this parameter depends on the device type.

### **DEVICE TYPE** *new-device-type*

Specifies a new device type for storing the backup image. Valid device types are:

- D** Disk
- K** Diskette
- T** Tape
- A** Tivoli Storage Manager
- F** Snapshot backup
- f** Snapshot backup that was generated by a custom script.
- U** User exit
- P** Pipe
- N** Null device
- X** XBSA
- Q** SQL statement
- O** Other

### **COMMENT** *new-comment*

Specifies a new comment to describe the entry. The size of *new-comment* cannot exceed 30 ASCII characters.

### **STATUS** *new-status*

Specifies a new status for an entry. Only backup entries can have their status updated. Valid values are:

- A** Active. The backup image is on the active log chain. Most entries are active.

- I** Inactive. Backup images that no longer correspond to the current log sequence, also called the current log chain, are flagged as inactive.
- E** Expired. Backup images that are no longer required, because there are more than NUM\_DB\_BACKUPS active images, are flagged as expired.
- D** Deleted. Backup images that are no longer available for recovery should be marked as having been deleted.
- X** Do not delete. Recovery database history records file entries that are marked DB2HISTORY\_STATUS\_DO\_NOT\_DELETE will not be pruned by calls to the **PRUNE HISTORY** command, running the ADMIN\_CMD procedure with **PRUNE HISTORY**, calls to the db2Prune API, or automated recovery database history records pruning. You can use the DB2HISTORY\_STATUS\_DO\_NOT\_DELETE status to protect key recovery file entries from being pruned and the recovery objects associated with them from being deleted. Only log files, backup images, and load copy images can be marked as DB2HISTORY\_STATUS\_DO\_NOT\_DELETE.

## Example

Let's say there was a full database backed up on April 13, 1997 at 10:00 a.m. and backed up to 2 target devices. The object-part of database history records entries for resulting backup images should be 19970413100000001 and 19970413100000002, respectively. The first 14 digits (1997041310000) of object-part is the time stamp associated with this backup image and the last 3 digits (001 or 002) is the sequence number of this backup image. To update database history records entries for this full database backup, please enter:

```
db2 update history for 19970413100000001 with
 location /backup/dbbackup.1 device type D
db2 update history for 19970413100000002 with location /backup/dbbackup.2 device type D
```

## Usage notes

The primary purpose of the database history records is to record information, but the data contained in the history is used directly by automatic restore operations. During any restore where the **AUTOMATIC** option is specified, the history of backup images and their locations will be referenced and used by the restore utility to fulfill the automatic restore request. If the automatic restore function is to be used and backup images have been relocated since they were created, it is recommended that the database history record for those images be updated to reflect the current location. If the backup image location in the database history is not updated, automatic restore will not be able to locate the backup images, but manual restore commands can still be used successfully.

## UPDATE LDAP NODE

Updates the protocol information associated with a node entry that represents the Db2 server in Lightweight Directory Access Protocol (LDAP).

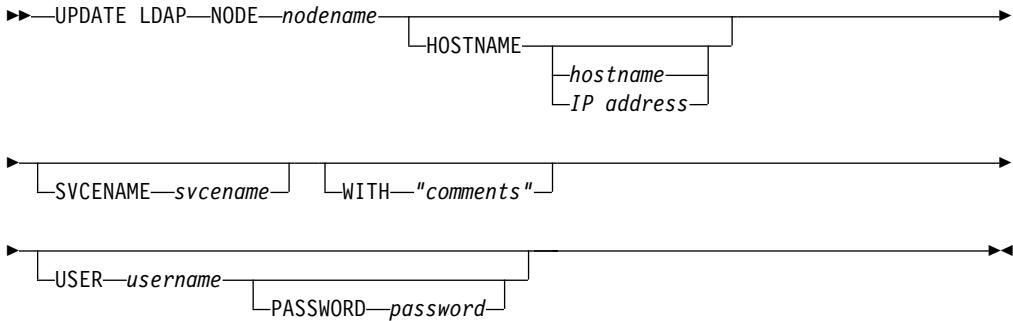
### Authorization

None

## Required connection

None

## Command syntax



## Command parameters

### NODE *nodename*

Specifies the node name when updating a remote Db2 server. The node name is the value specified when registering the Db2 server in LDAP.

### HOSTNAME *hostname* | *IP address*

Specifies the TCP/IP host name or IP address.

- If it is a TCPIP node, the host name will be resolved to an IPv4 or IPv6 address.
- If it is a TCPIP4 node, the host name will be resolved to an IPv4 address only.
- If it is a TCPIP6 node, the host name will be resolved to an IPv6 address only.

### SVCENAME *svcename*

Specifies the TCP/IP service name or port number.

### WITH *"comments"*

Describes the Db2 server. Any comment that helps to describe the server registered in the network directory can be entered. Maximum length is 30 characters. A carriage return or a line feed character is not permitted. The comment text must be enclosed by double quotation marks.

### USER *username*

Specifies the user's LDAP distinguished name (DN). The LDAP user DN must have sufficient authority to create and update the object in the LDAP directory. If the user's LDAP DN is not specified, the credentials of the current logon user will be used.

### PASSWORD *password*

Account password.

## UPDATE MONITOR SWITCHES

Turns one or more database monitor recording switches on or off.

When the database manager starts, the settings of the six switches are determined by the **dft\_mon** database manager configuration parameter.

The database monitor records a base set of information at all times. Users who require more than this basic information can turn on the appropriate switches, but at a cost to system performance. The amount of information available in output from the **GET SNAPSHOT** command reflects which, if any, switches are on.

## Scope

This command is issued on the currently attached member and, by default, returns information only for that member. In the case of multiple members per host, the currently attached member is the first member that is listed in the db2nodes.cfg file on that host.

To issue the command for a specific member that is not the currently attached member, specify the **ATTACH\_MEMBER** parameter. To issue the command for all members and receive an aggregated result, specify the **GLOBAL** parameter.

To change the currently attached member, issue the **SET CLIENT** command with the **ATTACH\_MEMBER** parameter . You must issue the **DETACH** command followed by the **ATTACH** command from your application for this change to take effect.

## Authorization

One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT
- SYSMON

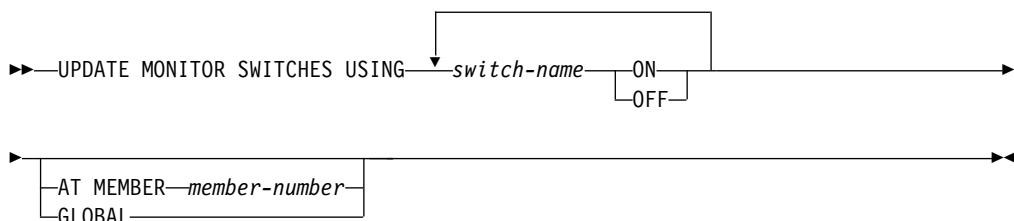
## Required connection

Instance or database:

- If there is neither an attachment to an instance, nor a connection to a database, a default instance attachment is created.
- If there is both an attachment to an instance, and a database connection, the instance attachment is used.

To update the monitor switches at a remote instance (or a different local instance), it is necessary to first attach to that instance.

## Command syntax



## Command parameters

### USING *switch-name*

The following switch names are available:

#### BUFFERPOOL

Buffer pool activity information

#### LOCK

Lock information

#### SORT

Sorting information

#### STATEMENT

SQL statement information

#### TABLE

Table activity information

#### TIMESTAMP

Monitoring timestamp information

#### UOW

Unit of work information.

### AT MEMBER *member-number*

Specifies the member for which the monitor switches are updated.

### GLOBAL

Updates the monitor switches on all members.

## Usage notes

Information is collected by the database manager only after a switch is turned on. The switches remain set until **db2stop** is issued, or the application that issued the **UPDATE MONITOR SWITCHES** command terminates. To clear the information related to a particular switch, set the switch off, then on.

Updating switches in one application does not affect other applications.

To view the switch settings, use the **GET MONITOR SWITCHES** command.

## Compatibilities

For compatibility with previous versions:

- **DBPARTITIONNUM** or **NODE** can be substituted for **MEMBER**, except when the **DB2\_ENFORCE\_MEMBER\_SYNTAX** registry variable is set to **ON**.

## UPDATE XMLSCHEMA

Updates one XML schema with another in the XML schema repository (XSR).

## Authorization

One of the following authorities:

- DBADM
- SELECT privilege on the catalog views SYSCAT.XSROBJECTS and SYSCAT.XSROBJECTCOMPONENTS and one of the following sets of privileges:
  - ALTERIN privilege on the XML schema to be updated and DROPIN privilege on the new XML schema, if the **DROP NEW SCHEMA** option is specified.
  - OWNER of the XML schema specified by xmlschema1.

## Required connection

## Database

## Command syntax

►—UPDATE XMLSCHEMA—*xmlschema1*—WITH—*xmlschema2*—►

## Command parameters

## UPDATE XMLSCHEMA *xmlschema1*

Specifies the SQL identifier for the original XML schema to be updated.

## WITH *xmlschema2*

Specifies the SQL identifier for the new XML schema that will be used to update the original XML schema.

## DROP NEW SCHEMA

Indicates that the new XML schema should be dropped after it is used to update the original XML schema.

## Example

```
UPDATE XMLSCHEMA JOHNDOE.OLDPROD
WITH JOHNDOE.NEWPROD
DROP NEW SCHEMA
```

The contents of the XML schema JOHNDOE.OLDFPROD is updated with the contents of JOHNDOE.NEWPROD, and the XML schema JOHNDOE.NEWPROD is dropped.

## Usage notes

- The original and new XML schema must be compatible. For details about the compatibility requirements, see “Compatibility requirements for evolving an XML schema”.
  - Before an XML schema can be updated, both the original and the new schema must be registered in the XML schema repository (XSR).

# UPGRADE DATABASE

Converts a Db2 database of the previous version to the formats corresponding to the release run by the instance.

The **db2ckupgrade** command must be issued before upgrading the instance to verify that your databases are ready for upgrade. The **db2iupgrade** command implicitly calls the **db2ckupgrade**. Backup all databases before upgrading, and before the installation of the current version of Db2 database product on Windows operating systems.

For Db2 Version 10.5 Fix Pack 7 or later HADR databases, the **db2iupgrade** command calls the **db2ckupgrade** command to verify that the primary's log shipping position matches the standby's log replay position. The **UPGRADE DATABASE** command also validates the log positions on start up and fails if they do not match.

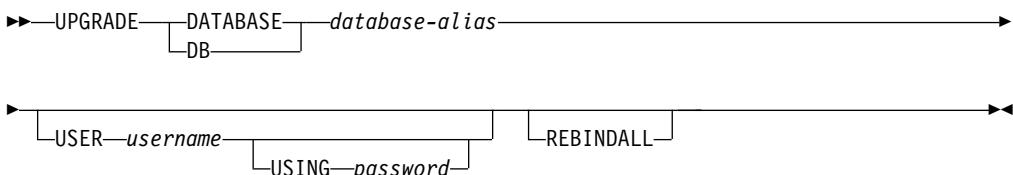
## Authorization

SYSADM

## Required connection

This command establishes a database connection.

## Command syntax



## Command parameters

### DATABASE *database alias*

Specifies the alias of the database to be upgraded to the currently installed version of the database manager.

### USER *username*

Identifies the user name under which the database is to be upgraded.

### USING *password*

The password used to authenticate the user name. If the password is omitted, but a user name was specified, the user is prompted to enter it.

### REBINDALL

Specifies that a REBIND of all packages is performed during upgrade. Performing the REBINDs automatically during the upgrade ensures that the step is not missed and will help ensure that other applications are not started before the REBINDs are complete.

## Examples

The following example upgrades the database cataloged under the database alias sales:

```
db2 UPGRADE DATABASE sales
```

## Usage notes

This command will only upgrade a database to a newer version, and cannot be used to convert an upgraded database to its previous version.

The database must be cataloged before upgrade.

If an error occurs during upgrade, it might be necessary to issue the **TERMINATE** command before attempting the suggested user response. For example, if a log full error occurs during upgrade (SQL1704: Database upgrade failed. Reason code "3"), it will be necessary to issue the **TERMINATE** command before increasing the values of the database configuration parameters **logprimary** and **logfilsiz**. The CLP must refresh its database directory cache if the upgrade failure occurs after the database has already been relocated (which is likely to be the case when a "log full" error returns).

For Db2 Version 10.5 Fix Pack 7 or later HADR databases, see Upgrading DB2 High Availability Disaster Recovery (HADR) environments for details.

## ZLOAD

The CLP LOAD command supports the remote load against Db2 for z/OS servers, by taking the file and loading it as an input parameter.

## Scope

The CLP LOAD command supports the remote load against Db2 for z/OS servers, by taking the file and loading it as an input parameter.

## Authorization

- Schema load authority.

## Required connection

Database. If implicit connect is enabled, a connection to the default database is established.

## Command syntax

```
►►ZLOAD FROM—filename [WITH utilityid] [MESSAGES-msgfilename]
►►USING loadstmt
```

## Command parameters

<filename>

Specifies the single fine name that contains the data to load.

User can specify the file name in which CLP can copy the messages that are returned by the LOAD utility.

### <loadstmt>

User can specify the SQL statement for the LOAD command.

<Utilityid>

User can specify the utility-id for the LOAD command.

## Examples

If you are running the ZLOAD command from a shell in Unix/Linux or from a Windows command prompt, enclose the ZLOAD command with double quotation mark delimiters:

```
C:\Program Files (x86)\IBM\SQLLIB_11\BIN>db2 "zload from block.cust.de1
of int with zloadidbxslr messages zloadutil.txt using template
SORTIN DSN DOC.SORTIN UNIT SYSDA SPACE(10,10) CYL DISP(NEW,DELETE,DELETE)
TEMPLATE SORTOUT DSN DOC.SORTOUT UNIT SYSDA SPACE(10,10)
CYL DISP(NEW,DELETE,DELETE)
LOAD DATA INDDN SYSCLEN WORKDDN(SORTIN,SORTOUT) REPLACE PREFORMAT
LOG(NO) REUSE NOCOPYPEND FORMAT DELIMITED EBCDIC STATISTICS
TABLE(ADMF001.CUSTOMER_LOCAL) index(all) column(all) INTO
TABLE ADMF001.CUSTOMER_LOCAL NUMRECS 30000 NOCOPYPEND"
```

If you are running the ZLOAD command from a CLP prompt or from a file, then you do not need to use double quotation mark delimiters.

```

zload from block.cust.del of int with zloadidbxs1r messages zloadutil.txt
 using template SORTIN DSN DOC.SORTIN UNIT SYSDA SPACE(10,10)
 CYL DISP(NEW,DELETE,DELETE) TEMPLATE SORTOUT DSN DOC.SORTOUT
 UNIT SYSDA SPACE(10,10) CYL DISP(NEW,DELETE,DELETE)
LOADDATA INDDN SYSCLEN WORKDDN(SORTIN,SORTOUT)
REPLACE PREFORMAT LOG(NO) REUSE NOCOPYPEND FORMAT DELIMITED
EBCDIC STATISTICS TABLE(ADMF001.CUSTOMER_LOCAL) index(a11)
column(a11) INTO TABLE ADMF001.CUSTOMER_LOCAL
NUMRECS 30000 NOCOPYPEND

```

## Usage notes

When a utilityid value is not provided, the driver generates a value (see the description of the SQL\_ATTR\_DB2ZLOAD.UtilityID for a format of the generated value) for the utilityid of the LOAD operation.

Error scenarios:

- If the file supplied to CLP ZLOAD command has any permission problems to read or open, it throws existing SQL error "SQL2731N Error while reading from input data file "<filename>"."
- CLI returns the "CLI0150E Driver not capable." error if user tries to turn on the LOAD against servers other than Db2 for z/OS 12 and above.
- SQL statement for LOAD utility must not be null and not more than 32704 bytes. Otherwise, CLI throws existing error "CLI0124E Invalid argument value." and CLP throws the existing error message "SQL0102N The string constant beginning with "" is too long." CLI or CLP does not validate or scan the SQL statement.
- If the user specifies an invalid value for record delimiter, CLI throws existing error "CLI0124E Invalid argument value." CLP throws the existing error "SQL0104N An unexpected token "INVALID" was found following "OF". Expected tokens might include "DEL".

## System commands

### **dasauto - Autostart Db2 administration server**

Enables or disables autostarting of the Db2 administration server.

**Important:** This command has been deprecated and might be removed in a future release because the Db2 administration server (DAS) has been deprecated in Version 9.7. For more information, see "Db2 administration server (DAS) has been deprecated" at [http://www.ibm.com/support/knowledgecenter/SSEPGG\\_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0059276.html](http://www.ibm.com/support/knowledgecenter/SSEPGG_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0059276.html).

This command is available on Linux and UNIX systems only. It is located in the *DB2DIR/das/adm* directory, where *DB2DIR* is the location where the current version of the Db2 database product is installed.

#### **Authorization**

DASADM

#### **Required connection**

None

## Command syntax



## Command parameters

**-h | -?**

Displays help information. When this option is specified, all other options are ignored, and only the help information is displayed.

**-on**

Enables autostarting of the Db2 administration server. The next time the system is restarted, the Db2 administration server will be started automatically.

**-off**

Disables autostarting of the Db2 administration server. The next time the system is restarted, the Db2 administration server will not be started automatically.

## dascrt - Create a Db2 administration server

The Db2 Administration Server provides support services for remote administration and Db2 administration tools such as the Replication Center. If a system does not have a DAS, you can use this command to manually generate it.

**Important:** This command has been deprecated and might be removed in a future release because the Db2 administration server (DAS) has been deprecated in Version 9.7. For more information, see “Db2 administration server (DAS) has been deprecated” at [http://www.ibm.com/support/knowledgecenter/SSEPGG\\_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0059276.html](http://www.ibm.com/support/knowledgecenter/SSEPGG_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0059276.html).

The **dascrt** command is located in the *DB2DIR/instance* directory, where *DB2DIR* is the location where the current version of the Db2 database product is installed.

This command is available on Linux and UNIX operating systems only. On Windows operating systems, you can use the **db2admin create** command for the same purpose.

**Note:** The Db2 Administration Server (DAS) has been deprecated in Version 9.7 and might be removed in a future release. The DAS is not supported in Db2 pureScale environments. Use software programs that use the Secure Shell protocol for remote administration. For more information, see “Db2 administration server (DAS) has been deprecated” at .

## Authorization

Root user authority

## Required connection

None

## Command syntax

```
>>>das crt -u DASuser [-d]<>
```

## Command parameters

### -u *DASuser*

*DASuser* is the user ID under which the DAS will be created. The DAS will be created under the `/home/DASuser/das` directory.

The following restrictions apply:

- If existing IDs are used to create Db2 DAS, make sure that the IDs are not locked and do not have expired passwords.

### -d

Enters debug mode, for use with Db2 Service.

## Usage notes

- On AIX 6.1 (or higher), when running this command from a shared Db2 copy in a system workload partition (WPAR) global environment, this command must be run as the root user. WPAR is not supported in a Db2 pureScale environment.

## dasdrop - Remove a Db2 administration server

On Linux and UNIX operating systems only, removes the Db2 Administration Server (DAS).

**Important:** This command has been deprecated and might be removed in a future release because the Db2 administration server (DAS) has been deprecated in Version 9.7. For more information, see “Db2 administration server (DAS) has been deprecated” at [http://www.ibm.com/support/knowledgecenter/SSEPGG\\_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0059276.html](http://www.ibm.com/support/knowledgecenter/SSEPGG_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0059276.html).

The Db2 Administration Server provides support services for remote administration and Db2 administration tools such as the Replication Center. On Windows operating systems, you can use the **db2admin drop** command for the same purpose.

**Note:** The Db2 Administration Server (DAS) has been deprecated in Version 9.7 and might be removed in a future release. The DAS is not supported in Db2 pureScale environments. Use software programs that use the Secure Shell protocol for remote administration. For more information, see “Db2 administration server (DAS) has been deprecated” at .

## Authorization

Root user authority

## Required connection

None

## Command syntax

```
►►dasdrop [-d]
```

## Command parameters

**-d** Enters debug mode, for use with Db2 Service.

## Usage notes

- The **dasdrop** command is located in the *DB2DIR/instance* directory, where *DB2DIR* is the location where the current version of the Db2 database product is installed.
- On AIX 6.1 (or higher), when running this command from a shared Db2 copy in a system workload partition (WPAR) global environment, this command must be run as the root user. WPAR is not supported in a Db2 pureScale environment.

## dasmigr - Migrate the Db2 administration server

Migrates the Db2 Administration Server (DAS) on the system from a previous version of Db2 database system (supported for migration to the current version of the database system) to the current version of Db2 database system at the Db2 database level related to the path where the **dasmigr** is issued.

**Important:** This command has been deprecated and might be removed in a future release because the Db2 administration server (DAS) has been deprecated in Version 9.7. For more information, see “Db2 administration server (DAS) has been deprecated” at [http://www.ibm.com/support/knowledgecenter/SSEPGG\\_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0059276.html](http://www.ibm.com/support/knowledgecenter/SSEPGG_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0059276.html).

To move the DAS from one Db2 database system installation location to another within the same version of Db2 database system, the **dasupd** command should be used. A DAS at a previous version of a Db2 database system can not be used to administer instances in the current version of Db2 database system.

On Linux and UNIX operating systems, this utility is located in the *DB2DIR/instance* directory. On Windows operating systems, it is located in the *DB2DIR\bin* directory. *DB2DIR* represents the installation location where the current version of the Db2 database system is installed.

## Authorization

Root user authority on UNIX operating systems or Local Administrator authority on Windows operating systems

## Required connection

None

## Command syntax

### For Linux and UNIX operating systems

```
►►dasmigr [-d]
```

## For Windows operating systems

```
►►dasmigr [-h] [-p path_override]
```

## Command parameters

For Linux and UNIX operating systems:

- d Enters debug mode, for use with Db2 database support.

For Windows operating systems:

- h Displays usage information.

- p *path\_override*

Indicates that the DAS profile should be moved as well. *path\_override* is a user specified path to be used instead of the default DAS profile path.

## Example

On Linux and UNIX operating systems:

*DB2DIR*/instance/dasmigr

On Windows operating systems:

*DB2DIR*\bin\dasmigr

## Usage notes

- On AIX 6.1 (or higher), when running this command from a shared Db2 copy in a system workload partition (WPAR) global environment, this command must be run as the root user. WPAR is not supported in a Db2 pureScale environment.

## **dasupd - Update DAS**

On Linux and UNIX operating systems, updates the Db2 Administration Server (DAS) if the related Db2 database system installation is updated.

On Linux, UNIX, and Windows operating systems, you can also use this utility to move the DAS from one installation location to another if both are at the same version of Db2 database system.

**Important:** This command has been deprecated and might be removed in a future release because the Db2 administration server (DAS) has been deprecated in Version 9.7. For more information, see “Db2 administration server (DAS) has been deprecated” at [http://www.ibm.com/support/knowledgecenter/SSEPGG\\_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0059276.html](http://www.ibm.com/support/knowledgecenter/SSEPGG_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0059276.html).

This utility is located in the *DB2DIR*/instance directory on Linux and UNIX operating systems, where *DB2DIR* is the location where the current version of the Db2 database product is installed. On Windows operating systems, the **dasupd** command is located in the *DB2DIR*\bin directory.

On Windows operating systems, this command updates the DAS from one Db2 copy to another within the same Db2 database version. To upgrade a DAS from an older version, use the **dasmigr** command. With **dasupd**, the DAS will be updated to the Db2 copy that the **dasupd** command is executed from.

After the installation of a fix pack, the **dasupdt** command is executed automatically, if the DAS on the system is related to the Db2 database product installation path updated by **installFixPack**.

## Authorization

Root user authority on Linux and UNIX operating systems or Local Administrator authority on Windows operating systems

## Required connection

None

## Command syntax

### For Linux and UNIX operating systems

```
►—dasupdt [-d] [-D] [-h] [-?]
```

### For Windows operating systems

```
►—dasupdt [-h] [-p path override]
```

## Command parameters

### For Linux and UNIX operating systems

- d      Sets the debug mode, which is used for problem analysis.
- D      Moves the DAS from a higher code level on one path to a lower code level installed on another path.
- h | -?      Displays usage information.

### For Windows operating systems

- h      Displays usage information.
- p *path\_override*      Indicates that the DAS profile should be moved as well.  
*path\_override* is a user specified path to be used instead of the default DAS profile path.

## Example

If a DAS is running in one Db2 database product installation path and you want to move the DAS to another installation path at a lower level (but the two installation paths are at the same version of Db2 database system), issue the following command from the installation path at the lower level:

```
dasupdt -D
```

## Usage notes

- On AIX 6.1 (or higher), when running this command from a shared Db2 copy in a system workload partition (WPAR) global environment, this command must be run as the root user. WPAR is not supported in a Db2 pureScale environment.

## db2\_deinstall - Uninstall Db2 database products, features, or languages

Uninstalls Db2 database products, features, or languages, depending on the command parameters and the location where the **db2\_deinstall** command is run. The command is only available on Linux and UNIX operating systems.

The **db2\_deinstall** command is located at *DB2DIR/install*, where *DB2DIR* is the location where the current version of the Db2 database product is installed. The **db2\_deinstall** command is also available on Db2 database product media. The **db2\_deinstall** command can be used to uninstall only the Db2 database products related to the installation path.

- If **db2\_deinstall -a** is run from a particular Db2 database installation path, then it can uninstall everything, or a particular feature or language, from the same path on the local host.
- If **db2\_deinstall -a** is run from the Db2 database product media, then you need to specify a path using the **-b** option. It can then uninstall everything, or a particular feature or language, from that install path on that local host.

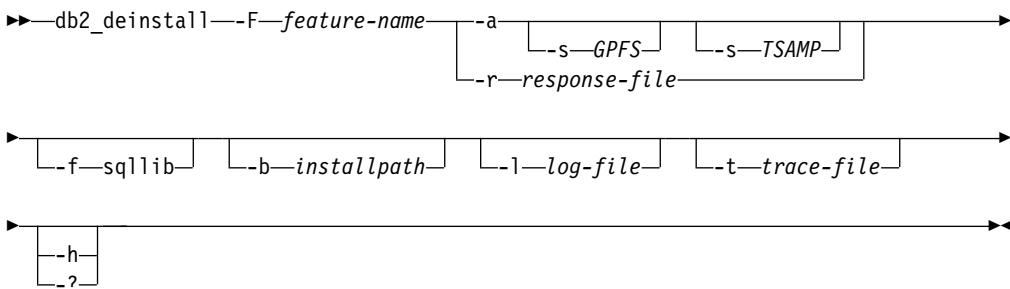
## Authorization

Root installations require root user authority.

## Required Connection

None

## Command syntax



## Command parameters

### **-F feature-name**

Specifies the removal of one feature. To indicate uninstallation of multiple features, specify this parameter multiple times. For example, **-F feature1 -F feature2**.

Cannot be used in combination with **-a**, except in one case. When the feature being removed is IBM Tivoli System Automation for

Multiplatforms (SA MP) and you have root user authority, you must use **-F** TSAMP and **-a** in combination, which removes both SA MP and Db2 database products together.

Can be used in combination with **-r**, except in one case. When the feature being removed is IBM Tivoli System Automation for Multiplatforms (SA MP), you cannot use **-F** TSAMP and **-r** in combination.

The Db2 database uninstaller will automatically update the related Db2 instances after it removed some Db2 features. If instance update failed as reported in the log file, you need to manually update the related Db2 instances with the **db2iupd** (root instances) or **db2nrupd** (non-root instance) command.

#### **-f sqllib**

This parameter is only valid for non-root install. When it is used with **-a**, the instance top directory and anything underneath will be removed.

#### **-a**

This parameter is mandatory when running the **db2\_deinstall** command on a IBM Db2 pureScale Feature copy. Removes all installed Db2 database products in the current location. Cannot be used in combination with **-F**, except in one case.

When the feature being removed is IBM Tivoli System Automation for Multiplatforms (SA MP) and you have root user authority, you must use **-F** TSAMP and **-a** in combination, which removes both SA MP and Db2 database products together.

Cannot be combined with the **-r** parameter.

In a non-root install, **-a** used with **-f sqllib** will also remove the non-root instance, which includes removal of the \$HOME/sqllib directory.

#### **-s GPFS**

If IBM General Parallel File System (GPFS<sup>TM</sup>) was installed as part of a Db2 pureScale Feature installation, GPFS is also uninstalled automatically. Specifying this parameter skips the removal of GPFS. You may want to use this parameter to keep the GPFS cluster and its file systems, but remove the Db2 copy. This parameter can only be combined with the **-a** parameter.

#### **-s TSAMP**

If IBM Tivoli System Automation for Multiplatforms (SA MP) was installed as part of a Db2 pureScale Feature installation, SA MP is also uninstalled automatically.

Specifying this parameter skips the removal of SA MP. You may want to use this parameter to keep the RSCT peer domain, but remove the Db2 copy. This parameter can only be combined with **-a** or **-F** parameters.

#### **-r response-file**

Performs an uninstallation of products, features, or languages based on what is specified in the response file. For example, **db2\_deinstall -r db2un.rsp**. The Db2 product image includes ready-to-use sample response files with default entries. The sample response file to uninstall products, features, or languages is **db2un.rsp**. The **db2un.rsp** file can be found in **DB2DIR/install** path.

Cannot be combined with the **-a** parameter, or **-s** parameter.

Can be combined with the **-F** parameter, except in one case. When the feature being removed is IBM Tivoli System Automation for Multiplatforms (SA MP), you cannot use **-F TSAMP** and **-r** in combination.

If both the **-r** and **-F** parameters are specified, the Db2 features specified in the **-F** parameter override the **REMOVE\_COMP** keywords in the response file.

The Db2 database uninstaller will automatically update the related Db2 instances after it removed some Db2 features. If instance update failed as reported in the log file, you need to manually update the related Db2 instances with the **db2iupdt** (root instances) or **db2nrupdt** (non-root instance) command.

#### **-b**

This parameter is valid if the command is run from the Db2 database product media. It specifies the absolute path where the Db2 database product was installed and will be uninstalled. The command will prompt for the path if the parameter is not specified.

#### **-l log-file**

Specifies the log file. For root installations, the default log file is `/tmp/db2_deinstall.log$$`, where `$$` represents the process ID.

For non-root installations, the default log file is `/tmp/db2_deinstall_userID.log`, where `userID` represents the user ID that owns the non-root installation. When the feature being removed is IBM Tivoli System Automation for Multiplatforms (SA MP), the install log file for SA MP will be located in the same directory as Db2 database log files.

#### **-t trace-file**

Turns on the debug mode. The debug information is written to the file name specified as *trace-file*.

#### **-h | -?**

Displays help information.

## **Example**

To uninstall all the Db2 database products that are installed in a location (*DB2DIR*), issue the **db2\_deinstall** command located in the *DB2DIR/install* directory:

```
DB2DIR/install/db2_deinstall -a -l /tmp/db2_deinstall.log
-t /tmp/db2_deinstall.trc
```

## **Usage notes**

- If you run **db2\_deinstall -a**, only the components and features installed by the Db2 database installer are removed.
- Before running the **db2\_deinstall** command, you must manually remove the IBM General Parallel File System (GPFS) cluster and file system. Otherwise, you must run the **db2\_deinstall** command with the **-s** parameter to skip the removal of GPFS binary files. You can also run the **db2\_deinstall** command with the **-s** parameter to skip the removal of SA MP.
- SA MP cannot be uninstalled individually with **db2\_deinstall** command to safe guard users from consequences of removing SA MP with an existing domain.

## **db2\_install - Install Db2 database product**

Installs all features of a Db2 database product to the given path. This command is available only on Linux and UNIX operating systems.

### **Authorization**

Root installations require root user authority. For non-root installations, you must log on with the user ID that owns the non-root installation.

### **Required Connection**

None

### **Command syntax**

```
►--db2_install [-b install-path] [-f NOTSAMP | PURESCALE]
 [-f ignoreType1] [-f noencryption] [-p productShortName]
 [-c NLPACK_location] [-n] [-m] [-y] [-L language]
 [-l log-file] [-t trace-file] [-h] [-?]
```

### **Command parameters**

#### **-b *install-path***

Specifies the path where the Db2 database product is to be installed. The value of the *install-path* variable must be a full path name, and its maximum length is 128 characters. This parameter is mandatory if you specify the **-n** parameter. In non-root install scenarios, the Db2 product may only be installed in a subdirectory called `sql1ib` in the user's home directory `$HOME/sql1ib`:

- The **-b** parameter is optional in non-root installation scenarios.
- If the **-b** parameter is specified in a non-root installation scenario, the only supported value for this parameter is the full path equivalent to `$HOME/sql1ib`.

#### **-f NOTSAMP or -f PURESCALE**

The **-f PURESCALE** and **-f NOTSAMP** parameters are mutually exclusive. The PURESCALE option applies to products that support the IBM Db2 pureScale Feature only. The PURESCALE option is ignored for products that do not support the Db2 pureScale Feature.

#### **NOTSAMP**

Specifies that IBM Tivoli System Automation for Multiplatforms (SA MP) should not be either installed or updated.

#### **PURESCALE**

Specifies that the Db2 pureScale Feature will be installed.

**-f nobackup**

This applies to the non-root upgrade only. Forces `db2_install` to not backup installation files when the components are updated. If you choose not to backup the files, the space requirement of the installation directory is reduced. However, choosing not to backup the files also means that if any errors occur, the Db2 database installer will not be able to perform a rollback operation. In this case, you will need to manually clean up the files and reinstall the product.

**-f ignoreType1**

This applies to the non-root upgrade only. Forces `db2_install` to ignore type-1 indexes when checking the database status.

**-f noencryption**

Specifies that the IBM Global Security Kit (GSKit) should not be either installed or updated. If you do not install the IBM GSKit, the encryption facility is not available in the Db2 instance. Users and applications cannot encrypt or decrypt data in the instance or in transit between Db2 servers and clients. The *noencryption* option is not supported if you select the Db2 pureScale Feature.

**-p productShortName**

Specifies the Db2 database product to be installed. This parameter is case insensitive and is mandatory when the **-n** parameter is specified. The product short name (*productShortName*) can be found in the file `ComponentList.htm` (under the product full name). The `ComponentList.htm` file lists all the components that are installed with your Db2 database product. The file is located in the `db2/plat` subdirectory on your media where *plat* is the platform name that you are installing on. You can only install one product at a time.

**Note:** The components listed in the `ComponentList.htm` file is dependant on the version of Db2 that you are installing. This file might be different on another version of Db2.

**-c NLPACK\_location**

Specifies the absolute path location of the related Db2 National Language Pack (NLPACK). This parameter is mandatory when **-n** is specified. The Db2 NLPACK location needs to be provided explicitly if all of the following conditions are met:

- The **-n** option is specified.
- The installation requires National Language (non-English) support.
- The Db2 NLPACK is neither inside the Db2 database product image nor in the same subdirectory as the Db2 database product image.

**-n** Specifies noninteractive mode. When specified, you must also specify **-b**, **-p**, and/or **-c**.

**-m** This option applies to non-root installation only. Specifies upgrade of a non-root copy. During upgrade, all preexisting Db2 database products in the current path are removed. Upgrade installs the specified product. Following the upgrade, other Db2 database products need to be installed separately.

**-y** Specifies that you have read and agreed to the license agreement file that is found in the `db2/llicense` directory of the product activation CD.

**-L language**

Specifies national language support. You can install a non-English version

of a Db2 database product. However, you must run this command from the product CD, not the National Language pack CD. By default, English is always installed, therefore, English does not need to be specified. When more than one language is required, this parameter is mandatory. To indicate multiple languages, specify this parameter multiple times. For example, to install both French and German, specify -L FR -L DE. This parameter is case insensitive.

#### **-l log-file**

Specifies the log file. For root installations, the default log file is /tmp/db2\_install.log\$\$, where \$\$ represents the process ID. For non-root installations, the default log file is /tmp/db2\_install(userID).log, where userID represents the user ID that owns the non-root installation. If IBM Tivoli System Automation for Multiplatforms (SA MP) is being installed or updated with the **db2\_install** command, the corresponding log file will be located in the same directory as Db2 database log files.

#### **-t trace-file**

Turns on the debug mode. The debug information is written to the file name specified as *trace-file*.

#### **-h | -?**

Displays usage information.

### **Example**

- To install from an image in /mnt/cdrom, and to be prompted for all needed input, or to install Db2 Enterprise Server Edition from an image in /mnt/cdrom, issue:

```
cd /mnt/cdrom
./db2_install
```

- To install Db2 Enterprise Server Edition to /db2/newlevel, from an image in /mnt/cdrom, non-interactively in English, issue:

```
cd /mnt/cdrom
./db2_install -p server -b /db2/newlevel -n
```

- To install Db2 Enterprise Server Edition with the Db2 pureScale Feature from an image in /mnt/cdrom, non-interactively in English, issue:

```
cd /mnt/cdrom
./db2_install -b <install_dir> -p SERVER -f PURESCALE
```

### **Usage notes**

If a IBM PowerHA® SystemMirror® for AIX cluster is running, you can not perform a IBM Tivoli System Automation for Multiplatforms (SA MP) installation, upgrade or update because SA MP bundles Reliable Scalable Cluster Technology (RSCT) filesets that are dependent on PowerHA SystemMirror.

To skip the SA MP installation use the **db2\_install** command or the **installFixPack** command. For information on installing or upgrading SA MP using a PowerHA SystemMirror cluster, see the white paper entitled “Upgrade guide for Db2 Servers in HACMP™ Environments”, which is available from the IBM Support and downloads website (<http://www.ibm.com/support/docview.wss?uid=swg21045033>).

## **db2\_local\_ps - Db2 process status for Linux/UNIX**

On Linux and UNIX systems, all of the Db2 processes running under an instance can be displayed using the **db2\_local\_ps** command.

## Authorization

None

## Required connection

None

## Command syntax

►►►db2\_local\_ps—————►►►

## Command parameters

### db2\_local\_ps

Outputs all of the Db2 processes running under an instance.

## Examples

```
[db2inst1@bower1 ~]$ db2_local_ps
Node 0
 UID PID PPID C STIME TTY TIME CMD
db2inst1 3254 3253 0 14:04 pts/1 00:00:00 db2sysc 0
root 3255 3254 0 14:04 pts/1 00:00:00 db2ckpwd 0
root 3256 3254 0 14:04 pts/1 00:00:00 db2ckpwd 0
root 3257 3254 0 14:04 pts/1 00:00:00 db2ckpwd 0
root 3266 3254 0 14:04 pts/1 00:00:00 db2gds 0
db2inst1 3267 3254 0 14:04 pts/1 00:00:00 db2licc 0
db2inst1 3268 3254 0 14:04 pts/1 00:00:00 db2ipccm 0
db2inst1 3269 3254 0 14:04 pts/1 00:00:00 db2tcpccm 0
db2inst1 3271 3254 0 14:04 pts/1 00:00:00 db2resync 0
db2inst1 3273 3254 0 14:04 pts/1 00:00:00 db2acd ,0,0,0,1,0,0,897b50,...
db2inst1 3297 3266 0 14:04 pts/1 00:00:00 db2loggr (SAMPLE) 0
db2inst1 3299 3266 0 14:04 pts/1 00:00:00 db2loggw (SAMPLE) 0
db2inst1 3300 3266 0 14:04 pts/1 00:00:00 db2lfr (SAMPLE) 0
db2inst1 3301 3266 0 14:04 pts/1 00:00:00 db2dlock (SAMPLE) 0
db2inst1 3303 3266 0 14:04 pts/1 00:00:00 db2pclnr 0
db2inst1 3313 3266 0 14:05 pts/1 00:00:00 db2pfchr 0
db2inst1 3314 3266 0 14:05 pts/1 00:00:00 db2pfchr 0
db2inst1 3315 3266 0 14:05 pts/1 00:00:00 db2pfchr 0
db2inst1 3316 3266 0 14:05 pts/1 00:00:00 db2stmm (SAMPLE) 0
db2inst1 3317 3266 0 14:05 pts/1 00:00:00 db2taskd (TOOLSDB) 0
db2inst1 3318 3266 0 14:05 pts/1 00:00:00 db2taskd (SAMPLE) 0
db2inst1 3319 3266 0 14:05 pts/1 00:00:00 db2stmm (TOOLSDB) 0
db2inst1 3320 3266 0 14:05 pts/1 00:00:00 db2evmgi (DB2DETAILEDLOCK) 0
db2inst1 3321 3266 0 14:05 pts/1 00:00:00 db2evmgi (DB2DETAILEDLOCK) 0
db2inst1 3341 3266 0 14:05 pts/1 00:00:00 db2loggr (TOOLSDB) 0
db2inst1 3343 3266 0 14:05 pts/1 00:00:00 db2loggw (TOOLSDB) 0
db2inst1 3344 3266 0 14:05 pts/1 00:00:00 db2lfr (TOOLSDB) 0
db2inst1 3345 3266 0 14:05 pts/1 00:00:00 db2dlock (TOOLSDB) 0
db2inst1 3346 3266 0 14:05 pts/1 00:00:00 db2pclnr 0
db2inst1 3347 3266 0 14:05 pts/1 00:00:00 db2pfchr 0
db2inst1 3348 3266 0 14:05 pts/1 00:00:00 db2pfchr 0
db2inst1 3349 3266 0 14:05 pts/1 00:00:00 db2pfchr 0
db2inst1 3270 3268 2 14:04 pts/1 00:00:01 db2agent (TOOLSDB) 0
db2inst1 3285 3268 0 14:04 pts/1 00:00:00 db2agent (SAMPLE) 0
```

Node 1 ...

## Usage notes

Note that processes will not be shown if the instance is stopped. Run the **db2start** command if processes are not listed.

## db2acsutil - Manage Db2 snapshot backup objects

Lists, deletes, and monitors Db2 snapshot backup objects.

You can use **db2acsutil** to manage Db2 snapshot backup objects in the following three ways:

- List the Db2 snapshot backups that you can use to restore your database
- Delete Db2 snapshot backups that were generated using the **BACKUP** command, the db2Backup API, or the ADMIN\_CMD stored procedure with the BACKUP DATABASE parameter
- Monitor the status of Db2 snapshot backups

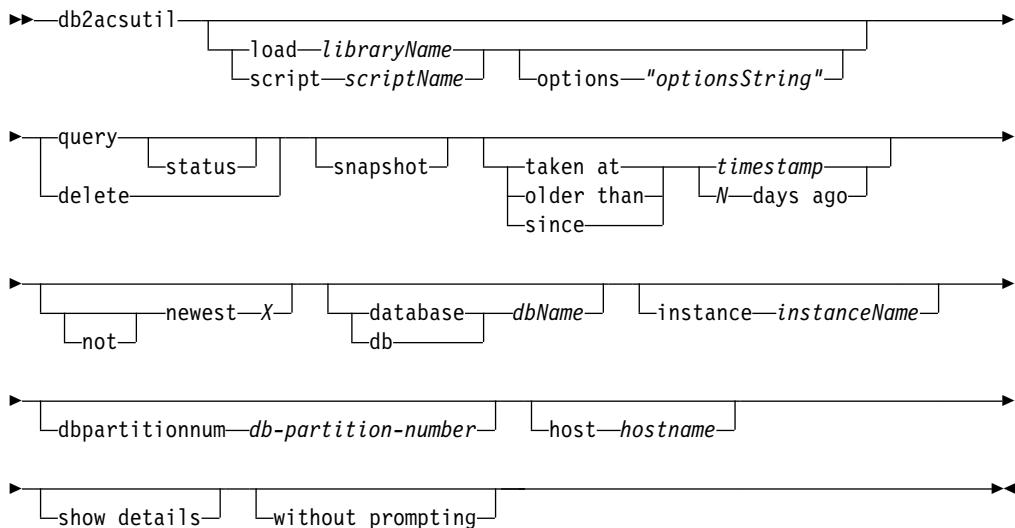
### Authorization

None

### Required connection

None

### Command syntax



### Command parameters

#### load *libraryName*

The name of the shared library containing the vendor fast copying technology used in the Db2 snapshot backup. This parameter can contain the full path. If the full path is not given, the default path is the same library as with the **BACKUP DATABASE** and **RESTORE DATABASE** commands (in `~/sql1ib/acs`).

#### script *scriptName*

The fully qualified name of the script that created the snapshot objects.

#### options "*optionsString*"

Specifies options to be used for this utility. The string will be passed to the vendor support library exactly as it was entered, without the double quotation marks.

**query**

Queries the Db2 ACS repository and returns a table of known objects.

**status**

Queries the Db2 ACS repository and returns a table of known objects with their current status.

**delete**

This deletes Db2 snapshot objects, and removes their record from the Db2 ACS repository after they have been deleted.

**snapshot**

Filters the records returned or operated on to only snapshot objects.

**taken at | older than | since**

These options filter the results of the utility to the specified time ranges.

**timestamp**

A timestamp of the form *YYYYMMDDhhmmss*.

**N days ago**

Number of days ago, where *N* is the number of days before the current date.

**[not] newest X**

Filter the utility results such that only the newest (by timestamp) *X* records are considered. If the **NOT** keyword is specified, then all records except the newest *X* are considered.

**database | db *dbName***

Considers only those objects associated with the specified database name.

**instance *instanceName***

The name of the database manager instance associated with the Db2 snapshot backup objects you are managing.

**dbpartitionnum *db-partition-number***

Considers only those objects created by the specified database partition number.

**host *hostname***

Considers only those objects created by the specified *hostname*. For example, this would typically be the TCP/IP hostname of the Db2 server.

**show details**

Displays detailed object information from the Db2 ACS repository. If this option is used, instead of a table with a single brief record per line, a detailed stanza will be produced for each Db2 ACS object.

**without prompting**

Specifies that the utility will run unattended, and that any actions which normally require user intervention will return an error message.

## Examples

Sample output for a snapshot backup with an active background copy.

```
db2acsutil query status db f01 instance db2inst1 dbpartitionnum 0
```

Instance	Database	Part	Image	Time	Status
keon14	F01	0	20070719120848		Remotely mountable + Background_monitor pending (16 / 1024 MB)

```

Sample output for a snapshot backup with a completed background copy.
db2acsutil query status db f01 instance db2inst1 dbpartitionnum 0 show details

Instance : keon14
Database : F01
Partition : 0
Image timestamp : 20070719120848
Host : machine1
Owner :
Db2 Version : 9.5.0
Creation time : Thu Jul 19 12:08:50 2007
First active log (chain:file) : 0:0
Metadata bytes : 6196
Progress state : Successful
Usability state : Remotely mountable + Repetitively restorable + Swap restorable
 + Physical protection + Full copy
Bytes completed : 0
Bytes total : 0

```

## Usage notes

Using **db2acsutil** is the only way to delete Db2 snapshot backups created using the **BACKUP** command, the db2Backup API, or the ADMIN\_CMD stored procedure with the BACKUP DATABASE parameter. You cannot use automated recovery object deletion or the **PRUNE HISTORY** command with the **AND DELETE** parameter to delete Db2 snapshot backups. You also cannot delete backups manually through the filer/storage system.

The usability state of a Db2 snapshot backup indicates what you can do with the Db2 snapshot. Table 48 lists and describes possible Db2 snapshot backup usability states.

**Note:** If you query a snapshot backup taken with a custom script, the usability state is always returned as Unknown because the usability of the image is dependent on the quality of the script.

*Table 48. Usability states returned for Db2 snapshot backups*

Usability state	Description
LOCALLY_MOUNTABLE	You can mount the backed up data from the local machine.
REMOTELY_MOUNTABLE	You can mount the backed up data from a remote machine.
REPETITIVELY_RESTORABLE	You can use the Db2 snapshot backup image multiple times to restore your backed up data.
DESTRUCTIVELY_RESTORABLE	You can use the Db2 snapshot backup image to restore your backed up data once; after the backed up data is restored, this Db2 snapshot image, and potentially others, are destroyed.
SWAP_RESTORABLE	You can access the volumes directly, but a <b>RESTORE DB</b> command cannot be executed and the backed up data cannot be copied back onto the source volumes.
PHYSICAL_PROTECTION	The snapshot is protected against physical failures in the source volumes.

*Table 48. Usability states returned for Db2 snapshot backups (continued)*

Usability state	Description
FULL_COPY	A full copy of the data has been created. You can use the Db2 snapshot backup image to restore the backed up data.
DELETED	Indicates that a backup has been marked for deletion. The snapshot storage associated with a DELETED backup will be withdrawn via a maintenance process running in the background. Once this has completed, the backup will be removed from the Db2 ACS repository.
FORCED_MOUNT	Awaiting verification of filesystem consistency by mounting an AIX JFS filesystem.
BACKGROUND_MONITOR_PENDING	Status is being monitored by the Db2 ACS background progress monitor.
TAPE_BACKUP_PENDING	Awaiting an offloaded tape backup.
TAPE_BACKUP_IN_PROGRESS	An offloaded tape backup is currently in progress.
TAPE_BACKUP_COMPLETE	Offloaded tape backup has completed.

## **db2addicons - Create main menu entries for Db2 tools**

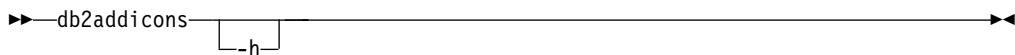
Creates main menu entries for Db2 tools.

On Linux operating systems, the **db2addicons** command creates main menu entries for Db2 tools for the current user. The main menu entries for Db2 tools are created by manually running the **db2addicons** command. For the Db2 instance owner, the menu entries are created automatically by instance utilities when the Db2 instance was created, updated or upgraded. If the main menu entries are needed on the desktop of another user, the **db2addicons** command can be run as that specific user, but the instance environment must first be set within that user's environment before running the command.

### **Authorization**

None

### **Command syntax**



```
►►—db2addicons [-h]
```

### **Command parameters**

**-h**      Displays usage information.

## **db2admin - Db2 administration server**

This utility is used to manage the Db2 Administration Server (DAS). If no parameters are specified, and the DAS exists, this command returns the name of the DAS.

**Important:** This command has been deprecated and might be removed in a future release because the Db2 administration server (DAS) has been deprecated in Version 9.7. For more information, see “Db2 administration server (DAS) has been deprecated” at [http://www.ibm.com/support/knowledgecenter/SSEPGG\\_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0059276.html](http://www.ibm.com/support/knowledgecenter/SSEPGG_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0059276.html).

On Linux and UNIX operating systems, the executable file for the **db2admin** command can be found in the *DASHOME/das/bin* directory, where *DASHOME* is the home directory of the DAS user. On Windows operating systems, the **db2admin** executable is found under the *DB2PATH\bin* directory where *DB2PATH* is the location where the Db2 copy is installed.

## **Authorization**

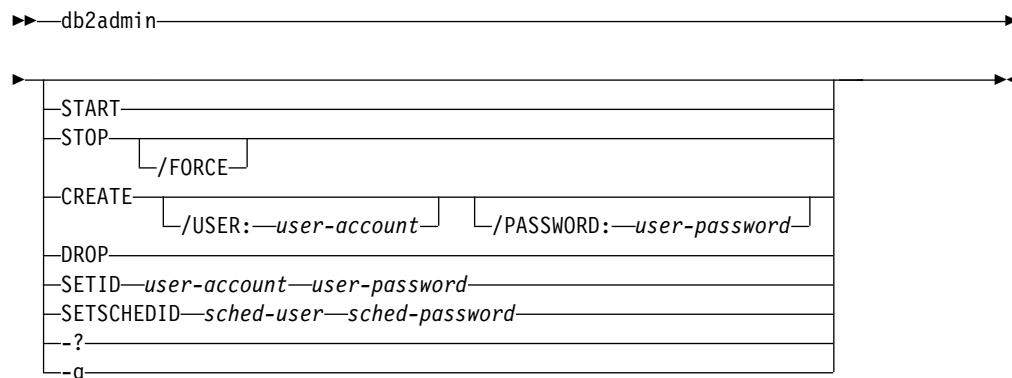
DASADM on UNIX operating systems but not associated with a 64-bit instance.

## Local administrator on Windows operating systems.

## Required connection

None

## Command syntax



## Command parameters

START

## Start the DAS

STOP /FORCE

Stop the DAS. The force option is used to force the DAS to stop, regardless of whether or not it is in the process of servicing any requests.

**CREATE /USER: *user-account* /PASSWORD: *user-password***

Create the DAS. If a user name and password are specified, the DAS will be associated with this user account. If the specified values are not valid, the utility returns an authentication error. The specified user account must be a valid SQL identifier, and must exist in the security database. It is recommended that a user account be specified to ensure that all DAS functions can be accessed. To create a DAS on UNIX operating systems, use the **dascrt** command.

**DROP** Deletes the DAS. To drop a DAS on UNIX operating systems you must use the **dasdrop** command.

**SETID *user-account/user-password***

Establishes or modifies the user account associated with the DAS.

**SETSCHEDID *sched-user/sched-password***

Establishes the logon account used by the scheduler to connect to the tools catalog database. Only required if the scheduler is enabled and the tools catalog database is remote to the DAS. For more information about the scheduler, see the *Administration Guide*.

**-?** Display help information. When this option is specified, all other options are ignored, and only the help information is displayed.

**-q** Run the **db2admin** command in quiet mode. No messages will be displayed when the command is run. This option can be combined with any of the other command options.

## **db2adutl - Managing Db2 objects within TSM**

Allows users to query, extract, verify, and delete backup images, logs, and load copy images that are saved by using Tivoli Storage Manager (TSM). Also allows users to grant and revoke access to objects on a TSM server.

On UNIX operating systems, this utility is located in the `sql1ib/adsm` directory. On Windows operating systems, it is located in `sql1ib\bin`.

### **Authorization**

None

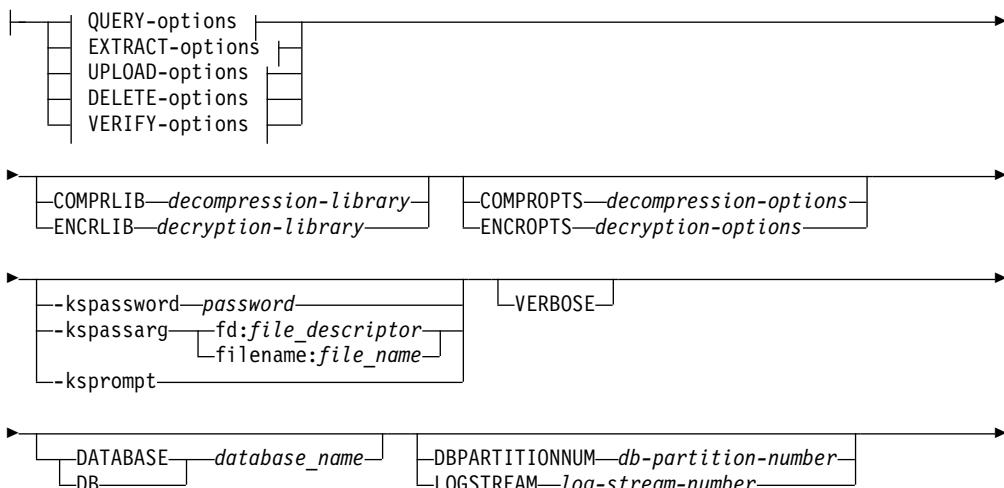
### **Required connection**

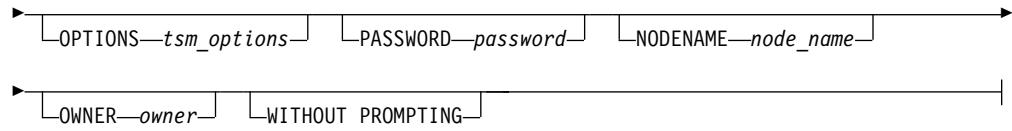
None

### **Command syntax**

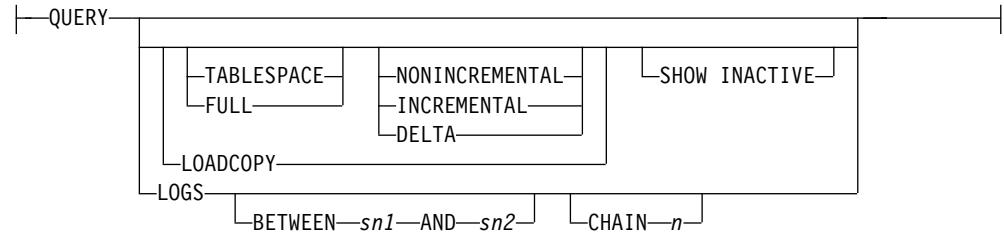
```
>>--db2adutl [db2-object-options | access-control-options]>
```

#### **db2-object-options:**

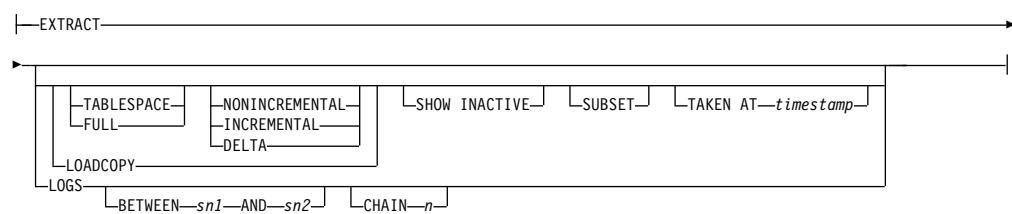




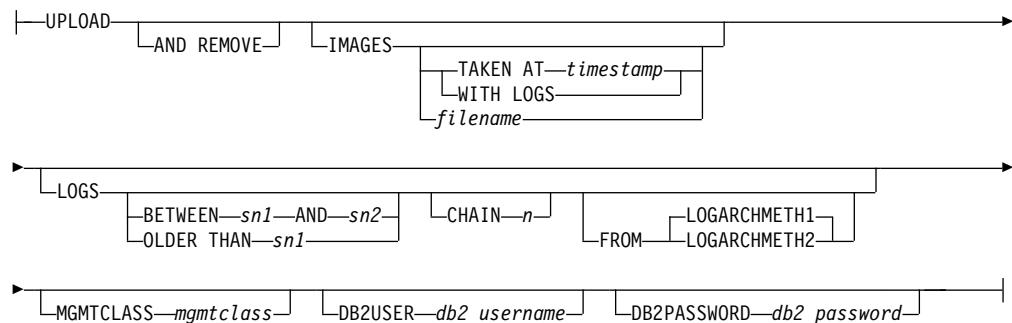
### QUERY-options:



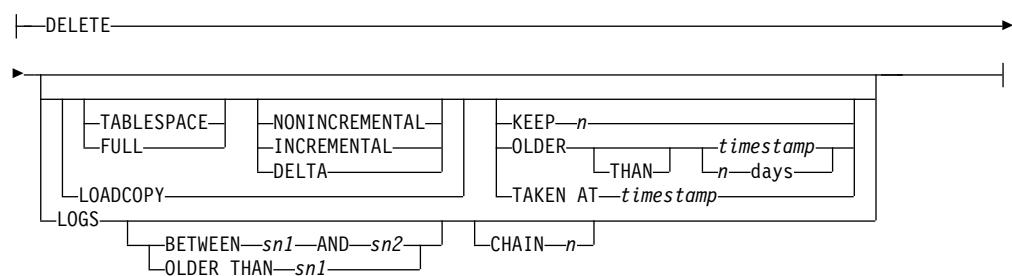
### EXTRACT-options:



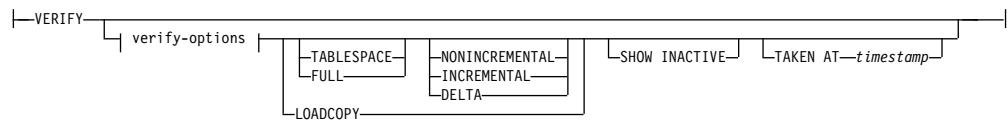
### UPLOAD-options:



### DELETE-options:



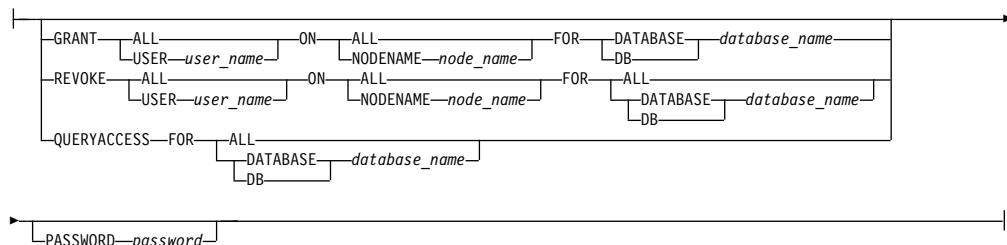
### **VERIFY-options:**



### **verify-options:**



### **access-control-options:**



## **Command parameters**

**QUERY** Queries the TSM server for Db2 objects.

### **EXTRACT**

Copies Db2 objects from the TSM server to the current directory on the local machine.

**UPLOAD** Uploads backup images or archived logs that are stored on disk to the TSM server. You must specify the database name when this option is used.

**DELETE** Either deactivates backup objects or deletes log archives on the TSM server.

**VERIFY** Performs consistency checking on the backup copy that is on the server. This parameter causes the entire backup image to be transferred over the network.

**ALL** Displays all available information.

**CHECK** Displays results of checkbits and checksums.

### **CHECKDMS**

Performs more DMS and AS tablespace page validation. This option is not implied or enabled by the **ALL** option.

**DMS** Displays information from headers of DMS table space data pages.

<b>HEADER</b>	Displays the media header information.
<b>HEADERONLY</b>	Displays the same information as HEADER but reads the 4 K media header information from the beginning of the image only. It does not validate the image.
<b>LFH</b>	Displays the log file header (LFH) data.
<b>OBJECT</b>	Displays detailed information from the object headers.
<b>PAGECOUNT</b>	Displays the number of pages of each object type that is found in the image.
<b>SGF</b>	Displays the automatic storage paths in the image.
<b>SGFONLY</b>	Displays only the automatic storage paths in the image but does not validate the image.
<b>TABLESPACES</b>	Displays the table space details, including container information, for the table spaces in the image.
<b>TABLESPACESONLY</b>	Displays the same information as <b>TABLESPACES</b> but does not validate the image.
<b>TABLESPACE</b>	Includes only table space backup images.
<b>FULL</b>	Includes only full database backup images.
<b>NONINCREMENTAL</b>	Includes only non-incremental backup images.
<b>INCREMENTAL</b>	Includes only incremental backup images.
<b>DELTA</b>	Includes only incremental delta backup images.
<b>LOADCOPY</b>	Includes load copy images only.
<b>LOGS</b>	Includes log archive images only.
<b>BETWEEN <i>sn1</i> AND <i>sn2</i></b>	Specifies that the logs between log sequence number 1 and log sequence number 2 are to be used.
<b>CHAIN <i>n</i></b>	Specifies the chain ID of the logs to be used.
<b>SHOW INACTIVE</b>	Includes backup objects that are deactivated.
<b>SUBSET</b>	Extracts pages from an image to a file. To extract pages, you need an input and an output file. The default input file is called <code>extractPage.in</code> . You can override the default input file name by setting the <b>DB2LISTFILE</b> environment variable to a full path. The format of the input file is as follows:  For SMS table spaces: <code>S &lt;tbspID&gt; &lt;objID&gt; &lt;objType&gt; &lt;startPage&gt; &lt;numPages&gt;</code>

**Note:**

1. <startPage> is an object page number that is object-relative.

For DMS table spaces:

D <tbspID> <objType> <startPage> <numPages>

**Note:**

1. <objType> is only needed if verifying DMS load copy images.
2. <startPage> is an object page number that is pool-relative.

For log files:

L <log num> <startPos> <numPages>

For other data (for example, initial data):

0 <objType> <startPos> <numBytes>

The default output file is `extractPage.out`. You can override the default output file name by setting the **DB2EXTRACTFILE** environment variable to a full path.

**TAKEN AT *timestamp***

Specifies the time stamp of the backup image to be uploaded to TSM.

**KEEP *n*** Deactivates all objects of the specified type except for the most recent *n* by time stamp.

**OLDER THAN *timestamp* or *n* days**

Specifies that objects with a time stamp earlier than *timestamp* or *n* days are deactivated.

**OLDER THAN *sn1***

Specifies that objects with a sequence number less than *sn1* are to be deleted.

**AND REMOVE**

Specifies that backup images and log files are to be removed after they are successfully uploaded to TSM.

**IMAGES** Specifies backup images that are to be uploaded to TSM. Even if you specify an image file name, **db2adut1** still attempts to query the history file. If a corresponding entry is found in the history file, **db2adut1** uploads the image only if the file name given matches the location in the history file. If a corresponding entry is not found, the image is uploaded directly from the specified path and no history file update is performed upon completion. If you specify the **IMAGES** with the **UPLOAD** option, you must specify the database name.

**WITH LOGS**

Specifies that archived logs are to be used along with the backup image.

***filename***

Specifies the image file name. If you do not specify this option, you must specify the database name.

**LOGARCHMETH1 or LOGARCHMETH2**

Specifies the archive location for the log files to be uploaded. LOGARCHMETH1 is the default.

**MGMTCLASS *mgmtclass***

Specifies a TSM management class where the upload occurs.

**DB2USER** *db2\_username*

Specifies userid to be used for the Db2 connection that must be made to update the recovery history file.

**DB2PASSWORD** *db2\_password*

Specifies password for userid to be used for the Db2 connection that must be made to update the recovery history file.

**COMPRLIB** *decompression-library* | **ENCLIB** *decryption-library*

Indicates the name of the library that is used to decompress or decrypt a backup image. The path to the following libraries is \$HOME/sql1lib/lib.

- Encryption libraries: libdb2encr.so (for Linux or UNIX based operating systems); libdb2encr.a (for AIX); and db2encr.dll (for Windows operating systems)
- Compression library: libdb2compr.so (for Linux or UNIX based operating systems); libdb2compr.a (for AIX); and db2compr.dll (for Windows operating systems)
- Encryption and compression libraries: libdb2compr\_encr.so (for Linux or UNIX based operating systems); libdb2compr\_encr.a (for AIX); and db2compr\_encr.dll (for Windows operating systems)

The name must be a fully qualified path that refers to a file on the server. If this parameter is not specified, the Db2 database system attempts to use the library that is stored in the image. If the backup image is not compressed or encrypted, the value of this parameter is ignored. If the specified library cannot be loaded, the operation fails.

**COMPROPTS** *decompression-options* | **ENCROPTS** *decryption-options*

Describes a block of binary data that is passed to the initialization routine in the decompression or decryption library. The Db2 database system passes this string directly from the client to the server. Any byte reversal or code page conversion issues are handled by the library. If the first character of the data block is "@", the remainder of the data is interpreted by the Db2 database system as the name of a file that is found on the server. The Db2 database system then replaces the contents of the data block with the contents of this file and passes the new value to the initialization routine instead. The maximum length for the string is 1024 bytes.

For the default Db2 libraries libdb2compr\_encr.so (compression and encryption) or libdb2encr.so (encryption only), the format of the **ENCROPTS** variable is as follows:

Master Key Label=*label-name*

The master key label is optional. If no master key label is specified, the database manager looks in the keystore for a master key label that was used to create the backup image. If you are using other libraries, the format of the **ENCROPTS** variable depends on those libraries.

**-kspassword** *password*

Specifies the password to use when opening the keystore.

**-kspassarg** *fd:file\_descriptor* | *filename:file\_name*

Specifies the keystore password arguments. The *file\_descriptor* parameter specifies a file descriptor that identifies an open and readable file or pipe that contains the password to use. The *file\_name* parameter specifies the name of the file that contains the password to use.

**-ksprompt**

Specifies that the user is to be prompted for a password.

**DATABASE *database\_name***

Considers only those objects that are associated with the specified database name.

**DBPARTITIONNUM *db-partition-number***

Considers only those objects that are created by the specified database partition number.

**LOGSTREAM *log-stream-number***

Considers only those objects that are created by the specified logstream number.

**OPTIONS "tsm\_options"**

Specifies options to be passed to the TSM server during the initialization of the TSM session. **OPTIONS** is passed to the TSM server exactly as it was entered, without the double quotation marks. When you use the **OPTIONS** parameter, the **db2adut1** command returns any errors that are generated by the TSM server.

**PASSWORD *password***

Specifies the TSM client password for this node, if required. If a database is specified and the password is not provided, the value that is specified for the **tsm\_password** database configuration parameter is passed to TSM; otherwise, no password is used.

**NODENAME *node\_name***

Considers only those images that are associated with a specific TSM node name.

**Important:** The **NODENAME** parameter and the **OPTIONS** parameter with the **-asnodenname** value are not compatible and cannot be used at the same time. You must use the **OPTIONS "-asnodenname"** parameter for TSM environments that support proxy nodes configurations, and use the **NODENAME** parameter for other types of TSM configurations.

**OWNER *owner***

Considers only those objects that are created by the specified owner.

**Important:** The **OWNER** parameter and the **OPTIONS** parameter with the **-asnodenname** value are not compatible and cannot be used at the same time. You must use the **OPTIONS "-asnodenname"** parameter for TSM environments that support proxy nodes configurations, and use the **OWNER** parameter for other types of TSM configurations.

**WITHOUT PROMPTING**

The user is not prompted for verification before objects are deleted.

**VERBOSE**

Displays more file information.

**GRANT ALL | USER *user\_name***

Adds access rights to the TSM files on the current TSM node to all users or to the users specified. Granting access to users gives them access for all current and future files that are related to the database specified.

**REVOKE ALL | USER *user\_name***

Removes access rights to the TSM files on the current TSM node from all users or to the users specified.

## **QUERYACCESS**

Retrieves the current access list. A list of users and TSM nodes is displayed.

### **ON ALL | NODENAME *node\_name***

Specifies the TSM node for which access rights are changed.

### **FOR ALL | DATABASE *database\_name***

Specifies the database to be considered.

## **Examples**

1. The following example is sample output from the command db2 backup database rawsampl use tsm:

```
Backup successful. The timestamp for this backup is : 20031209184503
```

The following example is sample output from the command db2adut1 query issued following the backup operation:

```
Query for database RAWSAMPL
```

```
Retrieving FULL DATABASE BACKUP information.
```

```
 1 Time: 20031209184403, Oldest log: S0000050.LOG, Sessions: 1
```

```
Retrieving INCREMENTAL DATABASE BACKUP information.
```

```
 No INCREMENTAL DATABASE BACKUP images found for RAWSAMPL
```

```
Retrieving DELTA DATABASE BACKUP information.
```

```
 No DELTA DATABASE BACKUP images found for RAWSAMPL
```

```
Retrieving TABLESPACE BACKUP information.
```

```
 No TABLESPACE BACKUP images found for RAWSAMPL
```

```
Retrieving INCREMENTAL TABLESPACE BACKUP information.
```

```
 No INCREMENTAL TABLESPACE BACKUP images found for RAWSAMPL
```

```
Retrieving DELTA TABLESPACE BACKUP information.
```

```
 No DELTA TABLESPACE BACKUP images found for RAWSAMPL
```

```
Retrieving LOCAL COPY information.
```

```
 No LOCAL COPY images found for RAWSAMPL
```

```
Retrieving log archive information.
```

```
 Log file: S0000050.LOG, Chain Num: 0, Log stream: 0,
```

```
 Taken at 2003-12-09-18.46.13
```

```
 Log file: S0000051.LOG, Chain Num: 0, Log stream: 0,
```

```
 Taken at 2003-12-09-18.46.43
```

```
 Log file: S0000052.LOG, Chain Num: 0, Log stream: 0,
```

```
 Taken at 2003-12-09-18.47.12
```

```
 Log file: S0000053.LOG, Chain Num: 0, Log stream: 0,
```

```
 Taken at 2003-12-09-18.50.14
```

```
 Log file: S0000054.LOG, Chain Num: 0, Log stream: 0,
```

```
 Taken at 2003-12-09-18.50.56
```

```
 Log file: S0000055.LOG, Chain Num: 0, Log stream: 0,
```

```
 Taken at 2003-12-09-18.52.39
```

2. The following example is sample output from the command db2adut1 delete full taken at 20031209184503 db rawsampl:

```
Query for database RAWSAMPL
```

```
Retrieving FULL DATABASE BACKUP information.
```

```
 Taken at: 20031209184503 Log stream: 0 Sessions: 1
```

```
Do you want to delete this file (Y/N)? y
```

```
Are you sure (Y/N)? y
```

```
Retrieving INCREMENTAL DATABASE BACKUP information.
No INCREMENTAL DATABASE BACKUP images found for RAWSAMPL
```

```
Retrieving DELTA DATABASE BACKUP information.
No DELTA DATABASE BACKUP images found for RAWSAMPL
```

The following example is sample output from the command db2adut1 query issued following the operation that deleted the full backup image. Note the time stamp for the backup image.

```
Query for database RAWSAMPL

Retrieving FULL DATABASE BACKUP information.
1 Time: 20031209184403, Oldest log: S0000050.LOG, Sessions: 1

Retrieving INCREMENTAL DATABASE BACKUP information.
No INCREMENTAL DATABASE BACKUP images found for RAWSAMPL

Retrieving DELTA DATABASE BACKUP information.
No DELTA DATABASE BACKUP images found for RAWSAMPL

Retrieving TABLESPACE BACKUP information.
No TABLESPACE BACKUP images found for RAWSAMPL

Retrieving INCREMENTAL TABLESPACE BACKUP information.
No INCREMENTAL TABLESPACE BACKUP images found for RAWSAMPL

Retrieving DELTA TABLESPACE BACKUP information.
No DELTA TABLESPACE BACKUP images found for RAWSAMPL

Retrieving LOCAL COPY information.
No LOCAL COPY images found for RAWSAMPL

Retrieving log archive information.
Log file: S0000050.LOG, Chain Num: 0, Log stream: 0,
Taken at 2003-12-09-18.46.13
Log file: S0000051.LOG, Chain Num: 0, Log stream: 0,
Taken at 2003-12-09-18.46.43
Log file: S0000052.LOG, Chain Num: 0, Log stream: 0,
Taken at 2003-12-09-18.47.12
Log file: S0000053.LOG, Chain Num: 0, Log stream: 0,
Taken at 2003-12-09-18.50.14
Log file: S0000054.LOG, Chain Num: 0, Log stream: 0,
Taken at 2003-12-09-18.50.56
Log file: S0000055.LOG, Chain Num: 0, Log stream: 0,
Taken at 2003-12-09-18.52.39
```

3. The following example is sample output from the command db2adut1 queryaccess for all

Node	User	Database Name	type
bar2	jchisan	sample	B
<all>	<all>	test	B

Access Types: B - Backup images L - Logs A - both

4. The following example is sample output that is displayed from a backup image of 3 members in a Db2 pureScale environment.

BufAddr	MemberNum	PoolID	Token	Type	Offset	FileSize	...
00000000:	0	0	0	19	0	268	...

Output (continued):

```

... ObjectSize OrigSize Object Name
... ----- -----
... 268 0 "BACKUP.START.RECORD.MARKER"

numTbspsInDB : 3
numTbspsInImg : 3

Total members : 3
Member numbers: 0,1,2

```

## Usage notes

One parameter from each of the following groups can be used to restrict what backup images types are included in the operation:

### Granularity:

- FULL - include only database backup images.
- TABLESPACE - include only table space backup images.

### Cumulativeness:

- NONINCREMENTAL - include only non-incremental backup images.
- INCREMENTAL - include only incremental backup images.
- DELTA - include only incremental delta backup images.

When you use proxy nodes in TSM environments, to see the backup images or the log archives taken when the proxy node was used, you must specify the **OPTIONS** parameter with the shared TSM proxy node value by using the `asnodename` option (for example `OPTIONS "-asnodename=cluster1"` ). The **OPTIONS** parameter is available starting in Version 9.8 Fix Pack 3 and later fix packs.

TSM grants delete access to the owner of the object or to the root user. It might restrict delete access to other users.

Each log file name has the following format:

`S0*****.LOG`

Before Version 9.8 Fix Pack 3, the log files on the TSM server were written to the `./NODE0***/TESTLOG/C0*****` directory. In Version 9.8 Fix Pack 3 and later fix packs, the log files on the TSM server are written to the `./NODE****/LOGSTREAM****/C0*****` directory.

If the **db2adut1** utility encounters errors with TSM the actual TSM return code is displayed and the TSM documentation might be referred for troubleshooting steps.

## db2advis - Db2 Design Advisor

The Db2 Design Advisor advises users on the creation of materialized query tables (MQTs) and indexes, the repartitioning of tables, the conversion to multidimensional clustering (MDC) tables, and the deletion of unused objects.

The recommendations are based on one or more SQL statements provided by the user. A group of related SQL statements is known as a *workload*. Users can rank the importance of each statement in a workload and specify the frequency at which each statement in the workload is to be executed. The Design Advisor outputs a DDL CLP script that includes CREATE INDEX, CREATE SUMMARY TABLE (MQT), and CREATE TABLE statements to create the recommended objects.

Structured type columns are not considered when this command is executed.

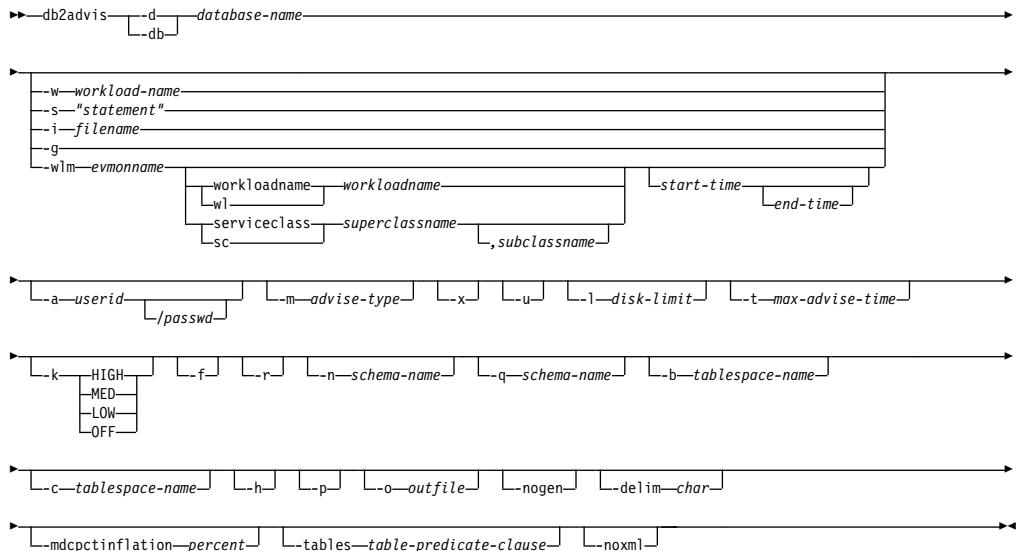
## Authorization

Read access to the database. Read and write access to the explain tables. If materialized query tables (MQTs) are used, you must have CREATE TABLE authorization, and read and write access to the MQTs.

## Required connection

None. This command establishes a database connection.

## Command syntax



## Command parameters

### **-d database-name**

Specifies the name of the database to which a connection is to be established.

### **-w workload-name**

Specifies the name of the workload to be assessed and have indexes suggested by the Design Advisor. This name is used in the ADVISE\_WORKLOAD table. This option cannot be specified with the **-g**, **-i**, or **-s** options.

### **-s "statement"**

Specifies the text of a single SQL statement to be assessed and have indexes suggested by the Design Advisor. The statement must be enclosed by double quotation marks. This option cannot be specified with the **-g**, **-i**, or **-w** options.

### **-i filename**

Specifies the name of an input file containing one or more SQL statements. The default is standard input. Identify comment text with two hyphens at the start of each line; that is, *-- comment*. Statements must be delimited by semicolons.

The frequency at which each statement in the workload is to be executed can be changed by inserting the following line into the input file:

```
--#SET FREQUENCY x
```

The frequency can be updated any number of times in the file. This option cannot be specified with the **-g**, **-s**, or **-w** options.

**-g** Specifies the retrieval of the SQL statements from a dynamic SQL snapshot. If combined with the **-p** command parameter, the SQL statements are kept in the ADVISE\_WORKLOAD table. This option cannot be specified with the **-i**, **-s**, or **-w** options.

**-wlm evmonname**

Specifies to get the table names corresponding to the ACTIVITY and ACTIVITYSTMT logical data groups from SYSCAT.EVENTTABLES for event name *evmonname*, and joins them together on ACTIVATE\_TIMESTAMP, ACTIVITY\_ID and ACTIVITY\_SECONDARY\_ID for records that have PARTIAL\_RECORD = 0 (completed transactions). An optional *start-time* and *end-time* timestamp can be added to get statements on or after the *start-time* and, optionally, on or before the *end-time*. *start-time* and *end-time* are with respect to the TIME\_COMPLETED column from the ACTIVITY tables.

**workloadname | wl workloadname**

Specifies the *workloadname* that is searched for in SYSCAT.WORKLOADS. The ACTIVITY event monitor table is joined with SYSCAT.WORKLOADS on the workload id to obtain these statements.

**serviceclass | sc superclassname**

Specifies the service class information which comes from SYSCAT.SERVICECLASSES. When no subclass is given, all statements for a service superclass is retrieved, which is basically the PARENTSERVICECLASS in SYSCAT.SERVICECLASSES. The ACTIVITY event monitor table is joined with SYSCAT.SERVICECLASSES on the service class id to obtain these statements.

*,subclassname*

Specifies the *subclassname* if a *superclassname* is specified; separated by a comma. This parameter is optional.

**start-time**

Specifies the start timestamp.

**end-time**

Specifies the end timestamp. This parameter is optional.

**-a userid/passwd**

Name and password used to connect to the database. The slash (/) must be included if a password is specified. A password should not be specified if the **-x** option is specified.

**-m advise-type**

Specifies the type of recommendation the advisor will return. Any combination of I, M, C, and P (in upper- or lowercase) can be specified. For example, **db2advis -m PC** will recommend partitioning and MDC tables. If **-m P** or **-m M** are used in a partitioned database environment, the advise\_partition table is populated with the final partition recommendation. The choice of possible values are:

- I** Recommends new indexes. This is the default.
- M** Recommends new materialized query tables (MQTs) and indexes on the MQTs. In partitioned database environments, partitioning on MQTs is also recommended.
- C** Recommendation to convert standard tables to multidimensional clustering (MDC) tables; or, to create a clustering index on the tables.
- P** Recommends the repartitioning of existing tables.
- x** Specifies that the password will be read from the terminal or through user input.
- u** Specifies that the advisor will consider the recommendation of deferred MQTs. Incremental MQTs will not be recommended. When this option is specified, comments in the DDL CLP script indicate which of the MQTs could be converted to immediate MQTs. If immediate MQTs are recommended in a partitioned database environment, the default distribution key is the implied unique key for the MQT.
- l disk-limit**  
Specifies the number of megabytes available for all recommended indexes and materialized views in the existing schema. Specify **-1** to use the maximum possible size. The default value is 20% of the total database size.
- t max-advise-time**  
Specifies the maximum allowable time, in minutes, to complete the operation. If no value is specified for this option, the operation will continue until it is completed. To specify an unlimited time enter a value of zero. The default is zero.
- k** Specifies to what degree the workload will be compressed. Compression is done to allow the advisor to reduce the complexity of the advisor's execution while achieving similar results to those the advisor could provide when the full workload is considered. HIGH indicates the advisor will concentrate on a small subset of the workload. MED indicates the advisor will concentrate on a medium-sized subset of the workload. LOW indicates the advisor will concentrate on a larger subset of the workload. OFF indicates that no compression will occur and every query is considered. The default is MED.
- f** Drops previously existing simulated catalog tables.
- r** Specifies that detailed statistics should be used for the virtual MQTs and for the partitioning selection. If this option is not specified, the default is to use optimizer statistics for MQTs. Although the detailed statistics might be more accurate, the time to derive them will be significant and will cause the **db2advis** execution time to be greater. The **-r** command parameter uses sampling to obtain relevant statistics for MQTs and partitioning. For MQTs, when the sample query either fails or returns no rows, the optimizer estimates are used.
- n schema-name**  
Specifies the qualifying name of simulation catalog tables, and the qualifier for the new indexes and MQTs. The default schema name is the caller's user ID, except for catalog simulation tables where the default schema name is SYSTOOLS. The default is for new indexes to inherit the schema name of the index's base.

**-q *schema-name***

Specifies the qualifying name of unqualified names in the workload. It serves as the schema name to use for CURRENT SCHEMA when **db2advis** executes. The default schema name is the user ID of the person executing the command.

**-b *tablespace-name***

Specifies the name of a table space in which new MQTs will be created. If not specified, the advisor will select the table spaces from the set of table spaces that exist.

**-c *tablespace-name***

Specifies the name of a table space (where the table space can be of any type, for example, use a file name or directory) in which to create the simulation catalog tables. This table space must only be created on the catalog database partition group. The default is USERSPACE1.

It is recommended that the user create the table space employed for the simulation instead of using the default USERSPACE1. In addition, the ALTER TABLESPACE DROPPED TABLE RECOVERY OFF statement should be run on this table space to improve the performance of the **db2advis** utility.

When the utility completes, turn the history back on for the table space. In a partitioned database environment, this option is required as USERSPACE1 is usually created across all partition groups.

**-h** Display help information. When this option is specified, all other options are ignored, and only the help information is displayed.

**-p** Keeps the plans that were generated while running the tool in the explain tables. The **-p** command parameter causes the workload for **-g** to be saved in the ADVISE\_WORKLOAD table and saves the workload query plans that use the final recommendation in the explain tables.

**-o *outfile***

Saves the script to create the recommended objects in *outfile*.

**-nogen** Indicates that generated columns are not to be included in multidimensional clustering recommendations.

**-delim *char***

Indicates the statement delimiter character *char* in a workload file input. Default is ';'.

**-mdcpctinflation *percent***

Specifies the maximum percentage that the table disk size can increase in an MDC recommendation. For example, it indicates that a table is allowed to increase to  $1+percent/100$  times its original size when it is converted to a MDC table. *percent* is a floating point number with a default value of 10.

**-tables *table-predicate-clause***

Indicates that only a subset of all existing tables should be considered. The *table-predicate-clause* must be a predicate that can be used in the WHERE clause of a query on SYSCAT.TABLES. The tables considered by **db2advis** will be the intersection of the tables from this query and the tables in the workload.

This command parameter does not apply to recommendations about new MQTs.

**-noxm1** Indicates that the detailed XML output following the recommendation text is not to be written to the console.

## Examples

1. In the following example, the utility connects to database PROTOTYPE, and recommends indexes for table ADDRESSES without any constraints on the solution:

```
db2advis -d prototype -s "select * from addresses a
where a.zip in ('93213', '98567', '93412')
and (company like 'IBM%' or company like '%otus')"
```

2. In the following example, the utility connects to database PROTOTYPE, and recommends indexes that will not exceed 53 MB for queries in table ADVISE\_WORKLOAD. The workload name is equal to "production". The maximum allowable time for finding a solution is 20 minutes.

```
db2advis -d prototype -w production -l 53 -t 20
```

3. In the following example, the input file db2advis.in contains SQL statements and a specification of the frequency at which each statement is to be executed:

```
--#SET FREQUENCY 100
SELECT COUNT(*) FROM EMPLOYEE;
SELECT * FROM EMPLOYEE WHERE LASTNAME='HAAS';
--#SET FREQUENCY 1
SELECT AVG(BONUS), AVG(SALARY) FROM EMPLOYEE
GROUP BY WORKDEPT ORDER BY WORKDEPT;
```

The utility connects to database SAMPLE, and recommends indexes for each table referenced by the queries in the input file. The maximum allowable time for finding a solution is 5 minutes:

```
db2advis -d sample -i db2advis.in -t 5
```

4. In the following example, MQTs are created in table space SPACE1 and the simulation table space is SPACE2. The qualifying name for unqualified names in the workload is SCHEMA1, and the schema name in which the new MQTs will be recommended is SCHEMA2. The workload compression being used is HIGH and the disk space is unlimited. Sample statistics are used for the MQTs. Issuing the following command will recommend MQTs and, in a partitioned database environment, indexes and partitioning will also be recommended.

```
db2advis -d prototype -w production -l -1 -m M -b space1 -c space2 -k
HIGH -q schema1 -n schema2 -r
```

To get the recommended MQTs, as well as indexes, partitioning and MDCs on both MQT and base tables, issue the command specifying a value of IMCP for the **-m** option as follows:

```
db2advis -d prototype -w production -l -1 -m IMCP -b space1 -c space2 -k
HIGH -q schema1 -n schema2 -r
```

5. In the following example, the utility connects to database SAMPLE, and recommends MDC for tables for EMPLOYEE and DEPT where MDC candidates are allowed to grow by 30.5% of their original size.

```
db2advis -d sample -type C -disklimit 100 -i db2advis.in
-tables "TABNAME IN ('EMPLOYEE','DEPT')" -mdcpctinflation 30.5
```

## Usage notes

When it provides recommendations about indexes, MQTs, or MDC tables, the Design Advisor ignores column-organized tables.

Because these features must be set up before you can run the DDL CLP script, database partitioning, multidimensional clustering, and clustered index recommendations are commented out of the DDL CLP script that is returned. It is up to you to transform your tables into the recommended DDL. One example of

doing this is to use the ALTER TABLE stored procedure but there are restrictions associated with it in the same way the RENAME statement is restricted.

Starting with Version 9.7, the Design Advisor will not recommend partitioned indexes. All indexes will be recommended with the NOT PARTITIONED clause. With this recommendation, it is your choice whether to use PARTITIONED (the default) or NOT PARTITIONED to create indexes based on their application scenarios and on the benefit that partitioned index can provide.

For dynamic SQL statements, the frequency with which statements are executed can be obtained from the monitor as follows:

1. Issue the command:

```
db2 reset monitor for database database-alias
```

Wait for an appropriate interval of time.

2. Issue the command:

```
db2advis -g other-options
```

If the **-p** parameter is used with the **-g** parameter, the dynamic SQL statements obtained will be placed in the ADVISE\_WORKLOAD table with a generated workload name that contains a timestamp.

The default frequency for each SQL statement in a workload is 1, and the default importance is also 1. The generate\_unique() function assigns a unique identifier to the statement, which can be updated by the user to be a more meaningful description of that SQL statement.

Any **db2advis** error information can also be found in the **db2diag** log file.

When the advisor begins running, the ADVISE\_INSTANCE table will contain a row that identifies the advisor. The main advisor row is identified by the START\_TIME showing when the advisor began its run. This row's STATUS is "STARTED".

If issuing the **db2advis** command results in an error saying "Cannot insert into DB2ADVIS\_INSTANCE", you will need to bind db2advis.bnd and run the **db2advis** command with the **-1** option. The bind operation can be performed by issuing the command:

```
db2 bind db2advis.bnd blocking all grant public
```

When the advisor is completed, you can check the associated row with the appropriate START\_TIME in the ADVISE\_INSTANCE table. If STATUS is "COMPLETED", the advisor executed successfully. If STATUS is still "STARTED" and there is no **db2advis** process running, the advisor has terminated prematurely. If STATUS has an "EX", you are also shown an "SQLCODE" to determine how the advisor failed.

If the **-1 disk-limit** option is not specified, you must have at least one of SYSADM, SYSCTRL, SYSMAINT, or SYSMON authority to determine the maximum database size using the GET\_DBSIZE\_INFO stored procedure.

The *table-predicate-clause* in the **-tables** parameter is used to query SYSCAT.TABLES and determine the tables that the advisor will consider. Only base tables or existing MQTs can be considered, but aliases and logical views can be used in the *table-predicate-clause* to return the list of base table names or MQTs. For example, to

specify the subset of tables that have views that start with 'TV', specify -tables "(tablename, tabschema) in (SELECT bname, bschema FROM SYSCAT.TABDEP WHERE TABNAME LIKE 'TV%')".

As of Version 9.7, the query optimizer measures the cost of the I/O savings and the cost of decompressing key values and RIDs in the cost model. As such, the Index advisor is capable of estimating the compressed index size.

## db2audit - Audit facility administrator tool

Db2 database systems provide an audit facility to assist in the detection of unknown or unanticipated access to data. The Db2 audit facility generates and permits the maintenance of an audit trail for a series of predefined database events.

The records generated from this facility are kept in audit log files. The analysis of these records can reveal usage patterns which would identify system misuse. Once identified, actions can be taken to reduce or eliminate such system misuse. The audit facility acts at both the instance and database levels, independently recording all activities in separate logs based on either the instance or the database.

Db2 database systems provide the ability to independently audit at both the instance and at the individual database level. The **db2audit** tool is used to configure audit at the instance level as well as control when such audit information is collected. The AUDIT SQL statement is used to configure and control the audit requirements for an individual database. The **db2audit** tool can be used to archive both instance and database audit logs as well as to extract from archived logs of either type.

When working in a multiple member database environment, such as a Db2 pureScale environment or a partitioned database environment, many of the auditable events occur at the database member at which the user is connected (the coordinator member) or at the catalog member (if they are not the same database member). The implication of this is that audit records can be generated by more than one database member. Part of each audit record contains information about the coordinator member and originating database member identifiers.

The instance audit log (`db2audit.instance.log.node_number[.timestamp]`) is located in the instance's security/auditdata subdirectory, and the audit configuration file (`db2audit.cfg`) is located in the instance's security subdirectory. The database audit log is named `db2audit.db.dbname.log.node_number[.timestamp]`. At the time you create an instance, read/write permissions are set on these files, where possible, by the operating system. By default, the permissions are read/write for the instance owner only. It is recommended that you do not change these permissions.

The default permissions for the archive log file you specify are read/write for the instance owner only. Do not change these permissions.

When you extract a file, the permissions for the extracted files are read/write for all users. You can specify a file name with the extract command keyword. By using a specific name, you can control where the file is located. To secure the extracted files, you can change the file permissions on the extracted files so read/write permissions are defined only for the instance owner.

Authorized users of the audit facility can control the following actions within the audit facility, using **db2audit**:

- Start recording auditable events within the Db2 instance. This does not include database level activities.
  - Stop recording auditable events within the Db2 instance.
  - Configure the behavior of the audit facility at the instance level only.
  - Select the categories of the auditable events to be recorded at the instance level only.
  - Request a description of the current audit configuration for the instance.
  - Flush any pending audit records from the instance and write them to the audit log.
  - Archive audit records from the current audit log for either the instance or a database under the instance.
  - Extract audit records from an archived audit log by formatting and copying them to a flat file or ASCII delimited file. Extraction is done in preparation for analysis of log records.

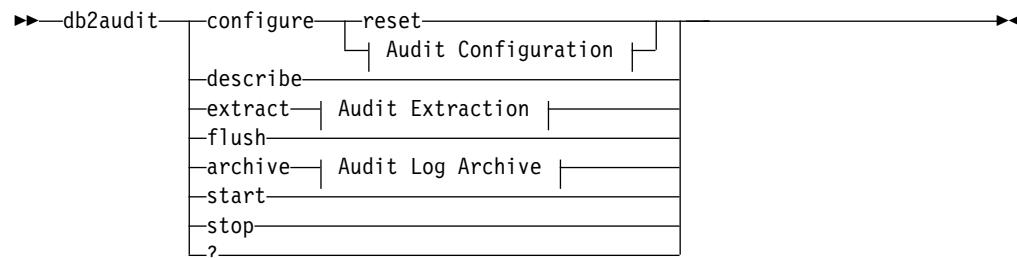
## Authorization

SYSADM

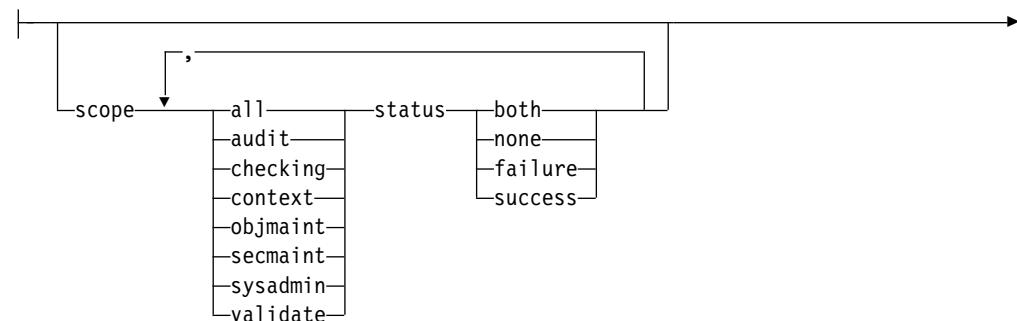
## Required Connection

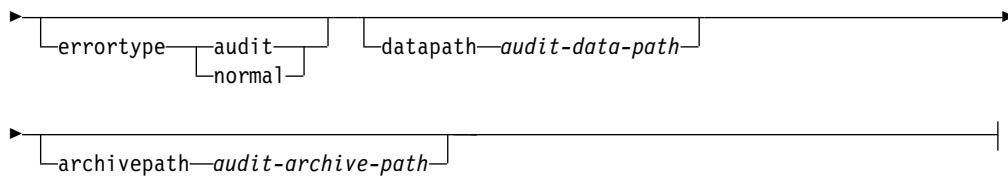
None

## Command syntax

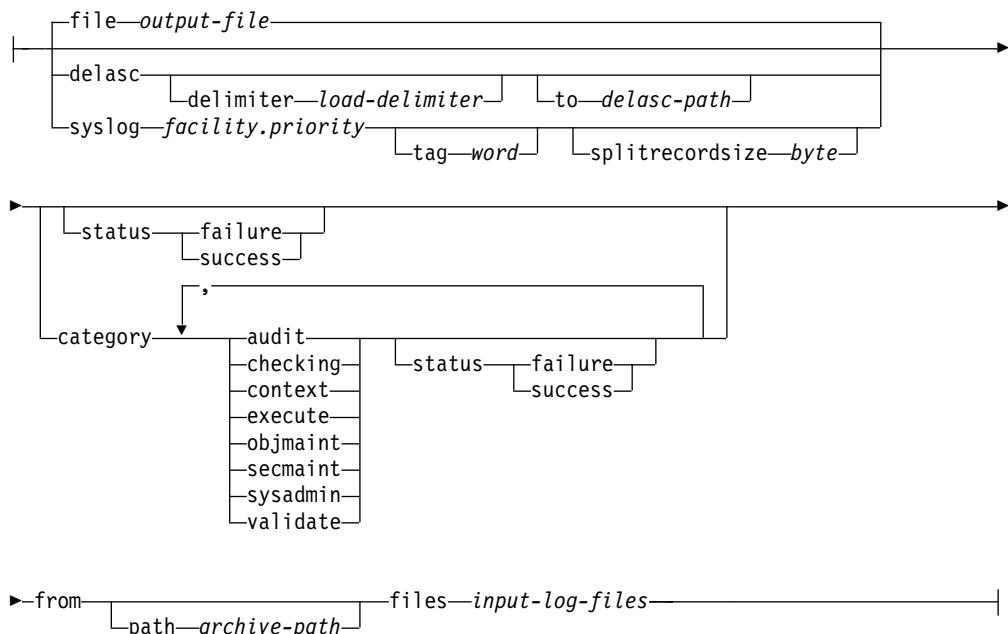


## Audit Configuration:

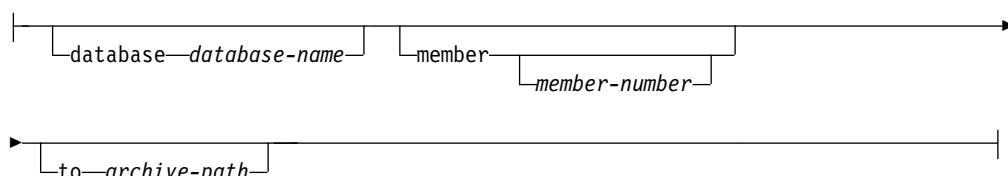




#### Audit Extraction:



#### Audit Log Archive:



### Command parameters

#### configure

This parameter allows the modification of the db2audit.cfg configuration file in the instance's security subdirectory. Updates to this file can occur even when the instance is stopped. Updates, occurring when the instance is active, dynamically affect the auditing being done by the Db2 instance. The configure action on the configuration file causes the creation of an audit record if the audit facility has been started and the **audit** category of auditable events is being audited. All configure options, except the data path and archive path, only apply to instance level audit events, and not to database level audit events. The path options apply to the instance and all databases within the instance.

The following are the possible actions on the configuration file:

**reset** This action causes the configuration file to revert to the initial configuration (where **scope** is all of the categories except context, **status** for each category is failure, **errortype** is normal, and the auditing of instance level events is off). This action will create a new audit configuration file if the original has been lost or damaged. The audit data path and archive path will be blank. This option does not reset any of the audit policies or use of those policies at the database level.

**scope** This action specifies which categories will be audited, and the status of each of those categories.

**status** This action specifies whether only successful or failing events, or both successful and failing events, should be logged. **status** has the following options:

**both** Successful and failing events will be audited.

**none** No events for this category will be audited.

**failure**

Only failing events will be audited.

**success**

Only successful events will be audited.

Only the categories specified on the configure statement will be modified. All other categories will have their status preserved.

**Note:**

- The default **scope** is all categories except **context** and may result in records being generated rapidly. In conjunction with the mode (synchronous or asynchronous), the selection of the categories may result in a significant performance reduction and significantly increased disk requirements. It is recommended that the number and type of events being logged be limited as much as possible, otherwise the size of the audit log will grow rapidly. This action also allows a particular focus for auditing and reduces the growth of the log.
- **context** events occur before the status of an operation is known. Therefore, such events are logged regardless of the value associated with this parameter, unless the **status** is none.
- If the same category is repeated, or categories are also specified with the **all** keyword, a syntax error will be returned.

**errortype**

This action specifies whether audit errors are returned to the user or are ignored. The value for this parameter can be:

**audit** All errors including errors occurring within the audit facility are managed by Db2 database and all negative SQLCODEs are reported back to the caller.

**normal** Any errors generated by **db2audit** are ignored and only the SQLCODEs for the errors associated with the operation being performed are returned to the application.

**datapath** *audit-data-path*

This is the directory to which the audit logs produced by the Db2 database system will be written. The default is `sql1ib/security/auditdata` (*instance path\instance\security\*)

`auditdata` on Windows). This parameter affects all auditing within an instance, including database level auditing. This must be a fully qualified path and not a relative path. The instance owner must have write permission on this directory. On Windows, the user issuing a local instance command, for example, `db2start`, `db2audit`, and `db2 update dbm cfg`, must also have write permission on this directory if the command is required to be audited. In a multiple member database environment, this directory does not need to be an NFS shared directory, although that is possible. A non-shared directory will result in increased performance as each member is writing to a unique disk. The maximum length of the path is 971 bytes for UNIX or Linux and 208 bytes for Windows operating systems.

If the path is provided as "", then the path will be updated to be the default. `db2audit describe` will show no path as being set and the default path will be used. Note, to prevent the shell from interpreting the quotation marks, they will generally need to be escaped, for example

```
db2audit configure datapath \"\"
```

The data path must exist. In a multiple member database environment, the same data path will be used on each member. There is no way to specify a unique set of data paths for a particular member unless database member expressions are used as part of the data path name. Doing this allows the member number to be reflected in the storage path such that the resulting path name is different on each member.

#### **archivepath *audit-archive-path***

This is the default directory for the archive and extract options. In a multiple member database environment, it is recommended that this directory be an NFS shared directory accessible by all members. The default is `sql1ib/security/auditdata` (`sql1ib\instance\security\auditdata` on Windows). This must be a fully qualified path and not a relative path. The instance owner must have write permission on this directory. The maximum length of the path is 971 bytes for UNIX or Linux and 208 bytes for Windows operating systems.

The archive path must exist, and database member expressions are NOT allowed for the archive path.

#### **describe**

This parameter displays to standard output the current instance level audit configuration information and status.

The following items are displayed:

- If audit is active.
- The status for each category.
- The error type in the form of whether or not an SQLCA is returned on errors.
- The data and archive paths.

This is an example of what the `describe` output looks like:

Db2 Audit Settings:

```
Audit active: "FALSE"
Log audit events: "SUCCESS"
```

```

Log checking events: "FAILURE"
Log object maintenance events: "BOTH"
Log security maintenance events: "BOTH "
Log system administrator events: "NONE"
Log validate events: "FAILURE"
Log context events: "NONE"
Return SQLCA on audit error: "TRUE "
Audit Data Path: "/auditdata"
Audit Archive Path: "/auditarchive"

AUD00001 Operation succeeded.

```

### **extract**

This parameter allows the movement of audit records from the audit log to an indicated destination. The audit log will be created in the database code page. All of the fields will be converted to the current application code page when extract is run.

The following are the options that can be used when extracting:

#### **file *output-file***

The extracted audit records are placed in *output-file*. If the directory is not specified, *output-file* is written to the current working directory. If the file already exists the output will be appended to it. If a file name is not specified, records are written to the db2audit.out file in the archive path specified in the audit configuration file.

#### **delasc**

The extracted audit records are placed in a delimited ASCII format suitable for loading into Db2 database relational tables. The output is placed in separate files, one for each category. In addition, the file auditlobs will also be created to hold anylobs that are included in the audit data. The filenames are:

- audit.del
- checking.del
- objmaint.del
- secmaint.del
- sysadmin.del
- validate.del
- context.del
- execute.del
- auditlobs

If the files already exist the output will be appended to them. The auditlobs file will be created if the **context** or **execute** categories are extracted. LOB Location Specifiers are included in the .del files to reference the LOBS in the auditlobs file.

#### **delimiter *load-delimiter***

Allows you to override the default audit character string delimiter, which is the double quote ("), when extracting from the audit log. You would use **delimiter** followed by the new delimiter that you want to use in preparation for loading into a table that will hold the audit records. The new load delimiter can be either a single character (such as !) or a four-character string representing a hexadecimal number (such as 0x3b).

#### **to *delasc-path***

Allows you to specify the path to which the delimited files are

written. If it is not specified, then the files are written to the directory indicated by the audit archive path option specified in the audit configuration file.

**syslog** Integrates log data from many different types of systems into a central repository. This option is not supported in a Windows environment.

***facility.priority***

A mandatory parameter required by the syslog daemon (syslogd) to log the messages and must be one of the predefined syslog values. For more information on the predefined values for *facility.priority* pair and configuration, refer to "Configuring the System event log (syslog)".

It is the user's responsibility to check the syslogd and the configuration file (/etc/syslog.conf) to ensure:

- syslogd is running normally
- Find a selector from (/etc/syslog.conf) that applies to the **db2audit** command
- Select a proper *facility.priority* pair for the extract syslog to match the above selector
- Know the **db2audit extract** syslog's destination in the *syslog.conf* file

***tag word***

An optional parameter that allows you to specify a word that will be used as a tag for all the messages in the current batch. The specified word will be added to beginning of all the **db2audit** messages in the syslog batch. Searching for this word in the operating system's syslog file, you can uniquely identify this whole batch of the syslog messages. The following naming rules apply:

- Must be unique and a single word
- Maximum length cannot exceed 16
- The *word* can be a combination of letters (a-z or A-Z), numbers (0-9), underscore (\_) and dash (-), excluding all other characters

Command example:

```
db2audit extract syslog user.info tag 131018_B05 ...
```

***splitrecordsize byte***

An optional parameter that allows you to specify the maximum length of a log message sent to the operating system's syslog, if a db2audit record is too long. The messages longer than the specified value will be split. The following rule exist for the *byte* value:

- The value must be a integer value in the range 32 and 8192 (inclusive)

If the message body is greater than the specified *byte* value then the message will be split and each part of

the split message will be concatenated with a correlator string. A correlator string is expressed in the following format:

'corr' + time + db2audit process ID + correlator sequence number, associated with dash '-', then followed by ":" and a sequence number within that correlation (#n).

Format example:

```
Oct 18 14:44:39 hotel37 user:info syslog: 131018_B05: corr-1018_170553-33292400-17:
#1: This message is 2000 bytes long ... (split)
```

```
Oct 18 14:44:39 hotel37 user:info syslog: 131018_B05: corr-1018_170553-33292400-17:
#2: long ... long (split)
```

```
Oct 18 14:44:39 hotel37 user:info syslog: 131018_B05: corr-1018_170553-33292400-17:
#3: long ... long
```

where 131018\_B05 is the tag word, corr is the start of the correlator string, 1018\_170553 is the time, 33292400 is the db2audit Process ID, 17 is the correlator sequence number and (#1, #2 & #3) is the sequence within that particular correlation.

**Note:** The real limit for the message body is around 995 in syslogd of AIX 6.1 and 7.1. If the *byte* value is larger than the real limit, all the characters beyond the real limit will be truncated by syslogd. For example, if the *byte* value is 1200, and the syslogd limit is 995 bytes, 205 characters will be lost due to truncation by syslogd. If you want to log the leading part of every message, the *byte* value can be as large as 8192.

#### **category**

The audit records for the specified categories of audit events are to be extracted. If not specified, all categories are eligible for extraction.

#### **status**

The audit records for the specified status are to be extracted. If not specified, all records are eligible for extraction.

#### **path**

The path to the location of the archived audit logs. If this is not specified, the archive path in the audit configuration will be used. The path is not used if the filename contains a fully qualified path.

#### **files**

The list of audit log files that will be extracted. This may be a single file or a list of files. These files are not altered during an extract. The filenames will be combined with **path** to get the fully qualified filenames if they are not already fully qualified. The list may include standard shell wild cards to specify multiple files.

**flush** This parameter forces any pending audit records to be written to the audit log. Also, the audit state is reset from "unable to log" to a state of "ready to log" if the audit facility is in an error state.

#### **archive**

This parameter moves the current audit log for either an individual database or the instance to a new location for archiving and later

extraction. The current timestamp will be appended to the filename. All records that are currently being written to the audit log will complete before the log is archived to ensure full records are not split apart. All records that are created while the archive is in progress will be written to the current audit log, and not the archived log, once the archive has finished.

The following are the options that can be used when archiving:

**database *database-name***

The name of the database for which you would like to archive the audit log. If the database name is not supplied, then the instance level audit log is archived.

**member**

Indicates that the archive command is to only be run on the current member, and that the **node\_number** monitor element will indicate what the current member is.

**Note:** The use of current *member-number* is optional in a Db2 pureScale environment and in a partitioned database environment. If db2audit archive .... node command is passed and if **DB2NODE** is set, the node value will be used. If **DB2NODE** is not set, 0 will be used.

**member-number**

Informs the **db2audit** executable about which member it is currently running on.

**Note:** The use of current *member-number* is optional in a Db2 pureScale environment and in a partitioned database environment. If db2audit archive .... node X command is passed, regardless of whether **DB2NODE** is set or not, the node value (X) will be used.

**to *archive-path***

The directory where the archived audit log should be created. The directory must exist and the instance owner must have create permission on this directory. If this is not provided, the archive path in the audit configuration will be used.

The format of the filename that is created is:

- db2audit.instance.log.*member\_number*[.YYYYMMDDHHMMSS] for the instance log
- db2audit.db.*dbname*.log.*member\_number*[.YYYYMMDDHHMMSS] for the database log

where *YYYY* is the year, *MM* is the month, *DD* is the day, *HH* is the hour, *MM* is the minute, and *SS* is the seconds. The time will be the local time. The database name portion will not be present for instance audit logs. The member number in a single member database environment is 0. If the file already exists, an append will be performed.

The timestamp will not reflect the last record in the log with 100% accuracy. The timestamp represents when the archive command was run. Entries that are currently being written to the log file must finish before it can be moved, and these entries may have timestamps that are later than the timestamp given to the filename.

If the **member** option is not specified, then the audit log on all members will be archived. The database server must be started in this case. If the database server has not been started, then archive must be run on each

member, and the **member** option must be specified to indicate on which member **archive** is to be run (AUD0029).

The **archive** option will output the result and names of the files from each member that archive was run on.

- start** This parameter causes the audit facility to begin auditing events based on the contents of the db2audit.cfg file for the instance only. In a multiple member Db2 database instance, auditing will begin for instance and client level activities on all database members when this clause is specified. If the **audit** category of events has been specified for auditing, then an audit record will be logged when the audit facility is started. This has no effect on database level auditing, which is controlled through the AUDIT DDL statement.
- stop** This parameter causes the audit facility to stop auditing events for the instance only. In a multiple member Db2 database instance, auditing is stopped for instance and client level activities on all database members when this clause is specified. If the **audit** category of events has been specified for auditing, then an audit record will be logged when the audit facility is stopped. This has no effect on database level auditing, which is controlled through the AUDIT DDL statement.
- ?** This parameter displays the help information for the **db2audit** command.

## Examples

This is a typical example of how to archive and extract a delimited ASCII file in a multiple member database environment. The UNIX remove (**rm**) command deletes the old delimited ASCII files.

```
rm /auditdelasc/*.del
db2audit flush
db2audit archive database mydb to /auditarchive
```

(files will be indicated for use in next step)

```
db2audit extract delasc to /auditdelasc from files /auditarchive
/db2audit.db.mydb.log.*.20070514102856
```

Load the .del files into a Db2 table.

## Usage notes

- Database level auditing is controlled with the **AUDIT** statement.
- The instance level audit facility must be stopped and started explicitly. When starting, the audit facility uses existing audit configuration information. Since the audit facility is independent of the Db2 database server, it will remain active even if the instance is stopped. In fact, when the instance is stopped, an audit record may be generated in the audit log.
- Ensure that the audit facility has been turned on by issuing the **db2audit start** command before using the audit utilities.
- There are different categories of audit records that may be generated. In the following description of the categories of events available for auditing, you should notice that following the name of each category is a one-word keyword used to identify the category type. The categories of events available for auditing are:
  - Audit (**audit**). Generates records when audit settings are changed or when the audit log is accessed.

- Authorization Checking (**checking**). Generates records during authorization checking of attempts to access or manipulate Db2 database objects or functions.
- Object Maintenance (**objmaint**). Generates records when creating or dropping data objects.
- Security Maintenance (**secmaint**). Generates records when granting or revoking: object or database privileges, or DBADM authority. Records are also generated when the database manager security configuration parameters **sysadm\_group**, **sysctrl\_group**, or **sysmaint\_group** are modified.
- System Administration (**sysadmin**). Generates records when operations requiring SYSADM, SYSMAINT, or SYSCTRL authority are performed.
- User Validation (**validate**). Generates records when authenticating users or retrieving system security information.
- Operation Context (**context**). Generates records to show the operation context when an instance operation is performed. This category allows for better interpretation of the audit log file. When used with the log's event correlator field, a group of events can be associated back to a single database operation.
- You can audit failures, successes, both or none.
- Any operation on the instance may generate several records. The actual number of records generated and moved to the audit log depends on the number of categories of events to be recorded as specified by the audit facility configuration. It also depends on whether successes, failures, or both, are audited. For this reason, it is important to be selective of the events to audit.
- To clean up and/or view audit logs, run **archive** on a regular basis, then run **extract** on the archived file to save what is useful. The audit logs can then be deleted with standard file system delete commands.

## **db2batch - Benchmark tool**

Reads SQL statements and XQuery statements from either a flat file or standard input, dynamically prepares and describes the statements, and returns an answer set.

This tool can work in both a single partition database and in a multiple partition database.

Through the optional parameters of the tool, you are able to control the number of rows to be fetched from the answer set, the number of fetched rows to be sent to the output file or standard output, and the level of performance information to be returned.

The output default is to use standard output. You can name the output file for the results summary.

## **Authorization**

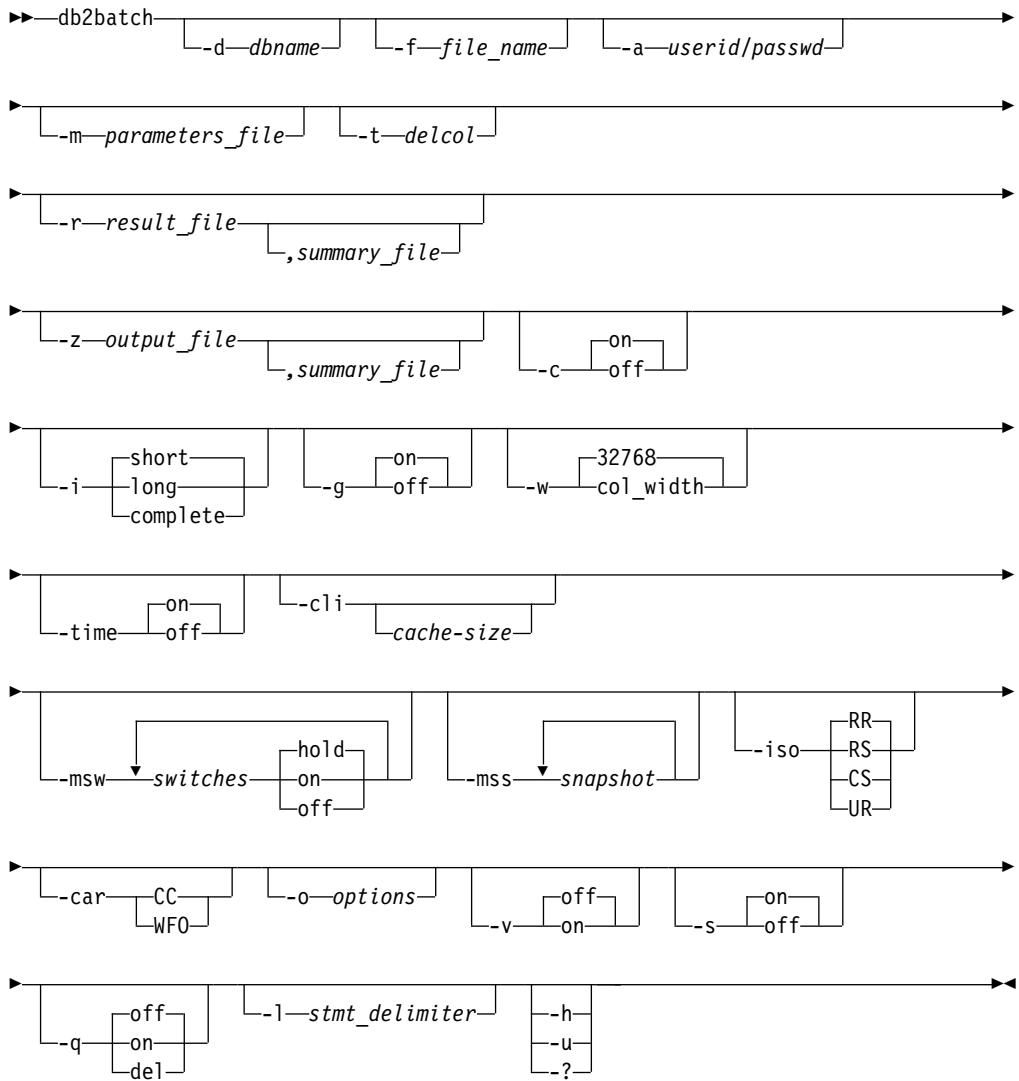
The same authority level as that required by the SQL statements or the XQuery statements to be read.

To use the **-o p** option, which specifies the level of performance information, or to use the **-o e** option, which sets the explain mode, you require SYSMON authority.

## Required connection

None. This command establishes a database connection.

## Command syntax



## Command parameters

### -d *dbname*

An alias name for the database against which SQL statements and XQuery statements are to be applied. If this option is not specified, the value of the **DB2DBDFT** environment variable is used.

### -f *file\_name*

Name of an input file containing SQL statements and XQuery statements. The default is standard input.

Identify comment text by adding two hyphens in front of the comment text, that is, `--comment`. All text following the two hyphens until the end of the line is treated as a comment. Strings delimited with single or double quotation marks may contain two adjacent hyphens, and are treated as

string constants rather than comments. To include a comment in the output, mark it as follows: --#COMMENT *comment*.

A *block* is a group of SQL statements and XQuery statements that are treated as one. By default, information is collected for all of the statements in the block at once, rather than one at a time. Identify the beginning of a block of queries as follows: --#BGBLK. Identify the end of a block of queries as follows: --#EOBLK. Blocks of queries can be included in a repeating loop by specifying a repeat count when defining the block, as follows: --#BGBLK *repeat\_count*. Statements in the block will be prepared only on the first iteration of the loop.

You can use #PARAM directives or a parameter file to specify the parameter values for a given statement and a given iteration of a block. See the following section on **-m** option for details.

Specify one or more control options as follows: --#SET *control option value*. Valid control options are:

#### **ROWS\_FETCH**

Number of rows to be fetched from the answer set. Valid values are -1 to *n*. The default value is -1 (all rows are to be fetched). If a value of 0 is used, then no rows are fetched and no error message is returned.

#### **ROWS\_OUT**

Number of fetched rows to be sent to output. Valid values are -1 to *n*. The default value is -1 (all fetched rows are to be sent to output).

#### **PERF\_DETAIL *perf\_detail***

Specifies the level of performance information to be returned. Valid values are:

- 0     Do not return any timing information or monitoring snapshots.
- 1     Return elapsed time only.
- 2     Return elapsed time and a snapshot for the application.
- 3     Return elapsed time, and a snapshot for the database manager, the database, and the application.
- 4     Return a snapshot for the database manager, the database, the application, and the statement (the latter is returned only if autocommit is OFF, and single statements, not blocks of statements, are being processed). The snapshot will not include hash join information.
- 5     Return a snapshot for the database manager, the database, the application, and the statement (the latter is returned only if autocommit is OFF, and single statements, not blocks of statements, are being processed). Also return a snapshot for the buffer pools, table spaces and FCM (an FCM snapshot is only available in a multi-database-partition environment). The snapshot will not include hash join information.

The default value is 1. A value >1 is only valid on Db2 Version 2 and Db2 database servers, and is not currently supported on host machines.

**ERROR\_STOP**

Specifies whether or not **db2batch** should stop running when a non-critical error occurs. Valid values are:

**no** Continue running when a non-critical error occurs. This is the default option.

**yes** Stop running when a non-critical error occurs.

**DELIMITER**

A one- or two-character end-of-statement delimiter. The default value is a semicolon (;).

**SLEEP**

Number of seconds to sleep. Valid values are 1 to *n*.

**PAUSE**

Prompts the user to continue.

**SNAPSHOT *snapshot***

Specifies the monitoring snapshots to take. See the **-mss** option for the snapshots that can be taken.

**TIMESTAMP**

Generates a time stamp.

**TIMING**

Print timing information. Valid values are:

**ON** Timing information is printed. This is the default.

**OFF** Timing information is not printed.

**-a *userid/passwd***

Specifies the user ID and password used to connect to the database. The slash (/) must be included.

**-m *parameters\_file***

Specifies an input file with parameter values to bind to the SQL statement parameter markers before executing a statement. The default is to not bind parameters.

If a parameters file is used, then each line specifies the parameter values for a given statement and a given iteration of a block. If instead #PARAM directives are used, multiple values and even parameter ranges are specified in advance for each parameter of each statement, and on each iteration of the block a random value is chosen from the specified sets for each parameter. #PARAM directives and a parameters file cannot be mixed.

Parameter Value Format:

-36.6	'DB2'	X'0AB2'	G'...'	NULL
12	'batch'	x'32ef'	N'...'	null
+1.345E-6	'db2 batch'	X'afD4'	g'...'	Null

Each parameter is defined like a SQL constant, and is separated from other parameters by whitespace. Non-delimited text represents a number, plain delimited ('') text represents a single byte character string, 'x' or 'X' prefixed text enclosed in single quotation marks ('') represents a binary string encoded as pairs of hex digits, 'g', 'G', 'n', or 'N' prefixed text enclosed in single quotation marks ('') represents a graphic string composed of double byte characters, and 'NULL' (case insensitive) represents a null value. To specify XML data, use delimited ('') text, such as '<last>Brown</last>'.

Parameter Input File Format:

Line X lists the set of parameters to supply to the Xth SQL statement that is executed in the input file. If blocks of statements are not repeated, then this corresponds to the Xth SQL statement that is listed in the input file. A blank line represents no parameters for the corresponding SQL statement. The number of parameters and their types must agree with the number of parameters and the types expected by the SQL statement.

Parameter Directive Format:

```
--#PARAM [single | start:end | start:step:end] [...]
```

Each parameter directive specifies a set of parameter values from which one random value is selected for each execution of the query. Sets are composed of both single parameter values and parameter value ranges. Parameter value ranges are specified by placing a colon (':') between two valid parameter values, with whitespace being an optional separator. A third parameter value can be placed between the start and end values to be used as a step size which overrides the default. Each parameter range is the equivalent of specifying the single values of 'start', 'start+step', 'start+2\*step', ... 'start+n\*step' where  $n$  is chosen such that 'start+n\*step'  $\geq$  'end' but 'start+(n+1)\*step'  $>$  'end'. While parameter directives can be used to specify sets of values for any type of parameter (even NULL), ranges are only supported on numeric parameter values (integers and decimal numbers).

When running a stored procedure, update the *parameters\_file* with dummy values for both IN or OUT parameters.

**-t delcol**

Specifies a single character column separator. Specify -t TAB for a tab column delimiter or -t SPACE for a space column delimiter. By default, a space is used when the **-q on** option is set, and a comma is used when the **-q del** option is set.

**-r result\_file [,summary\_file]**

Specifies an output file that will contain the query results. The default is standard output. Error messages are returned in the standard error. If the optional *summary\_file* is specified, it will contain the summary table.

**-z output\_file [,summary\_file]**

Specifies an output file that will contain the query results and any error messages returned. The default is standard output. Error messages are also returned in the standard error. If the optional *summary\_file* is specified, it will contain the summary table. This option is available starting in Version 9.7 Fix Pack 1.

**-c** Automatically commit changes resulting from each statement. The default is ON.

**-i** Specifies to measure elapsed time intervals. Valid values are:

**short** Measure the elapsed time to run each statement. This is the default.

**long** Measure the elapsed time to run each statement including the additional processing time between statements.

**complete**

Measure the elapsed time to run each statement where the prepare, execute, and fetch times are reported separately.

- g** Specifies whether timing is reported by block or by statement. Valid values are:
  - on** A snapshot is taken for the entire block and only block timing is reported in the summary table. This is the default.
  - off** A snapshot is taken and summary table timing is reported for each statement executed in the block.
- w** Specifies the maximum column width of the result set, with an allowable range of 0 to 2 G. Data is truncated to this width when displayed, unless the data cannot be truncated. You can increase this setting to eliminate the warning CLI0002W and get a more accurate fetch time. The default maximum width is 32768 columns.
- time** Specifies whether or not to report the timing information. Valid values are:
  - on** Timing is reported. This is the default.
  - off** Timing is not reported.
- cli** Embedded dynamic SQL mode, previously the default mode for the **db2batch** command is no longer supported. This command only runs in CLI mode. The **-cli** option exists for backwards compatibility. Specifying it (including the optional *cache-size* argument) will not cause errors, but will be ignored internally.
- msw *switch***
  - Sets the state of each specified monitor switch. You can specify any of the following options: uow, statement, table, bufferpool, lock, sort, and timestamp. The special switch all sets all of the switches mentioned previously. For each switch that you specify, you must choose one of the following values:
    - hold** The state of the switch is unchanged. This is the default.
    - on** The switch is turned ON.
    - off** The switch is turned OFF.
- mss *snapshot***
  - Specifies the monitoring snapshots that should be taken after each statement or block is executed, depending on the **-g** option. More than one snapshot can be taken at a time, with the information from all snapshots combined into one large table before printing. The possible snapshots are: applinfo\_all, dbase\_applinfo, dcs\_applinfo\_all, db2, dbase, dbase\_all, dcs\_dbbase, dcs\_dbbase\_all, dbase\_remote, dbase\_remote\_all, agent\_id, dbase\_apps, appl\_all, dcs\_appl\_all, dcs\_appl\_handle, dcs\_dbbase\_apps, dbase\_apps\_remote, appl\_remote\_all, dbase\_tables, appl\_locks\_agent\_id, dbase\_locks, dbase\_tablespaces, bufferpools\_all, dbase\_bufferpools, and dynamic\_sql.
  - The special snapshot all takes all of the snapshots. Any snapshots involving an appl ID are not supported in favor of their agent ID (application handle) equivalents. By default, no monitoring snapshots are taken.
- iso** Specifies the isolation level, which determines how data is locked and isolated from other processes while the data is being accessed. By default, **db2batch** uses the RR isolation level.

The **TxnIsolation** configuration keyword in the db2cli.ini file does not affect **db2batch**. To run this command with an isolation level other than RR, the **-iso** parameter must be specified.

**RR** Repeatable read (ODBC Serializable). This is the default.

**RS** Read stability (ODBC Repeatable Read).

**CS** Cursor stability (ODBC Read Committed).

**UR** Uncommitted read (ODBC Read Uncommitted).

**-car** Specifies the concurrent access resolution to use for the **db2batch** operation. The **-car** parameter requires a properly configured database server and the isolation level parameter **-iso** set to CS.

**CC** Specifies that the **db2batch** operation should use the currently committed version of the data for applicable scans when it is in the process of being updated or deleted. Rows in the process of being inserted can be skipped. This option applies when the isolation level in effect is Cursor Stability or Read Stability (for Read Stability it skips uncommitted inserts only) and is ignored otherwise. Applicable scans include read-only scans that can be part of a read-only statement as well as a non read-only statement.

**WFO** Specifies that the **db2batch** operation should wait for the outcome of an operation. For Cursor Stability and higher scans, **db2batch** will wait for the commit or rollback when encountering data in the process of being updated or deleted. Rows in the process of being inserted are not skipped.

**-o options**

Control options. Valid options are:

**f rows\_fetch**

Number of rows to be fetched from the answer set. Valid values are -1 to *n*. The default value is -1 (all rows are to be fetched). If a value of 0 is used, then no rows are fetched and no error message is returned.

**r rows\_out**

Number of fetched rows to be sent to output. Valid values are -1 to *n*. The default value is -1 (all fetched rows are to be sent to output).

**p perf\_detail**

Specifies the level of performance information to be returned. Valid values are:

**0** Do not return any timing information or monitoring snapshots.

**1** Return elapsed time only.

**2** Return elapsed time and a snapshot for the application.

**3** Return elapsed time, and a snapshot for the database manager, the database, and the application.

**4** Return a snapshot for the database manager, the database, the application, and the statement (the latter is returned only if autocommit is OFF, and single statements, not blocks of statements, are being processed).

- 5**      Return a snapshot for the database manager, the database, the application, and the statement (the latter is returned only if autocommit is OFF, and single statements, not blocks of statements, are being processed). Also return a snapshot for the buffer pools, table spaces and FCM (an FCM snapshot is only available in a multi-database-partition environment).
- The default value is 1. A value >1 is only valid on Db2 Version 2 and Db2 database servers, and is not currently supported on host machines.
- o *query\_optimization\_class***  
Sets the query optimization class. Valid values are 0, 1, 2, 3, 5, 7, or 9. The default is -1 to use the current optimization class.
- e *explain\_mode***  
Sets the explain mode under which **db2batch** runs. The explain tables must be created before using this option. Valid values are:
- no**      Run query only (default).
  - explain**  
Populate explain tables only. This option populates the explain tables and causes explain snapshots to be taken.
  - yes**      Populate explain tables and run query. This option populates the explain tables and causes explain snapshots to be taken.
- s *error\_stop***  
Specifies whether or not **db2batch** should stop running when a non-critical error occurs. Valid values are:
- no**      Continue running when a non-critical error occurs. This is the default option.
  - yes**      Stop running when a non-critical error occurs.
- v**      Verbose. Send information to standard error during query processing. The default value is OFF.
- s**      Summary table. Provide a summary table for each query or block of queries, containing elapsed time with arithmetic and geometric means, the rows fetched, and the rows output.
- q**      Query output. Valid values are:
- off**      Output the query results and all associated information. This is the default.
  - on**      Output only query results in non-delimited format.
  - del**      Output only query results in delimited format.
- l *stmt\_delimiter***  
Specifies the termination character (statement delimiter). The delimiter can be 1 or 2 characters. The default is a semi-colon (';').
- h | -u | -?**  
Displays help information. When this option is specified, all other options are ignored, and only the help information is displayed.

## Examples

1. The following example is sample output from the command db2batch -d crystl -f update.sql

```
* Timestamp: Thu Feb 02 2006 10:06:13 EST

* SQL Statement Number 1:
create table demo (c1 bigint, c2 double, c3 varchar(8));
* Elapsed Time is: 0.101091 seconds

* SQL Statement Number 2:
insert into demo values (-9223372036854775808, -0.0000000000000005, 'demo');
* Elapsed Time is: 0.002926 seconds

* SQL Statement Number 3:
insert into demo values (9223372036854775807, 0.0000000000000005, 'demodemo');
* Elapsed Time is: 0.005676 seconds

* SQL Statement Number 4:
select * from demo;
C1 C2 C3

-9223372036854775808 -5.00000000000000E-015 demo
9223372036854775807 +5.00000000000000E-015 demodemo
* 2 row(s) fetched, 2 row(s) output.
* Elapsed Time is: 0.001104 seconds

* SQL Statement Number 5:
drop table demo;
* Elapsed Time is: 0.176135 seconds
* Summary Table:
Type Number Repetitions Total Time (s) Min Time (s) Max Time (s)

Statement 1 1 0.101091 0.101091 0.101091
Statement 2 1 0.002926 0.002926 0.002926
Statement 3 1 0.005676 0.005676 0.005676
Statement 4 1 0.001104 0.001104 0.001104
Statement 5 1 0.176135 0.176135 0.176135
Arithmetic Mean Geometric Mean Row(s) Fetched Row(s) Output

 0.101091 0.101091 0 0
 0.002926 0.002926 0 0
 0.005676 0.005676 0 0
```

0.001104	0.001104	2	2
0.176135	0.176135	0	0
-----			
* Total Entries:	5		
* Total Time:	0.286932 seconds		
* Minimum Time:	0.001104 seconds		
* Maximum Time:	0.176135 seconds		
* Arithmetic Mean Time:	0.057386 seconds		
* Geometric Mean Time:	0.012670 seconds		
-----			
* Timestamp: Thu Feb 02 2006 10:06:13 EST			

## Usage notes

- All SQL statements must be terminated by a delimiter (default ';') set by the --#SET DELIMITER command. This delimiter can be 1 or 2 characters.
- SQL statement length is limited only by available memory and the interface used. Statements can break over multiple lines, but multiple statements are not allowed on a single line.
- Input file line length is limited only by available memory.
- **c** automatically issues CONNECT and CONNECT RESET statements.
- PAUSE and SLEEP are timed when *long* is specified for the **-i** timing option.
- Explain tables must be created before explain options can be used.
- All command line options and input file statements are case insensitive with respect to **db2batch**.
- **db2batch** supports the following data types: INTEGER, CHAR, VARCHAR, LONG VARCHAR, FLOAT, SMALLINT, BIGINT, DECIMAL, DATE, TIME, TIMESTAMP, CLOB, GRAPHIC, VARGRAPHIC, LONGVARGRAPHIC, DBCLOB, BLOB, and XML.
- --#SET PERF\_DETAIL *perf\_detail* (or -o p *perf\_detail*) provides a quick way to obtain monitoring output. If the performance detail level is > 1, all monitor switches are turned on internally by **db2batch**. If more precise control of monitoring output is needed, use the options **-msw** and **-mss** (or --#SET SNAPSHOT).
- If you specify **-r** and **-z** option together, the **-r** option is ignored as the **-z** option includes what the **-r** specifies.

## db2bfd - Bind file description tool

Displays the contents of a bind file.

This utility, which can be used to examine and to verify the SQL statements within a bind file, as well as to display the precompile options used to create the bind file, might be helpful in problem determination related to an application's bind file.

## Authorization

None

## Required connection

None

## Command syntax



## Command parameters

- h**      Display help information. When this option is specified, all other options are ignored, and only the help information is displayed.
- b**      Display the bind file header.
- s**      Display the SQL statements.
- v**      Display the host variable declarations.

*filespec*

Name of the bind file whose contents are to be displayed.

## db2caem - Capture activity event monitor data tool

The **db2caem** tool automates the procedure of creating an activity event monitor.

Run the **db2caem** command to create the activity event monitor to capture data for an SQL statement. This data can be collected with the **db2support** command. The information collected and generated by the **db2caem** tool includes:

- Detailed activity information captured by an activity event monitor including monitor metrics, for example total\_cpu\_time for statement execution
- Formatted EXPLAIN output, including section actuals (statistics for different operators in the access plan).

The **db2caem** tool uses an activity event monitor to capture information about the statements and then extracts and formats the information.

The **db2caem** tool automates the process for creating an activity event monitor,

1. Enabling capture for the statements of interest
2. Invoking the statements (each statement is rolled back after being executed to prevent side effects in the database)
3. Formatting the output information (including exporting activity information for the statements of interest and generation of formatted explain output from the captured section and section actuals).

## Authorization

1. To create activity event monitor, the privileges must include one of the following authorities:
  - DBADM authority
  - SQLADM authority
  - WLMADM authority
 and also EXECUTE privilege on the WLM\_SET\_CONN procedure.
2. If there is not a need to create activity event monitor, the following privileges and authority are required:
  - EXECUTE privilege on the EXPLAIN\_FROM\_ACTIVITY procedure
  - INSERT privilege on the Explain tables in the specified schema

- SELECT privilege on the event monitor tables for the source activity event monitor

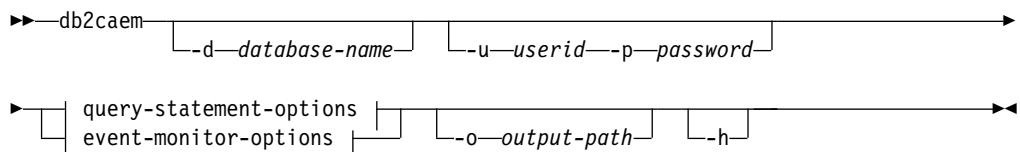
and also one of the following authorities:

- DATAACCESS authority on the activity event monitor tables
- CONTROL or SELECT privilege on the activity event monitor tables

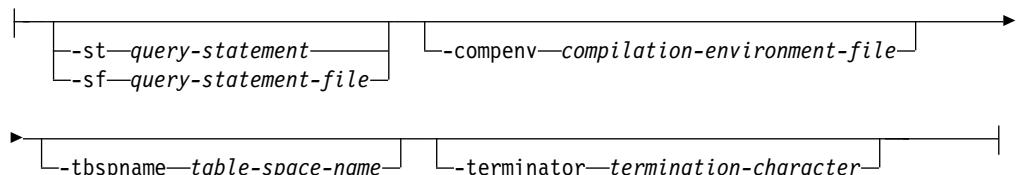
## Required connection

None

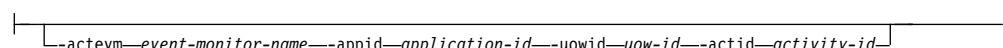
## Command syntax



### query-statement-options:



### event-monitor-options:



## Command parameters

### **-d database-name**

Specifies the name of the database to be connected to.

### **-u userid**

Specifies the user ID when connecting to the database.

### **-p password**

Specifies the password for the user ID when connecting to the database.

### **-o output-path**

The output files of db2caem will be written to the path that you specify.

**-h** Displays help information. When this option is specified, all other options are ignored, and only the help information is displayed.

## query-statement-options

### **-st query-statement**

Specifies the SQL statement for which activity event monitor data is to be captured.

**Note:** The SQL statement will be executed against the specified database by the tool.

**-sf *query-statement-file***

Specifies the file path containing the SQL statement for which activity event monitor data is being captured. Use the **-terminator** option to specify the character that marks the end of the SQL statement.

**Note:** The SQL statement will be executed against the specified database by the tool.

**-compenv *compilation-environment-file***

Specifies that the compilation environment will be used when the SQL statement is executed. The compilation environment (comp\_env\_desc) is in BLOB data type and specified through a file as an optional input. If the option is not provided, the default compilation environment will be used when executing the SQL statement.

**-tbspname *table-space-name***

Specifies the table space name for which the activity event monitor will be created in. For a partitioned database environment, the table space should exist on all the database partitions where the SQL statement of interest will be run. If the option is not provided, the default table space will be used when there is a need to create the activity event monitor.

**-terminator *termination-character***

Specifies the character that indicates the end of the SQL statement in the **-sf** SQL file if there are multiple statements in the file. The default is a semicolon.

## event-monitor-options

The following options uniquely identify an SQL statement that has already been captured by an existing activity event monitor. They are specified together to identify the statement for which **activity data** and **explain output** should be extracted.

**Note:** Formatted explain output will only be gathered if the section for the statement was captured, and the formatted explain output will only include section actuals if section actuals had been captured for the statement.

**-actevm *event-monitor-name***

Specifies the name of the existing activities event monitor containing the data for the statement of interest.

**-appid *application-id***

Specifies the application identifier (appl\_id monitor element) uniquely identifying the application that issued the statement of interest.

**-uowid *uow-id***

Specifies the unit of work ID (uow\_id monitor element) in which the statement of interest was executed.

**-actid *activity-id***

Specifies the activity ID (activity\_id monitor element) of the statement of interest.

## Examples

The following examples show how you can use the **db2caem** tool to create the activity event monitor to capture data for an SQL statement:

- db2caem -d sample -st "select \* from staff"

Creates the activity event monitor and capture information of details, section and values, as well as actuals for the SQL statement "select \* from staff".

- `db2caem -d sample -sf badquery.sql -terminator $`  
Creates the activity event monitor and capture information of details, section and values, as well as actuals for the SQL statement specified in the file `badquery.sql`.
  - `db2caem -d sample -actevm mymon -appid *LOCAL.mikita.100203234904 -uowid 44 -actid 1`  
Captures the activity event monitor information of details, section and values, as well as actuals for the SQL statement identified by the event monitor options from the existing activity event monitor. The `db2caem` tool will not create activity event monitor in this example.

## Usage notes

The **db2caem** tool is used to create the activity event monitor for capturing data which can be collected with the **db2support** command. DB2CAEM\_<timestamp> directory will be generated to contain all the information captured by the **db2caem** tool.

The **db2caem** tool does not support parameter markers in SQL statements. For example, the following query statement cannot be used with the **db2caem** tool.

```
SELECT * FROM syscat.tables WHERE tablename=? and tbspaceid =?
```

**db2cap - CLI/ODBC static package binding tool**

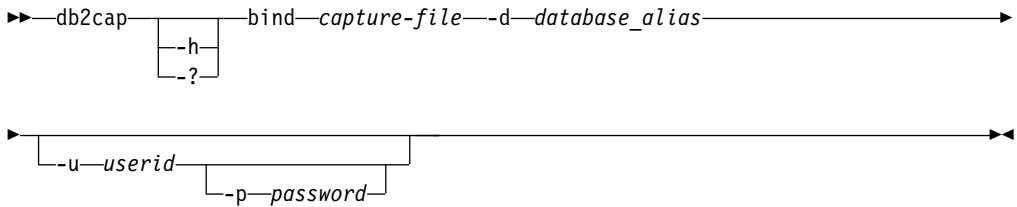
Binds a capture file to generate one or more static packages.

A *capture file* is generated during a static profiling session of a CLI, ODBC, or .NET application, and contains SQL statements that were captured during the application run. This utility processes the capture file so that it can be used by the CLI, ODBC, or .NET driver to execute static SQL for the application.

## Authorization

- Access privileges to any database objects referenced by SQL statements recorded in the capture file.
  - Sufficient authority to set bind options such as OWNER and QUALIFIER if they are different from the connect ID used to invoke the **db2cap** command.
  - BINDADD authority if the package is being bound for the first time; otherwise, BIND authority is required.

## Command syntax



## Command parameters

**-h | -?** Displays help text for the command syntax.

**bind *capture-file***

Binds the statements from the capture file and creates one or more packages. This capture file is also known as the pureQueryXML file for .NET.

**-d *database\_alias***

Specifies the database alias for the database that contains one or more packages.

**-u *userid***

Specifies the user ID to be used to connect to the data source. If a user ID is not specified, a trusted authorization ID is obtained from the system.

**-p *password***

Specifies the password to be used to connect to the data source.

## Usage notes

This command must be entered in lowercase on UNIX platforms, but can be entered in either lowercase or uppercase on Windows operating systems. Static package binding for .NET applications is supported only on Windows operating systems.

This utility supports many user-specified bind options that can be found in the capture file. In order to change the bind options, open the capture file in a text editor.

The SQLERROR(CONTINUE) and the VALIDATE(RUN) bind options can be used to create a package.

When using this utility to create a package, static profiling must be disabled.

The number of packages created depends on the isolation levels used for the SQL statements that are recorded in the capture file. The package name consists of up to a maximum of the first seven characters of the package keyword from the capture file, and one of the following single-character suffixes:

- 0 - Uncommitted Read (UR)
- 1 - Cursor Stability (CS)
- 2 - Read Stability (RS)
- 3 - Repeatable Read (RR)
- 4 - No Commit (NC)

To obtain specific information about packages, the user can:

- Query the appropriate SYSIBM catalog tables using the COLLECTION and PACKAGE keywords found in the capture file.
- View the capture file.

## db2cat - System catalog analysis

Analyzes the contents of packed descriptors. Given a database name and other qualifying information, this command will query the system catalogs for information and format the results.

It must be issued on the server.

## Authorization

None

## Required Connection

None

## Command syntax

```
►►—db2cat [-d dbname] [-h] [-l] [-n name] [-o outfile]
► [-p descriptor] [-vi versionID] [-s schema] [-t] [-v]
► [-x] [-cb]
```

## Command parameters

### **-d *dbname***

*dbname* is the name of the database for which the command will query the system catalogs.

### **-h**

Displays usage information.

### **-l**

Turns on case sensitivity for the object name.

### **-n *name***

Specifies the name of the object.

### **-o *outfile***

Specifies the name of the output file.

### **-p *descriptor***

Specifies the name of the packed descriptor (pd) to display where *descriptor* is one of the following values:

#### **check**

Display table check constraints packed descriptor.

#### **controls**

Displays packed descriptors for all enabled permissions and masks for a given table.

#### **rel**

Display referential integrity constraint packed descriptor.

#### **table**

Display table packed descriptor. This includes the inline length if at least one exists for the table.

#### **summary**

Display summary table packed descriptor.

#### **syscontrols**

Displays the packed descriptor for a given mask or permission.

#### **trig**

Display table trigger packed descriptor.

**view**  
     Display view packed descriptor.

**variable**  
     Display global variable packed descriptor.

**remote**  
     Display remote non-relational data sources packed descriptor.

**ast**  
     Display materialized query table packed descriptor.

**routine**  
     Display routine packed descriptor.

**sysplan**  
     Display package packed descriptor.

**datatype**  
     Display structured type packed descriptor.

**sequence**  
     Display sequence packed descriptor.

**esri**  
     Display key transformation thread and index extension packed descriptor.

**event**  
     Display event monitor packed descriptor.

**server**  
     Display server packed descriptor.

**auth**  
     Display privileges held by this grantee on this object.

**-vi *versionID***  
     Specifies the version ID of the package packed descriptor. **-vi** is only valid when **-p sysplan** is specified. If *versionID* is omitted, the default is the empty string.

**-s *schema***  
     Specifies the name of the object schema.

**-t** Displays terminal output.

**-v** Validates packed descriptor. This parameter is only valid for table packed descriptors.

**-x** Validates table space extent size in catalogs (does not require a table name).

**-cb**  
     Cleans orphan rows from SYSCAT.BUFFERPOOLDBPARTITIONS (does not require a table name).

## Examples

### Example 1

The following command prints the packed descriptor information for the table splt\_tb1 with schema raguk from database testdb to terminal:

```
db2cat -d testdb -s raguk -t -n splt_tb1
```

### Usage notes

- The options **-d**, **-s** and **-n** are mandatory when executing the **db2cat** command.

- Table name and table schema may be supplied in LIKE predicate form, which allows percent sign (%) and underscore (\_) to be used as pattern matching characters to select multiple sources with one invocation.
- Prompting will occur for all fields that are not supplied or are incompletely specified (except for the **-h** and **-l** options).
- If **-o** is specified without a file name, and **-t** is not specified, you will be prompted for a file name (the default name is db2cat.out).
- If neither **-o** nor **-t** is specified, you will be prompted for a file name (the default is terminal output).
- If **-o** and **-t** are both specified, the output will be directed to the terminal.

## db2ccprf - Copy client profile

You can use this command to copy client configuration files into another directory.

### Authorization

None

### Required connection

None

### Command syntax

```
►—db2ccprf—-tTargetProfilePath—-sSourceProfilePath—-f
```

### Command parameters

**-h** | **-?**

Display help for the **db2ccprf** command.

**-t** *TargetProfilePath*

Specifies the target location that the client configuration files are copied to. If you want a local client to use the configuration files that are copied by using this command, you must set **DB2\_APPL\_CFG\_PATH** to this directory.

**-s** *SourceProfilePath*

Specify the source location where the client configuration files are copied from. If a location is not specified, client configuration files are copied from the path that is specified in the **DB2\_NET\_CLIENT\_PATH** environment variable.

**-f** Specify this parameter to overwrite existing files in the path that the client configuration files are being copied to.

### Usage notes

- In a network-mounted client environment, you can specify a user-specific client configuration as follows:
  1. Copy the client configuration files from the global location to a local directory by issuing the **db2ccprf** command. For example, to copy the client configuration to a local directory \$HOME/db2, issue the following command.  
`db2ccprf -t $HOME/db2`

- Set the **DB2\_APPL\_CFG\_PATH** environment variable to this local directory. For example, to set the client configuration path to this local directory \$HOME/db2, issue the following command.

```
export DB2_APPL_CFG_PATH=$HOME/db2
```

If you set the environment variable to a non-default path, any changes that you make to the local client configurations apply only to the local client workstations. Changes to the global client configuration on the network do not impact the local client configurations.

**Tip:** For C shell environment, use the **setenv** command instead of the **export** command to set the environment variables. For other command shell environments see topic "Setting environment variables outside the profile registries on Linux and UNIX operating systems"

- If the directory that the client configuration files are being copied to is not empty and the -f option is not specified, an error is returned.

## **db2cfexp - Connectivity configuration export tool**

Exports connectivity configuration information to an export profile, which can later be imported at another Db2 database workstation instance of similar instance type (that is, client instance to client instance).

The resulting profile will contain only configuration information associated with the current Db2 database instance. This profile can be referred to as a *client* configuration profile or a configuration profile of an *instance*.

This utility exports connectivity configuration information into a file known as a configuration profile. It is a non-interactive utility that packages all of the configuration information needed to satisfy the requirements of the export options specified. Items that can be exported are:

- Database information (including DCS and ODBC information)
- Node information
- Protocol information
- database manager configuration settings
- registry settings
- Common ODBC/CLI settings.

This utility is especially useful in situations where multiple similar remote Db2 clients are to be installed, configured, and maintained (for example, cloning or making templates of client configurations).

### **Authorization**

One of the following authorities:

- SYSADM
- SYSCTRL

### **Command syntax**



## **Command parameters**

### ***filename***

Specifies the fully qualified name of the target export file. This file is known as a configuration profile.

### **TEMPLATE**

Creates a configuration profile that is used as a template for other instances of the same instance type (that is, client instance to client instance). The profile includes information about:

- All databases, including related ODBC and DCS information
- All nodes associated with the exported databases
- Common ODBC/CLI settings
- Common client settings in the database manager configuration
- Common client settings in the Db2 registry.

### **BACKUP**

Creates a configuration profile of the Db2 database instance for local backup purposes. This profile contains all of the instance configuration information, including information of a specific nature relevant only to this local instance. The profile includes information about:

- All databases including related ODBC and DCS information
- All nodes associated with the exported databases
- Common ODBC/CLI settings
- All settings in the database manager configuration
- All settings in the Db2 registry
- All protocol information.

### **MAINTAIN**

Creates a configuration profile containing only database- and node-related information for maintaining or updating other instances.

### **Note:**

The **db2cfexp** command will not export the File data source location information from a client.

If you use the default location, no action is required. If you change the default location on a client, you will need to manually copy this location when exporting connectivity information.

To copy the File data source location from one client to another:

1. On the client you are exporting connectivity information, locate the %DB2PATH%\TOOLS directory.
2. Copy the CA.properties file.
3. On the client you are importing connectivity information, locate the %DB2PATH%\TOOLS directory.
4. Overwrite the existing CA.properties file with the copy taken from the originating client.

You have duplicated the File data source location from one client to another.

## **db2cfimp - Connectivity configuration import tool**

Imports connectivity configuration information from a file known as a configuration profile. It is a non-interactive utility that will attempt to import all the information found in the configuration profile.

A configuration profile can contain connectivity items such as:

- Database information (including Db2 Connect and ODBC information)
- Node information
- Protocol information
- database manager configuration settings
- Db2 database registry settings
- Common ODBC/CLI settings.

This utility can be used to duplicate the connectivity information from another similar instance (that is, client instance to client instance) that was configured previously. It is especially useful in situations where multiple similar remote Db2 clients are to be installed, configured, and maintained (for example, cloning or making templates of client configurations). When cloning an instance, the profile imported should always be a client configuration profile that contains configuration information about one Db2 database instance only.

### **Authorization**

One of the following authorities:

- SYSADM
- SYSCTRL

#### **Note:**

- The root ID should not be used to run the tool.
- If a valid ID is used to run the tool, the ID must have the correct permission for the configuration profile to be imported.

### **Command syntax**

►►—db2cfimp—*filename*————►►

### **Command parameters**

*filename*

Specifies the fully qualified name of the configuration profile to be imported. Valid import configuration profiles are profiles created by any Db2 database or Db2 Connect product using the **db2cfexp** command.

## **db2checkCOL - Check database for table accessibility in a prior fix pack**

Scans a database and determines whether any tables cannot be accessed in a fix pack before Db2 Cancun Release 10.5.0.4. If you want to revert to a previous fix pack after applying Db2 Cancun Release 10.5.0.4, run this command before you revert to the previous fix pack.

## Authorization

The authorization ID requires one of the following authorities to run the command:

- SYSADM
- SYSCTRL
- SYSMAINT
- SYSMON

Also, the authorization ID must hold one of the following authorizations:

- DATAACCESS authority
- SELECT privilege on the system catalog tables and all column-organized tables in the database

The authorization ID requires write access to the current directory.

## Required connection

This command establishes a database connection.

## Command syntax

```
►—db2checkCOL—database_alias—checkFP—userid—password—►
```

## Command parameters

### *database\_alias*

Specifies the alias of the database to scan. The specified database must be a local database.

### **-checkFP**

Returns a list of all tables that cannot be accessed in a fix pack before Db2 Cancun Release 10.5.0.4. If an attempt is made to access such tables in a fix pack before Db2 Cancun Release 10.5.0.4, SQL0901N ("Table dictionary version mismatch") is returned.

### *userid*

Specifies the user ID to use to connect to the database.

### *password*

Specifies the password for the user ID.

## Example

```
db2checkCOL testdb -checkFP
```

```
Starting Phase 1 of 3: Query Catalog Tables
Starting Phase 2 of 3: Loading Table Descriptors
Starting Phase 3 of 3: Analyzing Table Descriptors
ERROR: Table "MYSQM7"."MYTB7" is affected.
ERROR: Table "NEWTON"."MYTB8" is affected.
DBT7112E The database has been completely tested, and one or more tables
 were found that require additional action.
Exiting with return code "-800".
```

## Usage notes

- Before you run this command, set the appropriate environment variable for your operating system:

- On the Linux operating system, set the **LD\_LIBRARY\_PATH** environment variable to `~/sqllib/lib64`. On the AIX operating system, set the **LIBPATH** environment variable to `~/sqllib/lib64`.
- The **db2checkCOL** command is an online tool, but it is recommended that you run it during nonpeak periods. Run time can range from seconds to approximately an hour, depending on the number of tables and the amount of concurrent activity.
- On average, 500 KB of disk space per column-organized table might be required for temporary files.
- The command returns one of the following values:

*Table 49. Codes returned by the db2checkCOL command*

Return code	Description
0	You can access all tables in a fix pack before Db2 Cancun Release 10.5.0.4.
-100	The command encounters an internal error while testing the database. If this return code is being returned consistently, the assistance of IBM software support is needed to diagnose the problem.
-300	It is not possible to scan or process all the column-organized tables in the database (for example, because a table space is offline or there is insufficient disk storage for temporary files). When the issue is resolved, rerun the command.
-400	The command encounters an internal error while testing the database. If this return code is being returned consistently, the assistance of IBM software support is needed to diagnose the problem.
-500	The authorization ID of the command does not hold the required authorization. Rerun the command with an authorization ID that holds the required authorization.
-600	A syntax error is encountered. Correct the syntax and rerun the command.
-700	The command encounters an internal error while testing the database. If this return code is being returned consistently, the assistance of IBM software support is needed to diagnose the problem.
-800	One or more tables cannot be accessed in a fix pack before Db2 Cancun Release 10.5.0.4.

- If the **db2checkCOL** command identifies a table that cannot be accessed in a fix pack before Fix Pack 4, take the following steps:
  1. Export the table data in Fix Pack 4 by using the **EXPORT** command.
  2. Revert to the prior fix pack.
  3. Rebuild the table-level compression dictionary at a version that is appropriate for the fix pack by using the **LOAD REPLACE** command to load the exported data.

## **db2checkSD - Verify database is ready to upgrade to Db2 pureScale environment**

Verify that your database is ready to be upgraded to a Db2 pureScale environment.

### **Authorization**

SYSADM and DATAACCESS authorities are required.

### **Command syntax**

```
►►—db2checkSD—[database]—[-e]—[-l filename]—[-u userid]—[-p password]—►►
```

### **Command parameters**

#### *database*

Specifies an alias name of a local database to be scanned.

**-e** Specifies that all local cataloged databases are to be scanned.

#### **-l filename**

Specifies a log file to which to write errors and warnings generated for the scanned database or databases.

#### **-u userid**

Specifies the user ID of the system administrator.

#### **-p password**

Specifies the password of the user ID of the system administrator.

### **Usage notes**

You can run the **db2checkSD** command against a Db2 V9.7 database before upgrading to determine whether you must take actions before using the database in a Db2 pureScale environment. The **db2checkSD** command generates a script file containing information about any issues found. Except for certain features that are controlled by database configuration parameters that the **db2iupgrade** instance upgrade and the **db2iupd** instance update commands disable, you must correct issues for the instance upgrade or update to be completed successfully.

The **db2iupd** command call the **db2checkSD** command. The **db2iupd** commands call the **db2checkSD** command with the **-e** option to check all of the local cataloged databases for the instance. If the **db2checkSD** command detects issues in any database when it is called by these instance commands, in most cases, the instance command fails, but in some cases, the function is disabled.

## **db2chglibpath - Modify the embedded runtime library search path**

Modifies the embedded runtime library search path value within an executable or shared library file. It can be used to replace the embedded runtime library search path value with a new user-specified value when the existing value is no longer valid.

The **db2chglibpath** command can be used to replace the requirement for using operating system library search path environment variables such as **LIBPATH** (AIX), **SHLIB\_PATH** (HPPA, HPIPF) and **LD\_LIBRARY\_PATH** (AIX, SUN, HPPA64, HPIPF and

Linux). This command is only supported on Linux and UNIX operating systems. It can be found under the *DB2DIR/bin* directory, where *DB2DIR* is the Db2 database installation location.

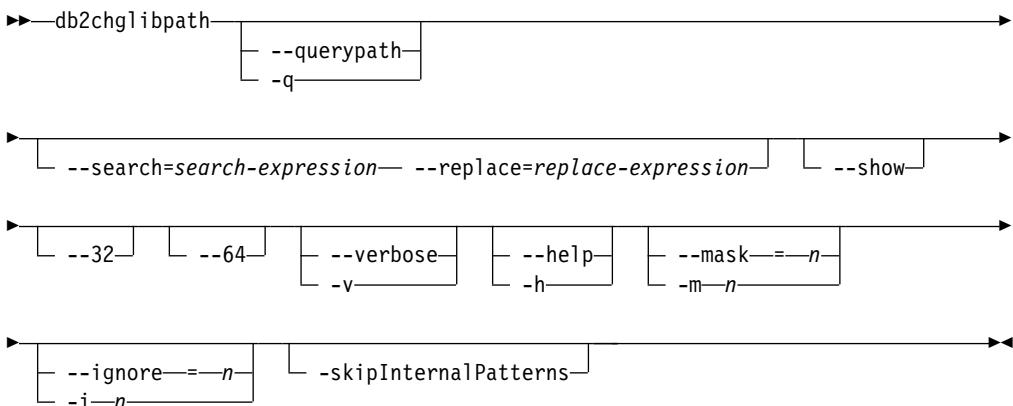
## Prerequisites

- Read and write access is required on the shared library or executable file to be modified.
- The binary has to have an embedded library path to start with, and the embedded path cannot be changed to anything bigger than the path already in the binary.
- The length of the user-specified value that is to replace the embedded runtime library search path value must not be greater than the existing value.
- This command directly modifies the binary code of the shared library or executable file and it is *strongly recommended* that you create a backup of the file before using the command.

## Required Connection

None

## Command syntax



## Command parameters

### --querypath

Specifies that a query should be performed without altering the embedded library path in the binary.

### --search | -s=search-expression

Specifies the expression to be searched for.

### --replace | -r=replace-expression

Specifies the expression that the *search-expression* is to be replaced with.

### --show

Specifies that the search and replace operations are to be performed without actually writing the changes to the files.

### --32

Performs the operation if the binary type is 32-bit.

### --64

Performs the operation if the binary type is 64-bit.

### --verbose

Displays information about the operations that are being performed.

**--help** Displays usage information.

**--mask | -m**  
Suppresses error messages for exit values and can only be specified once.  
Exit values for the mask options are shown under the ignore option.

**--ignore | -i**  
Suppresses a specific error message.

Exit values for mask and ignore options are:

- 0 - path successfully changed
- 1 - not all specified search and replace on the operations succeeded.
- 2 - file was of the right type but does not have a libpath
- 3 - file was not of the right type to have a libpath
- >3 - other errors

#### **--skipInternalPatterns**

The pattern search and replace methods is performed internally to reclaim potential space on the resultant path. Use this option to avoid this replacement.

## **Examples**

- To change the embedded runtime library search path value in the executable file named myexecutable from /usr/opt/db2\_08\_01/lib to /u/usr1/sql1lib/lib32, issue:

```
db2chglpath --search=/usr/opt/db2_08_01/lib --replace=/u/usr1/sql1lib/lib32
/mypath/myexecutable
```

Note that the length of the new value is the same as that of the original value.

## **Usage notes**

- This command is only to be used for updating Db2 database application executables and Db2 external routine shared library files when other methods for upgrading applications and routines cannot be used or are unsuccessful.
- This command is not supported under Db2 service contract agreements. It is provided as-is and as such, IBM is not responsible for its unintended or malicious use.
- This command does not create a backup of the shared library or executable file before modifying it. It is *strongly recommended* that a backup copy of the file be made before issuing this command.

## **db2chglpath - Change embedded runtime path**

Used by the Db2 database installer on Linux and UNIX operating systems to update the embedded runtime path in the related Db2 database library and executable files.

The command can be reissued under the direction of IBM Db2 database support if there were errors related to the command during the Db2 database installation.

**Note:** If SELinux (Security-enhanced Linux) is enabled after the Db2 database installations on Red Hat Enterprise Linux version 5 (RHEL5), you need to manually run this command for each Db2 database installation of the current release to make the Db2 database system work properly. See the *Usage notes* section for additional information.

## Authorization

Root installations require root user authority. For non-root installations, you must log on with the user ID that owns the non-root installation.

## Required Connection

None

## Command syntax

```
>>db2chgpath [-d] [-f file-name] >>
```

## Command parameters

- d      Turns debug mode on. Use this option only when instructed by Db2 database support.
- f *file-name*      Specifies a specific file name to update the runtime path. *file-name* should have the path name relative to the base of the current Db2 database product install location.

## Example

- To check all files under the Db2 database product install path and do a runtime path update, issue:  
*DB2\_installation\_path/install/db2chgpath*
- To update the path for a specific file called libbdb2.a which is under *DB2\_installation\_path/lib64* directory, issue:  
*DB2\_installation\_path/install/db2chgpath -f lib64/libbdb2.a*

## Usage notes

On RHEL5 systems, if you have installed a Db2 database product, when SELinux was either uninstalled or disabled, and want to enable SELinux, these are the steps:

- Install SELinux rpms if necessary.
- Change */etc/sysconfig/selinux*; set the status to "permissive" or "enforcing".
- Reboot the machine to apply SELinux labels to all files.
- Run **db2chgpath** to set the SELinux attribute that allows Db2 shared libraries with text relocations to be loaded (*textrel\_shlib\_t*).

## db2ckbkp - Check backup

This utility can be used to test the integrity of a backup image and to determine whether or not the image can be restored. It can also be used to display the metadata stored in the backup header.

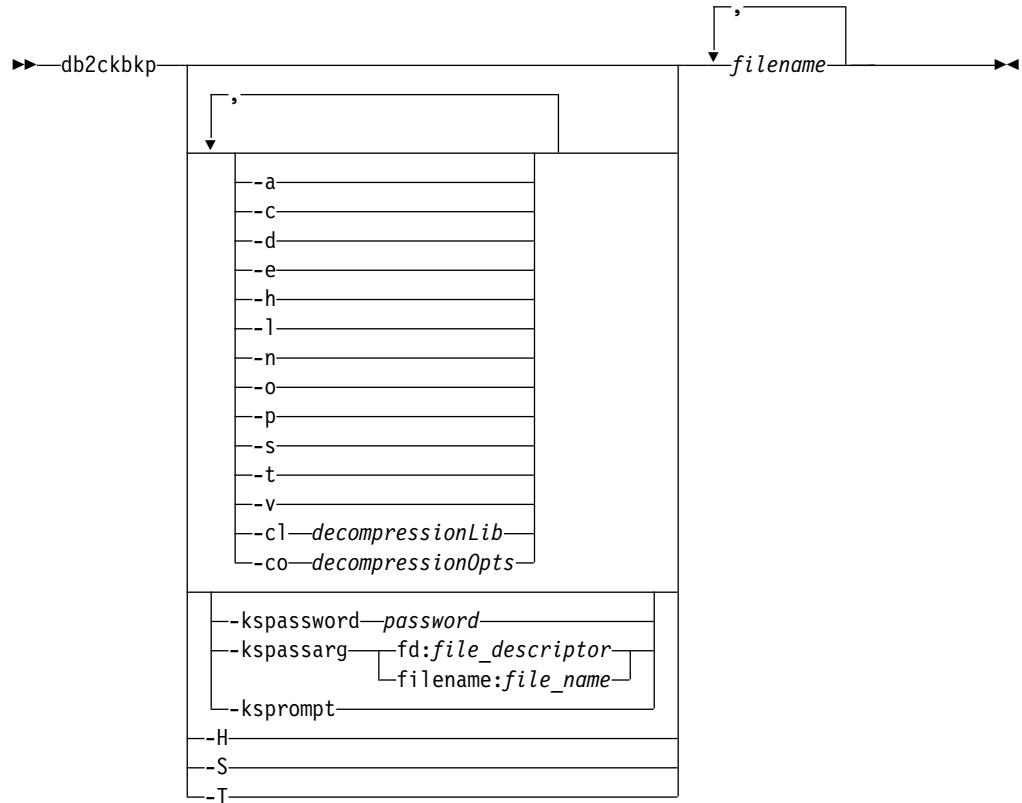
## Authorization

Anyone can access the utility, but users must have read permissions on image backups in order to execute this utility against them.

## Required connection

None

## Command syntax



## Command parameters

- a** Displays all available information.
- c** Displays results of checkbits and checksums.
- d** Displays information from the headers of DMS table space data pages.
- e** Extracts pages from an image to a file. To extract pages, you will need an input and an output file. The default input file is called `extractPage.in`. You can override the default input file name by setting the `DB2LISTFILE` environment variable to a full path. The format of the input file is as follows:

For SMS table spaces:

```
S <tbspID> <objID> <objType> <startPage> <numPages>
```

**Note:**

1. `<startPage>` is an object page number that is object-relative.

For DMS table spaces:

```
D <tbspID> <objType> <startPage> <numPages>
```

**Note:**

1. <objType> is only needed if verifying DMS load copy images.
2. <startPage> is an object page number that is pool-relative.

For log files:

```
L <log num> <startPos> <numPages>
```

For other data (for example, initial data):

```
0 <objType> <startPos> <numBytes>
```

The default output file is `extractPage.out`. You can override the default output file name by setting the `DB2EXTRACTFILE` environment variable to a full path.

- h** Displays media header information including the name and path of the image expected by the restore utility.
- l** Displays log file header (LFH) and mirror log file header (MFH) data.
- n** Prompt for tape mount. Assume one tape per device.
- o** Displays detailed information from the object headers.
- p** Displays the number of pages of each object type. This option will not show the number of pages for all different object types if the backup was done for DMS table spaces data. It only shows the total of all pages as `SQLUDMSTABLESPACEDATA`. The object types for `SQLUDMSLOBDATA` and `SQLUDMSLONGDATA` will be zero for DMS table spaces.
- s** Displays the automatic storage paths in the image.
- t** Displays table space details, including container information, for the table spaces in the image.
- v** Performs additional DMS and AS tablespace page validation. This option is not implied or enabled by the **-a** (all) option.

#### **-cl** *decompressionLib*

Indicates the name of the library to be used to perform the decompression. The name must be a fully qualified path referring to a file on the server. If this parameter is not specified, Db2 will attempt to use the library stored in the image. If the backup was not compressed, the value of this parameter will be ignored. If the specified library cannot be loaded, the operation will fail.

#### **-co** *decompressionOpts*

Describes a block of binary data that will be passed to the initialization routine in the decompression library. Db2 will pass this string directly from the client to the server, so any issues of byte reversal or code page conversion will have to be handled by the decompression library. If the first character of the data block is '@', the remainder of the data will be interpreted by Db2 as the name of a file residing on the server. Db2 will then replace the contents of *string* with the contents of this file and will pass this new value to the initialization routine instead. The maximum length for *string* is 1024 bytes.

#### **-kspassword** *password*

Specifies the password to use when opening the keystore.

#### **-kspassarg** *fd:file\_descriptor* | *filename:file\_name*

Specifies the keystore password arguments. The *file\_descriptor* parameter specifies a file descriptor that identifies an open and readable file or pipe

that contains the password to use. The *file\_name* parameter specifies the name of the file that contains the password to use.

**-ksprompt**

Specifies that the user is to be prompted for a password.

- H** Displays the same information as **-h** but only reads the 4K media header information from the beginning of the image. It does not validate the image. This option cannot be used in combination with any other options.
- S** Displays the same information as **-s** but does not validate the image. This option cannot be used in combination with any other options.
- T** Displays the same information as **-t** but does not validate the image. This option cannot be used in combination with any other options.

*filename*

The name of the backup image file. One or more files can be checked at a time.

**Note:**

1. If the complete backup consists of multiple objects, the validation will only succeed if **db2ckbkp** is used to validate all of the objects at the same time.
2. When checking multiple parts of an image, the first backup image object (.001) must be specified first.

## Examples

### Example 1 (on UNIX operating systems)

```
db2ckbkp SAMPLE.0.krodger.DBPART000.19990817150714.001
 SAMPLE.0.krodger.DBPART000.19990817150714.002
 SAMPLE.0.krodger.DBPART000.19990817150714.003

[1] Buffers processed: ##
[2] Buffers processed: ##
[3] Buffers processed: ##
Image Verification Complete - successful.
```

**Note:** Using "CATN####" is only applicable to previous versions that used this form of naming convention.

### Example 2

```
=====
MEDIA HEADER REACHED:
=====
 Server Database Name -- SAMPLE2
 Server Database Alias -- SAMPLE2
 Client Database Alias -- SAMPLE2
 Timestamp -- 19990818122909
 Database Partition Number -- 0
 Instance -- krodger
 Sequence Number -- 1
 Release ID -- 900
 Database Seed -- 65E0B395
 DB Comment's Codepage (Volume) -- 0
 DB Comment (Volume) --
 DB Comment's Codepage (System) -- 0
 DB Comment (System) --
 Authentication Value -- 255
```

Backup Mode	-- 0
Include Logs	-- 0
Compression	-- 0
Backup Type	-- 0
Backup Gran.	-- 0
Status Flags	-- 11
System Cats inc	-- 1
Catalog Database Partition No.	-- 0
DB Codeset	-- IS08859-1
DB Territory	--
LogID	-- 1074717952
LogPath	-- /home/krodger/krodger/NODE0000/SQL0001/LOGSTREAM0000
Backup Buffer Size	-- 4194304
Number of Sessions	-- 1
Platform	-- 0

The proper image file name would be:  
 SAMPLE2.0.krodger.NODE0000.CATN0000.19990818122909.001

[1] Buffers processed: #####  
 Image Verification Complete - successful.

**Note:** Using "CATN#####" is only applicable to previous versions that used this form of naming convention.

Example 3: The following example is sample output that is displayed from a backup image of 3 members in a Db2 pureScale environment.

BufAddr	MemberNum	PoolID	Token	Type	Offset	FileSize	...
-----	-----	-----	-----	-----	-----	---	...
00000000:	0	0	0	19	0	268	...

Output (continued):

...	ObjectSize	OrigSize	Object	Name
...	-----	-----	-----	-----
...	268	0	"BACKUP.START.RECORD.MARKER"	

numTbpspsInDB : 3  
 numTbpspsInImg : 3

Total members : 3  
 Member numbers: 0,1,2

## Usage notes

1. If a backup image was created using multiple sessions, **db2ckbkp** can examine all of the files at the same time. Users are responsible for ensuring that the session with sequence number 001 is the first file specified.
2. This utility can also verify backup images that are stored on tape (except images that were created with a variable block size). This is done by preparing the tape as for a restore operation, and then invoking the utility, specifying the tape device name. For example, on Linux and UNIX operating systems:

`db2ckbkp -h /dev/rmt0`

and on Windows:

`db2ckbkp -d \\.\tape1`

3. If the image is on a tape device, specify the tape device path. You will be prompted to ensure it is mounted, unless option **-n** is given. If there are multiple tapes, the first tape must be mounted on the first device path given. (That is the tape with sequence 001 in the header).

The default when a tape device is detected is to prompt the user to mount the tape. The user has the choice on the prompt. Here is the prompt and options: (where the device I specified is on device path /dev/rmt0)

```
Please mount the source media on device /dev/rmt0.
Continue(c), terminate only this device(d), or abort this tool(t)?
(c/d/t)
```

The user will be prompted for each device specified, and when the device reaches the end of tape.

## db2ckgpfs - Display the name, version information, and status of the GPFS cluster

Displays information regarding the IBM General Parallel File System (GPFS) cluster.

You can display information regarding the GPFS cluster using the **db2ckgpfs** command.

This command can be found in the *DB2DIR/install/gpfs* directory (where *DB2DIR* represents the location where the Db2 copy is installed.)

### Command syntax

```
►—db2ckgpfs [-d] [-l logFile] [-v install | media] [-s install | media] [-c -n cluster-name] [-h] [-?] —►
```

### Command parameters

**-d** Turns debug mode on.

**-l *logFile***  
Writes the log to the file name specified.

**-v *install | media***  
Displays the GPFS version already installed on the system, or, the GPFS version on the installation media.

- 0 - Success
- 7 - GPFS is not installed on the system
- 8 - GPFS is not on the media

**-s *install | media***  
Prints the efix string of GPFS version.

**-c** Displays the name of the GPFS cluster (if it exists.) The cluster information is indicated by a return code value:

- 9 - No cluster
- 0 - Online cluster
- 10 - Cluster exists, but is not online

**-n *cluster-name***  
This parameter must be used with the -c parameter. Displays the status of a specific GPFS cluster. The cluster information is indicated by a return code value:

- 9 - No cluster

- 0 - Online cluster
- 10 - Cluster exists, but is not online

**-h | -?**

Displays the usage information.

## Example

To display the GPFS version level installed in your Db2 pureScale environment, use the following **db2ckgpfs** command:

```
db2ckgpfs -v install
```

To display the GPFS version level on the installation media, use the following **db2ckgpfs** command:

```
db2ckgpfs -v media
```

To display the status of a specific GPFS cluster, use the following **db2ckgpfs** command:

```
db2ckgpfs -c -n gpfs-cluster-name
```

The GPFS cluster name can be retrieved with the **db2cluster** command. For example:

```
db2cluster -cfs -list -domain
```

## db2cklog - Check archive log file validity

You use the **db2cklog** command to check the validity of archive log files in order to determine whether or not the log files can be used during rollforward recovery of a database or table space. Either a single archive log file or a range of archive log files can be checked.

Archive log files that pass validation by the **db2cklog** command without any DBT error messages or warnings can be used during a rollforward recovery operation. If an archive log file fails validation with an error message or if a warning is returned, then you must not use that log file during rollforward recovery. A log file that returns an error during validation by the **db2cklog** command will cause the recovery operation to fail. If the validation of a log file returns a warning, then that log file might be invalid, unless the log file is still active. Only log files that are closed, such as archive log files, can be validated successfully.

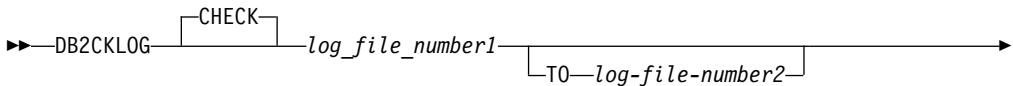
## Authorization

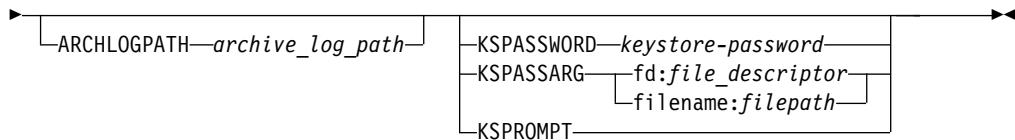
Anyone can run the command, but you must have read permission on the archive log files.

## Required connection

None

## Command syntax





## Command parameters

### CHECK

Validates the archive log file or the range of archive log files by performing checks on the internal validity of the files. This is the default action.

### *log\_file\_number1*

Specifies the numeric identifier of the log file to validate. For example, the numeric identifier of the S0000001.LOG log file is 1. If the TO *log\_file\_number2* parameter is also specified, then *log\_file\_number1* represents the first numeric identifier in a range of log files to check.

### TO *log\_file\_number2*

Specifies that a range of numbered log files is to be validated (ranging from *log\_file\_number1* to *log\_file\_number2*). If *log\_file\_number2* is numbered lower than *log\_file\_number1*, then only *log\_file\_number1* is checked.

### ARCHLOGPATH *archive\_log\_path*

Specifies a relative or an absolute path where the archive log files are stored. The default path is the current directory.

### KSPASSWORD *keystore-password*

Specifies the password to use when opening the keystore.

### KSPASSARG *fd:file\_descriptor* | *filename:filepath*

Specifies the keystore password arguments. The *file\_descriptor* parameter specifies a file descriptor that identifies an open and readable file or pipe that contains the password to use. The *filepath* parameter specifies the path of the file that contains the password to use.

### KSPROMPT

Specifies that the user is to be prompted for a password.

## Example

The following example shows the successful validation of the archive log file S0000003.LOG in the path tests (output is abridged). This file can be used during rollforward recovery.

```
$ db2cklog CHECK 3 ARCHLOGPATH tests
```

---

D B 2 C K L O G

Db2 Check Log File tool

...

"db2cklog": Finished processing log file "S0000003.LOG". Return code: "0".

The following example shows the successful validation of a range of archive log files (S0000003.LOG to S0000005.LOG; output is abridged). Successful validation of each file is indicated in the output. These files can be used during rollforward recovery.

```
$ db2cklog 3 TO 5
```

---

```
----- D B 2 C K L O G -----
Db2 Check Log File tool
...
"db2cklog": Finished processing log file "S0000003.LOG". Return code: "0".
...
"db2cklog": Finished processing log file "S0000004.LOG". Return code: "0".
...
"db2cklog": Finished processing log file "S0000005.LOG". Return code: "0".
```

The following example shows how the first log file in a range of archive log files returns an error and fails validation (output is abridged). Once an error is encountered, a DBT error message is returned, and the **db2cklog** command exits without processing further log files. This log file should not be used for rollforward recovery, because it will cause the recovery operation to fail.

```
$ db2cklog 0 TO 1
```

---

```
----- D B 2 C K L O G -----
Db2 Check Log File tool
...
DBT7053E Log file validation failed because the specified log file contains
an invalid log page followed by another invalid log page.
DBT7048E The db2cklog utility determined that the current log file
is invalid.
"db2cklog": Finished processing log file "S0000000.LOG".
Return code: "-2000".
```

The following example shows how validating an encrypted log file without a keystore password returns an error and fails validation (output is abridged). Once an error is encountered, a DBT error message is returned, and the **db2cklog** command exits without processing further log files. Use one of the keystore password options to specify the password and retry validation.

```
$ db2cklog 0 TO 1
```

---

```
----- D B 2 C K L O G -----
Db2 Check Log File tool
...
...
```

```
DBT7079E The db2cklog command failed because of an internal error.
Failed to get cipher ticket from header dek for log file "S0000000.LOG"!
Reason code: -2141452064, sqlcode: -1728.
```

The following example shows the successful validation of encrypted log file (S0000000.LOG; output is abridged) with the KSPASSWORD option. The keystore password is Str0ngPassw0rd. Successful validation is indicated in the output. This file can be used during rollforward recovery.

```
$ db2cklog 0 KSPASSWORD Str0ngPassw0rd
```

---

```

D B 2 C K L O G

Db2 Check Log File tool
...
"db2cklog": Finished processing log file "S0000000.LOG". Return code: "0".
```

### Usage notes

The **db2cklog** utility can be used to determine what Db2 version a recovery log file is from. If the recovery log file is not from the current version then a DBT warning message will be returned.

## db2ckrst - Check incremental restore image sequence

Queries the database history and generates a list of timestamps for the backup images that are required for an incremental restore. A simplified restore syntax for a manual incremental restore is also generated.

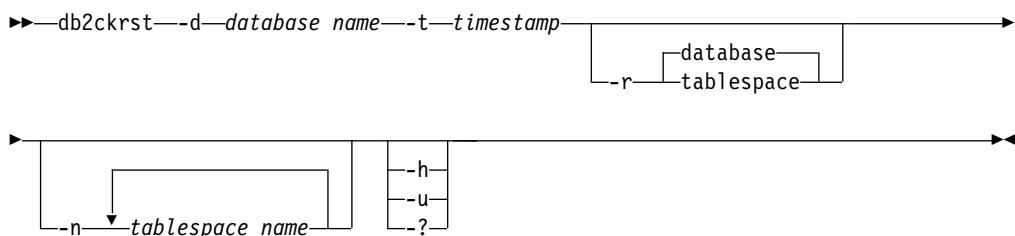
### Authorization

None

### Required connection

None

### Command syntax



### Command parameters

#### -d *database name*

Specifies the alias name for the database that will be restored.

#### -t *timestamp*

Specifies the timestamp for a backup image that will be incrementally restored.

- r Specifies the type of restore that will be executed. The default is database. If tablespace is chosen and no table space names are given, the utility looks into the history entry of the specified image and uses the table space names listed to do the restore.
- n *tablespace name*  
Specifies the name of one or more table spaces that will be restored. If a database restore type is selected and a list of table space names is specified, the utility will continue as a table space restore using the table space names given.
- h | -u | -?  
Displays help information. When this option is specified, all other options are ignored, and only the help information is displayed.

## Examples

```

db2ckrst -d mr -t 20001015193455 -r database
db2ckrst -d mr -t 20001015193455 -r tablespace
db2ckrst -d mr -t 20001015193455 -r tablespace -n tbsp1 tbsp2

> db2 backup db mr

Backup successful. The timestamp for this backup image is : 20001016001426

> db2 backup db mr incremental

Backup successful. The timestamp for this backup image is : 20001016001445

> db2ckrst -d mr -t 20001016001445

Suggested restore order of images using timestamp 20001016001445 for
database mr.
=====
db2 restore db mr incremental taken at 20001016001445
db2 restore db mr incremental taken at 20001016001426
db2 restore db mr incremental taken at 20001016001445
=====

> db2ckrst -d mr -t 20001016001445 -r tablespace -n userspace1
Suggested restore order of images using timestamp 20001016001445 for
database mr.
=====
db2 restore db mr tablespace (USERSPACE1) incremental taken at
20001016001445
db2 restore db mr tablespace (USERSPACE1) incremental taken at
20001016001426
db2 restore db mr tablespace (USERSPACE1) incremental taken at
20001016001445
=====
```

## Usage notes

The **db2ckrst** utility will not be enhanced for the rebuilding of a database. Due to the constraints of the history file, the utility will not be able to supply the correct list if several table spaces need to be restored from more than one image.

The database history must exist in order for this utility to be used. If the database history does not exist, specify the **HISTORY FILE** option in the **RESTORE** command before using this utility.

If the **FORCE** option of the **PRUNE HISTORY** command is used, you can delete entries that are required for automatic incremental restoration of databases. Manual restores will still work correctly. Use of this command can also prevent the

**db2ckrst** utility from being able to correctly analyze the complete chain of required backup images. The default operation of the **PRUNE HISTORY** command prevents required entries from being deleted. It is recommended that you do not use the **FORCE** option of the **PRUNE HISTORY** command.

This utility should not be used as a replacement for keeping records of your backups.

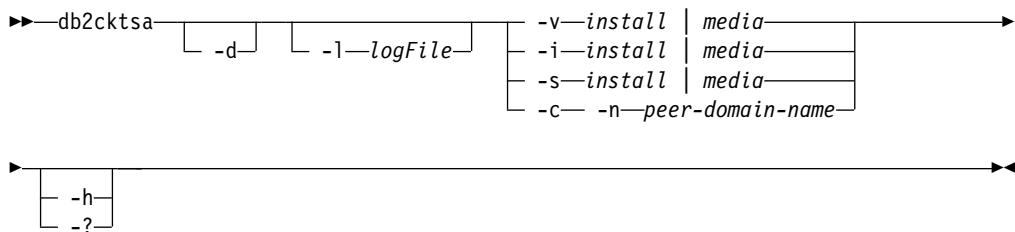
## **db2cktsa - Display version, license type, and status of Tivoli SA MP and the RSCT peer domain**

Displays information regarding the IBM Tivoli System Automation for Multiplatforms (Tivoli SA MP) and IBM Reliable Scalable Cluster Technology (RSCT) peer domain.

You can display information regarding Tivoli SA MP and the RSCT peer domain using the **db2cktsa** command.

This command can be found in the DB2DIR/install/tsamp directory (where DB2DIR represents the location where the Db2 copy is installed.)

### **Command syntax**



### **Command parameters**

**-d** Turns debug mode on.

**-l logfile** Writes the log to the file name specified.

**-v install | media**

Displays the Tivoli SA MP version already installed, or the Tivoli SA MP version on the installation media.

- 0 - Success
- 7 - Tivoli SA MP is not installed on the system
- 8 - Tivoli SA MP is not on the media

**-i install | media**

Displays the Tivoli SA MP license type already installed on the system, or, the Tivoli SA MP license type on the installation media. The license information is indicated by a return code value:

- 0 - No license or Tivoli SA MP is not installed
- 13 - Try & Buy license
- 14 - Permanent license

**-s install | media**

Displays the RSCT version that is already installed, or the RSCT peer domain version on the installation media.

- c** Displays either the online RSCT peer domain or the offline peer domain (if it exists.) The peer domain information is indicated by a return code value:
  - 0 - No peer domain
  - 1 - Online peer domain
  - 2 - Peer domain exists, but is not online
- n *peer-domain-name***  
This parameter must be used with the **-c** parameter. Displays the status of a specific RSCT peer domain. The peer domain information is indicated by a return code value:
  - 0 - No peer domain
  - 1 - Online peer domain
  - 2 - Peer domain exists, but is not online
- h | -?**  
Displays the usage information.

## Example

To display the Tivoli SA MP version level already installed on your system, use the following **db2cktsa** command:

```
db2cktsa -v install
```

To display the Tivoli SA MP version level on the installation media, use the following **db2cktsa** command:

```
db2cktsa -v media
```

To display the RSCT version level already installed on your system, use the following **db2cktsa** command:

```
db2cktsa -s install
```

To display the RSCT version level on the installation media, use the following **db2cktsa** command:

```
db2cktsa -s media
```

To display the status of a specific RSCT peer domain, use the following **db2cktsa** command:

```
db2cktsa -c -n db2domain
```

**Note:** To display the domain name, use the following command:

```
db2cluster -cm -list -domain
```

## db2ckupgrade - Check database for upgrade

Verifies that a database can be upgraded.

### Scope

In a partitioned database environment, the **db2ckupgrade** command checks each database partition.

### Authorization

SYSADM

## Required connection

None

## Command syntax

```
►►—db2ckupgrade—database—[—e—] [—allChecks—] [—resetUpgradePending—]
►—l—filename—[—u—userid—p—password—]►►
```

## Command parameters

### *database*

Specifies an alias name of a local database to be scanned.

### **-e**

Specifies that all local cataloged databases are to be scanned.

### **-allChecks**

Specifies that all the checks are to be run. This requires exclusive database connection.

### **-resetUpgradePending**

Specifies that upgrade pending state to be reset.

### **-l *filename***

Specifies a log file to keep a list of errors and warnings generated for the scanned database.

### **-u *userid***

Specifies the user ID of the system administrator.

### **-p *password***

Specifies the password of the system administrator's user ID.

## Usage notes

To run the **db2ckupgrade** command:

- On Linux and UNIX operating systems, install a new Db2 copy to which you want to upgrade. Then run the **db2ckupgrade** command from the *DB2DIR/bin* directory, where *DB2DIR* is the location where the Db2 copy is installed.
- On Windows operating systems, insert the Db2 database product CD to which you want to upgrade. Then run the **db2ckupgrade** command from the *db2\Windows\Utilities* directory on the CD.
- The **db2ckupgrade** command checks the following two types of database concepts:
  - Data compatibility - Ensures that data tables and similar objects are compatible for upgrade. These checks can be done under a shared or exclusive database connection.
  - Data consistency - Ensures that the database is consistent, including for HADR databases supporting upgrade that the primary and standby log positions are valid. These checks can be done only under an exclusive database connection.
- When **db2ckupgrade** command is called internally by the **db2iupgrade** command, an exclusive database connection is attained. Under this mode, the utility executes all data compatibility and data consistency checks. If all these checks

pass and the database is ready to be upgraded, the database is put into upgrade pending state. No database connections are allowed while the database is in upgrade pending state. This is to prevent further workload from running on the database that might invalidate the checks made by the **db2ckupgrade** command. This is done to ensure that the **UPGRADE DATABASE** command issued later on succeeds. If for any reason you are not upgrading your database until a later time and if you want the database connections to resume, you can reset the upgrade pending state by issuing **db2ckupgrade** with the **-resetUpgradePending** parameter.

- When **db2ckupgrade** command is called manually, the utility attempts to attain an exclusive database connection. However, if this connection mode cannot be established, the utility will fallback to attempt a shared connection to the database. The connection mode attained by the utility determines the type of checking that is done on the database. If you want to perform all checks on the database, specify the **-allChecks** parameter. This enforces that an exclusive connection to the database is attained and all data compatibility and data consistency checks are executed. But, when the utility is run manually, the upgrade pending state is not turned on.

The **db2ckupgrade** command fails to run against databases which are catalogued as remote databases.

This command verifies that all the following conditions are true:

- A catalogued database actually exists.
- A database is not in an inconsistent state.
- A database is not in a backup pending state.
- A database is not in a restore pending state.
- A database is not in rollforward pending state.
- Tables are not in a load pending state.
- Tables are not in a redistribute pending state.
- For Version 9.8 or later, that all table space container paths use the same mount point.
- For Version 9.8 Fix Pack 3 or later, that the I/O write operations for the database are not suspended or are not being suspended.
- That there are no MQTs that depend on system views.
- Table spaces are in a normal state.
- A database does not contain user-defined types (UDTs) with the name ARRAY, BINARY, CURSOR, DECFLOAT, ROW, VARBINARY, or XML.
- A database does not contain the built-in DATALINK data type.
- A database does not have a schema with the name SYSPUBLIC.
- A database does not have orphan rows in system catalog tables that would cause database upgrade to fail.
- A database that is enabled as an HADR primary database allows successful connections.
- For Version 9.7 (all Fix Packs), Version 10.1 (all Fix Packs) and Version 10.5 Fix Pack 6 or earlier, an HADR database role is not standby.
- If SYSCATSPACE is a DMS table space and AUTORESIZE is not enabled, SYSCATSPACE has at least 50% free pages of total pages.
- A database is not enabled for XML Extender.
- A database is not using raw logs.

A local database must pass all of these checks to succeed at the upgrade process. The **db2iupgrade** command calls the **db2ckupgrade** command and specifies update.log as the log file for **db2ckupgrade**. The default log file created for **db2iupgrade** is /tmp/db2ckupgrade.log.processID. The **db2iupgrade** fails if the **db2ckupgrade** command finds that any of the previously listed conditions are not true, and returns the DBI1205E error code. The user needs to resolve these errors before upgrading the instance.

The **db2ckupgrade** command writes a warning message to the log file, as specified with the **-l** parameter, for any of the following conditions:

- Column names, routine parameter names, or variable names are called NULL.
- Workload connection attributes contain asterisks (\*).
- Database is enabled for Db2 WebSphere® MQ functions.

For an HADR database, the **db2ckupgrade** command called by the **db2iupgrade** command and **db2ckupgrade** with the **-allChecks** option performs the following actions:

- For HADR environments that support upgrade without the need for standby reinitialization (single partition ESE Db2 Version 10.5 Fix Pack 7 or later databases or refer to the FAQ technote "<http://www-01.ibm.com/support/docview.wss?uid=swg21298716>" for pureScale supported 10.5 Fix Packs).
  - Primary database
    - The **db2ckupgrade** command tool verifies that successful connections are allowed and validates that the primary's log shipping position matches the standby's log replay position.
  - Standby database
    - The tool skips database verification and returns success if it detects an HADR standby database.
- For HADR environments that do not support upgrade without the need for standby reinitialization (Db2 Version 9.7 (all Fix Packs), Version 10.1 (all Fix Packs) or single partition ESE databases Version 10.5 Fix Pack 6 or earlier or refer to the FAQ technote "<http://www-01.ibm.com/support/docview.wss?uid=swg21298716>" for pureScale supported 10.5 Fix Packs).
  - Primary database
    - The **db2ckupgrade** command issues **STOP HADR** to turn the database role to standard. This action requires the HADR pair to be re-initialized post-upgrade. To initialize the HADR pair, see [Initializing high availability disaster recovery \(HADR\)](#)
  - Standby database
    - The **db2ckupgrade** command fails if it detects an HADR standby database.

**Note:** An important part of the HADR upgrade procedure is the **db2ckupgrade** command validating the log positions of the primary database and all standby databases cataloged in the instances. This applies to both single standby and multiple standby configurations. For the **UPGRADE DATABASE** command to be successful, it is highly recommended to run **db2ckupgrade** command for validating the log positions.

During installation on Windows operating systems, if you select a Db2 copy with the **upgrade** action in the **Work with Existing** window and you have local databases cataloged on your instances, a message box will warn you that you must run the **db2ckupgrade** command from the Db2 database product CD. Then you can choose one of the following actions:

- Ignore the message and continue the installation process.
- Run the **db2ckupgrade** command. If this command runs successfully, continue the installation process. If you find errors, quit the installation process, fix any errors, and then rerun the installation process.
- Quit the installation process.

To verify that a database is ready for upgrade, refer to “Verifying that your databases are ready for upgrade” in *Upgrading to Db2 Version 10.5*.

## **db2cli - Db2 interactive CLI**

Starts the interactive call level interface (CLI) environment for design and prototyping in CLI.

### **Authorization**

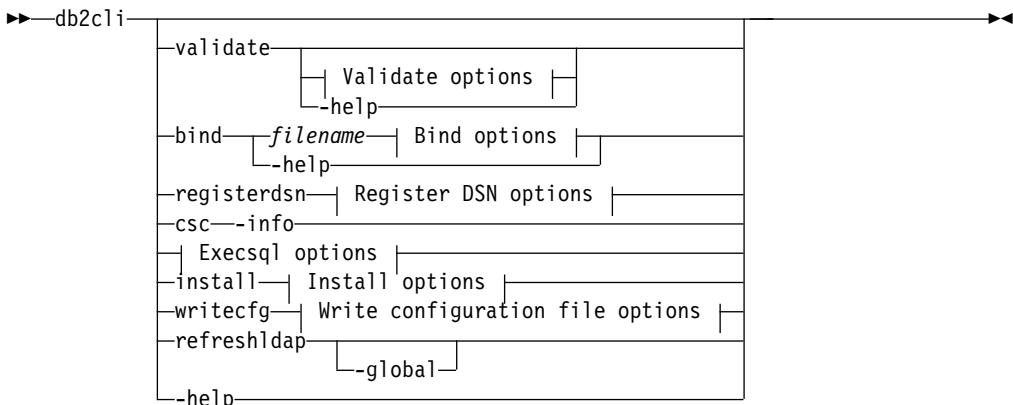
The **db2cli** command is located in the **bin** subdirectory of the directory where you installed IBM data server product. On UNIX and Linux operating systems, the **db2cli** command is located in the *home\_dir/sql1lib/bin* directory, where *home\_dir* is the home directory of the instance owner. On Windows operating systems, the command is located in the *DB2PATH\bin* directory, where *DB2PATH* is the installation location of the Db2 copy.

None

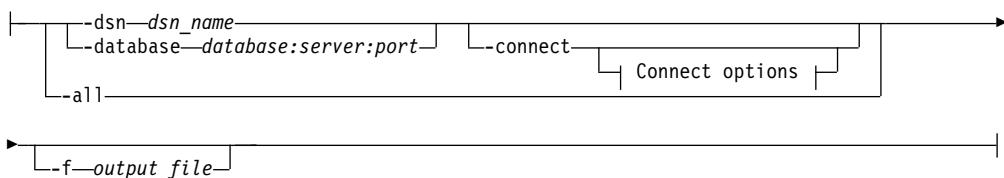
### **Required connection**

None

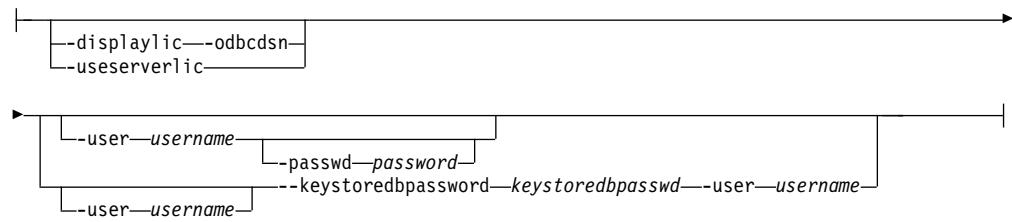
### **Command syntax**



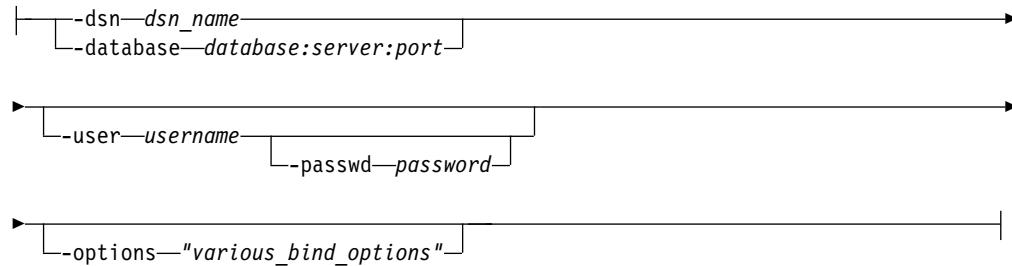
#### **Validate options:**



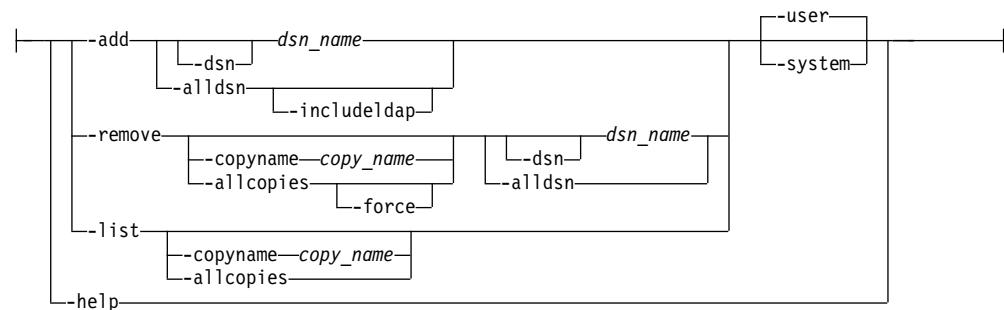
### Connect options:



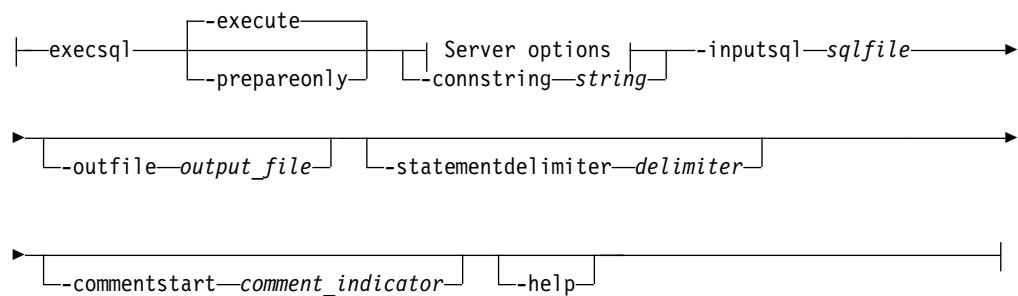
### Bind options:



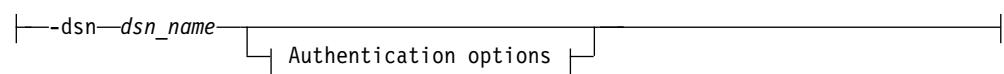
### Register DSN options:



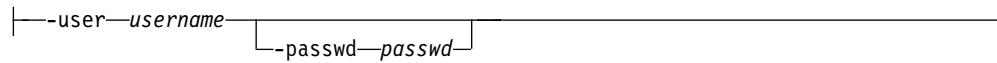
### Execsql options:



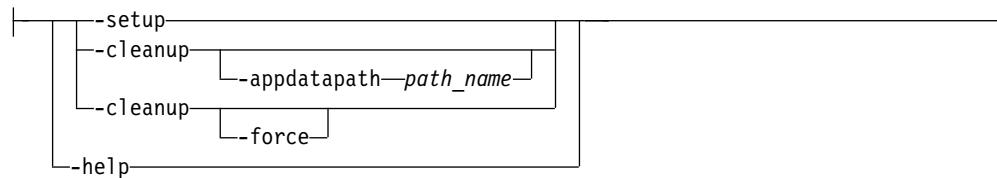
### Server options:



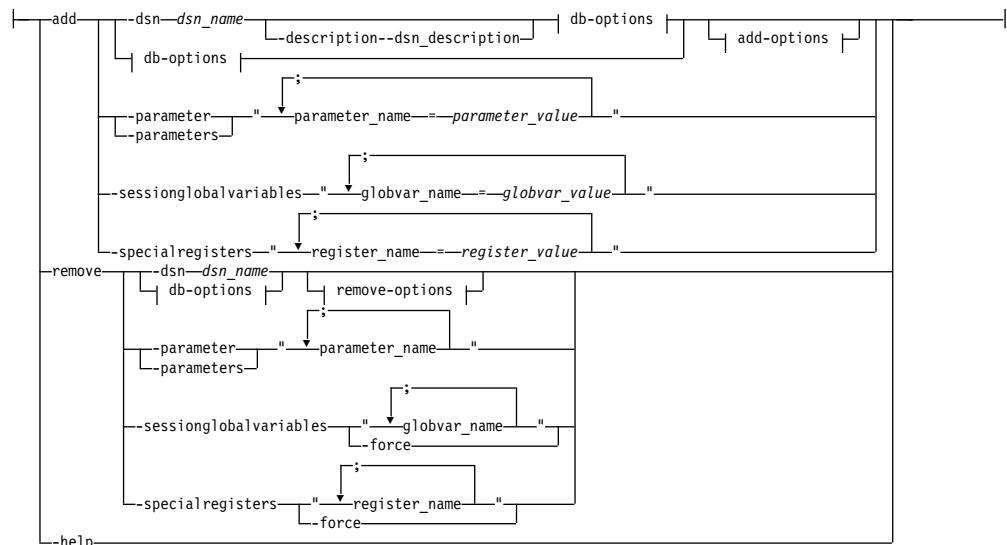
### **Authentication options:**



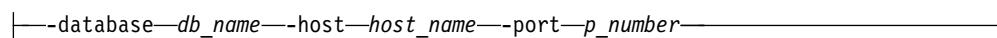
### **Install options (available only on Windows):**



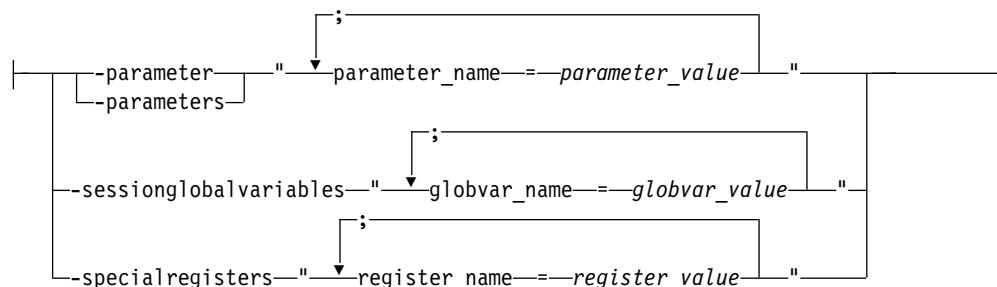
### **Write configuration file options:**



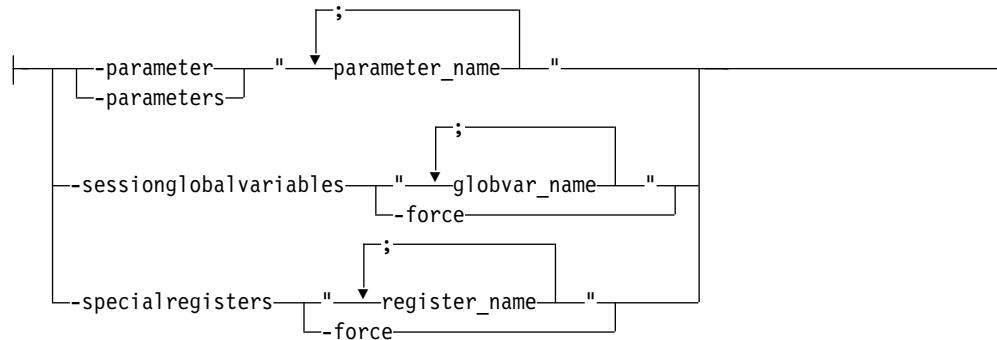
### **db-options:**



### **add-options:**



### **remove-options:**



## **Command parameters**

### **validate**

Validates and tests the CLI environment configuration. This option shows a list of keywords that are found in the `db2cli.ini` and `db2dsdriver.cfg` files. If any keywords are invalid for the specified data source or database name, they are listed as UNKNOWN. IBM data server clients (the IBM Data Server Client or the IBM Data Server Runtime Client), the **db2cli validate** command lists the installed Db2 client packages on a Windows operating system.

When you issue the **db2cli validate** command from the IBM data server clients, the list is limited to the IBM data server clients that are installed on the Windows operating system. To list IBM Data Server Driver for ODBC and CLI packages and the IBM data server client packages that are installed on a Windows operating system, you must issue the **db2cli validate** command from the IBM Data Server Driver for ODBC and CLI installation. The list indicates the current copy name as [C] and the default copy name as [D].

#### **-dsn dsn\_name**

Specifies the data source name (DSN) to validate. If `dsn_name` has white space in the middle, surround it with double quotation marks.

#### **-database database:server:port**

Specifies the database name, server name, and port number to validate. You must use a colon to separate the database name, server name, and port number. The server name must consist of a fully qualified domain name (FQDN), for example, `TESTDB:dbserver.example.com:19677`.

#### **-all**

Validates every database and DSN entries present in the `db2dsdriver.cfg` file.

#### **-connect**

The **db2cli validate** command connects and writes information about the connection attempt to the command output.

**Restriction:** If a connection is made to a gateway that is at a lower version than the client version, new features that are supported with a corresponding client-server combination might not be available.

**-f *OUTPUT\_FILE***

Specifies an optional output file for the results of the **db2cli** command.

**-help** Shows the help information that is related to the usage of the **validate** parameter.**Connect**

Specifies the DSN or database to which the **db2cli validate** command can test a connection. The information about the connection attempt and license information is listed in the command output.

**-displaylic**

Displays the presence of a valid license and where the license is located. The license can be present on the client, server, or both. For the license that is located on Db2 for IBM i or Db2 for z/OS server, the command output contains information about whether the user-defined function (UDF) or the stored procedure (SP) is used for the licensing and the license version.

**-odbcdsn**

Enables the user to validate database connectivity with the ODBC driver manager.

**-useserverlic**

Tests the license that is located on Db2 for IBM i or Db2 for z/OS server by calling the user-defined function (UDF) or the stored procedure (SP) that is used for the licensing. The **-useserverlic** option bypasses the client-side license check. Displays the license version and whether the user-defined function (UDF) or the stored procedure (SP) is used for the licensing.

**Remember:** You can use the **-useserverlic** option only with a connection to Db2 for IBM i or Db2 for z/OS server.

**-user *username***

Specifies the user name to use for the connection.

**-passwd *password***

Specifies the password to use for the connection.

**-keystoredbpassword *keystoredbpasswd***

Specifies the password for the SSL connection when the **Authentication** parameter is set to **CERTIFICATE**.

**bind**

Binds the specified *filename* against the target database. The **db2cli bind** command first connects to the target database with the information provided in the **db2cli bind** command parameters then performs the bind action. Bind files have the extension .bnd.

***filename***

The *filename* can be a name of bind file or list file that contains the name of several bind files. If a list file is specified, the @ character must be prefixed to the list file name. The fully qualified bind file name can be specified within a double quotation mark.

When just the bind file name without any path is specified, the file would be first searched for in the current directory. If the file is found, it would be picked up and the package would be created. If

the file is not found in the current directory, then the file would be automatically picked up from the instance or install path.

**-dsn *dsn\_name***

Specifies the data source name (DSN) you bind to. When using this bind option, all information except for a valid user ID and password required to connect to the target database must be present in:

- The data source name section in the db2cli.ini file.
- The database section or the DSN section in the db2dsdriver.cfg file.
- The local catalog entry.

**-database *database:server:port***

Specifies the database name, server name, and port number you bind to. You must use a colon to separate the database name, server name, and port number. The server name must consist of a fully qualified domain name (FQDN), for example, TESTDB:dbserver.example.com:19677.

**-user *username***

Specifies the user name to use for the connection.

**-passwd *password***

Specifies the password to use for the connection.

**-options "various\_bind\_options"**

Specifies the bind options and their values. The following bind options are available:

- BLOCKING
- COLLECTION
- ENCODING
- GENERIC
- GRANT
- GRANT\_ROLE
- ISOLATION
- KEEPDYNAMIC
- REOPT

**-help** Shows the help information that is related to the usage of the **bind** parameter.

## registerdsn

Specifies the **db2cli** register DSN mode. Use this command parameter to register a DSN in the Windows operating system.

**-add *dsn\_name* | -alldsn**

Adds system or user ODBC data sources to the Microsoft ODBC Data Source Administrator. The **description** will be added into registry only if the **description** value is present for that DSN in the db2dsdriver.cfg file or in the db2cli.ini file.

*dsn\_name*

Indicates the DSN to register. The value of *dsn\_name* must be the DSN that is defined in the db2cli.ini file or the DSN alias that is defined in db2dsdriver.cfg file and cannot be a DBALIAS name. The **-add *dsn-name*** parameter

adds data sources for cataloged databases that are available in the local database directory. The *dsn-name* can indicate a data source that is defined in the db2cli.ini or the DSN aliases that are defined in the db2dsdriver.cfg file, and a database alias in the local database directory in IBM Data Server clients. If the *dsn\_name* has white space in the middle, surround it with double quotation marks.

**-dsn** Enables the user to specify a DSN name that needs to be added to the Microsoft ODBC Data Source Administrator. The **db2cli registerdsn -add -dsn** command is available on Windows operating systems.

**-alldsn**

Registers all the data sources that are defined in the db2cli.ini file, the DSN aliases defined in the db2dsdriver.cfg file, and the local database catalog. You must use this parameter with the **-add** parameter.

**-includeldap**

Registers all the data sources that are specified in the LDAP server, the db2cli.ini file, the db2dsdriver.cfg file, and the local database catalog. Ensure that you can connect successfully to the LDAP server by configuring the LDAP section in the IBM data server driver configuration file or configuring the LDAP connection in your Windows environment.

**-user** Registers data sources as user ODBC data sources. If no parameter is specified, data sources are registered as user ODBC data sources.

**-system**

Registers data sources as system ODBC data sources.

**-remove dsn\_name**

Removes a system or user ODBC data source from the Microsoft ODBC Data Source Administrator. If the *dsn\_name* has white space in the middle, surround it with double quotation marks.

**-alldsn**

Removes all the user or system ODBC data source entries of a specified Db2 copy from the Microsoft ODBC Data Source Administrator. The **db2cli register -remove -alldsn** command is available on Windows operating systems.

**-copyname copy\_name**

Removes the user or system ODBC data source entries of a specified Db2 copy from the Microsoft ODBC Data Source Administrator. If you do not specify a copy name, the current copy name is used. The current copy name is the copy name of the client where the **db2cli** utility is from. If you specify the **-copyname** option with the **-alldsn** option, all data source entries in the Microsoft ODBC Data Source Administrator are removed from the specified Db2 copy. The **db2cli register -remove -copyname** command is available on Windows operating systems.

**-allcopies**

Removes all the user or system ODBC data source entries of all the Db2 copies from the Microsoft ODBC Data Source Administrator. Unless you also specify the **-force** option, you are prompted to confirm that you want to remove all ODBC data source entries. The **db2cli register -remove -allcopies** command is available on Windows operating systems.

**-force**

Removes all the user or system ODBC data source entries without prompting you for confirmation. You can use the **-force** option only with the **-allcopies** option. The **db2cli register -remove -allcopies -force** command is available on Windows operating systems.

**-dsn**

Specifies a DSN name to remove from the Microsoft ODBC Data Source Administrator. The **db2cli register -remove -dsn** command is available on Windows operating systems. The default option is **-user**, which removes a user DSN. You must specify the **-system** option to remove a system DSN.

**-list**

Lists all the system or user IBM Data Server ODBC data sources that are registered in the Microsoft ODBC Data Source Administrator.

**-copyname *copy\_name***

Lists the user or system ODBC data source entries of the specified Db2 copy in the Microsoft ODBC Data Source Administrator. If you do not specify the copy name, the current copy name is used. The current copy name is the copy name of the client where the **db2cli** utility is from. The **db2cli register -list -copyname** command is available on Windows operating systems.

**-allcopies**

Lists all the user or system ODBC data source entries of all the Db2 copies in the Microsoft ODBC Data Source Administrator. The **db2cli register -list -allcopies** command is available on Windows operating systems.

**-help**

Shows the help information that is related to the usage of the **registerdsn** parameter.

**Note:** To add, remove, or list 32-bit ODBC data source entries on 64-bit Windows machines, use **db2cli32** command.

**csc -info**

Displays connection supervisor client (CSC) information. A CSC is a dynamically loadable library that CLI uses for the purpose of end-to-end monitoring.

**-execsql**

Executes or prepares the SQL statements specified in an input file. Can also save output to a file.

**-execute**

Specifies that the SQL statements in the SQL script file are prepared and run. This is the default if no parameter is specified. Results are displayed in the console. To save the output to a file,

specify the option **-output** with the absolute or relative path of the file. SQL statements in the SQL script file cannot have parameter markers.

**-prepareonly**

Specifies that the SQL statements in the file specified by the **-inputSql** option are prepared but not run. Use this option to check the syntax of the SQL statements without running the statements.

**-commentstart *comment\_indicator***

Specifies the character combination that appear at the beginning of a line to indicate a comment line. The default value of *comment\_indicator* is two dashes (--). If a comment spans multiple lines, start each line with the *comment\_indicator* character combination. The maximum length of a comment line is 128 characters. In the input SQL file, the text after the comment characters can contain statement cursor attributes. The cursor attributes apply to the SQL statement immediately following the comment.

**-connstring *string***

Specifies the database name, server, and port number of the target database. The information must be specified in the format as defined by the **InConnectionString** argument in the **SQLDriverConnect** API function. For example:

```
DATABASE=SAMPLE;HOSTNAME=test.ibm.com;PORT=50000;UID=db2user;PWD=db2pwd
```

**-dsn *dsn\_name***

Specifies the data source name in the db2cli.ini file or the dsn alias defined in db2dsdriver.cfg file.. If the *dsn\_name* has white space in the middle, surround it with double quotation marks.

**-help** Displays summary usage information.

**-inputsql *sqlfile***

Specifies the input file that contains SQL statements. The value of *sqlfile* is the absolute or relative path of the file. The SQL statements in the file are separated by a delimiter. Only preparable statements are used. Db2 commands such as **DESCRIBE TABLE** and **BIND** are not allowed.

Only SQL statements and comments can be in the input SQL file. The file cannot contain CLI specific attributes or keywords. Batch SQL statements are not supported.

**-outfile *outputfile***

Specifies the absolute or relative path of the file to store the output results. When this option is not specified, the results are displayed in the console.

**-passwd *password***

Specifies the password to use for authenticating with the database.

**-statementdelimiter *delimiter***

Specifies the character combination that is used in the input SQL file to separate statements. The default value of delimiter is a carriage return.

**-user *username***

Specifies the user for authenticating with the database.

**install**

Registers or unregisters the IBM Data Server Driver for ODBC and CLI in the Windows registry.

**-setup** Registers the IBM Data Server Driver for ODBC and CLI under ODBC in the Windows registry. This parameter also creates configuration folders (cfg, cfgcache, db2dump) and sample configuration file in the default application data path.

**-appdatapath <path name>**

Creates configuration folders (cfg, cfgcache, db2dump) and sample configuration files in the path name.

**-cleanup**

Unregisters the current IBM Data Server Driver for ODBC and CLI from the Windows registry under ODBC. The cleanup then removes the folders, configuration sample files, and license management files that are created at the application data path for the current installation. Any user-created files or folders are not removed unless you specify the **-force** option.

**-force** When specified with the **-cleanup** option, the entire install-specific folder is removed from the application data path. This folder belongs to this installation only. Any user-created files or folders in this folder are removed without any prompt or warning.

**-help** Shows the help information that is related to the usage of the **install** parameter.

**writecfg add | remove**

Updates the db2dsdriver.cfg configuration file.

**add -dsn | -database | -parameter[s]**

Adds information about the DSN, database, or parameters to the db2dsdriver.cfg configuration file.

**-dsn *dsn\_name* [-description *dsn\_description*] -database *db\_name***  
**-host *host\_name* -port *port\_number***

Specifies the DSN alias name along with an optional description value. You can add or update the parameter elements, the session global variable parameter element, or the entire **-dsn** subsection for the DSN alias in the configuration file. If the *dsn\_name* has white space in the middle, surround it with double quotation marks. The **-dsn** *dsn\_name* option is mandatory for **-description** *dsn\_description*.

If the **-dsn** subsection with the *dsn\_name* as the DSN alias does not exist in the configuration file, a new **-dsn** subsection in the *dsncollection* section is added.

If a **-dsn** subsection with the *dsn\_name* as the DSN alias exists in the configuration file, the new parameters or session global variables information is appended to the existing **-dsn** subsection.

If a **-database** subsection with the same *db\_name* information exists in the db2dsdriver.cfg configuration file, the specified parameter element is appended to the **-database** subsection. Otherwise, the specified parameter elements or the session global variable parameter elements are added to a new **-database** subsection.

**-parameter[s] "par1=par1\_val[...;parN=parN\_val]"**

Specifies the parameter information to add or update parameter elements in the specified **-dsn** subsection of the db2dsdriver.cfg configuration file.

If you specify a new parameter element that is not found in the **-dsn** subsection of the db2dsdriver.cfg configuration file, a new parameter element is added to the **-dsn** subsection.

If the specified parameter element is already present in the configuration file, the existing parameter value in the <dsn> subsection is updated with the value that you specify with the **-parameter[s]** option.

Special characters, such as path separators in the value, must be preceded by the escape character "\".

The **db2cli writecfg** command does not verify the syntax or validate the value of the specified parameter.

**-sessionglobalvariables**

"*globvar\_name=globvar\_value[...;globvar\_nameN=globvarN\_value]*"

Specifies the session global variable information to add or update a parameter element for the specified DSN in the db2dsdriver.cfg configuration file.

If you specify a new session global variable parameter that is not found in the **-dsn** subsection of the db2dsdriver.cfg configuration file, a new session global variable parameter element is added to the **-dsn** subsection.

If the specified session global variable parameter element is already present in the configuration file, the session global variable value in the **-dsn** subsection is updated with the value that you specify with the **-sessionglobalvariables** option.

Special characters, such as path separators in the value, must be preceded by the escape character "\".

The **db2cli writecfg** command does not verify the syntax or validate the value of the specified session global variable parameter.

**-specialregisters**

"*register\_name=register\_value[...;register\_nameN=registerN\_value]*"

Specifies special register information that is used to add or update a parameter element for the specified DSN in the db2dsdriver.cfg configuration file.

If you specify a special register parameter that is not in the <dsn> subsection of the db2dsdriver.cfg configuration file, a new special register parameter element is added to that subsection. If the specified special register parameter element is already in the configuration file, the special register value in the **-dsn** subsection is updated with the value that you specify for the **-specialregisters** parameter.

You must precede any special characters in the special register value (*registerN\_value*) with the escape character “\”.

The **db2cli writecfg** command does not verify the syntax or validate the value of the specified special register parameter.

**-database db\_name -host host\_name -port port\_number**

Specifies the connection information for a <database> subsection. This information consists of the database name, the host name where the database is located, and the port number of the database server.

If a <database> subsection with the same *db\_name* information exists in the db2dsdriver.cfg configuration file, the specified parameter element is appended to the <database> subsection. Otherwise, the specified parameter elements or the session global variable parameter elements are added to a new <database> subsection.

**-parameter[s]**

*"parameter\_name1=par1\_val[;...;parN=parN\_val]"*

Specifies the parameter information to add or update a parameter element for the specified database name in the db2dsdriver.cfg configuration file.

If you specify a new parameter element that is not found in the <database> subsection of the db2dsdriver.cfg configuration file, a new parameter element is added to the <database> subsection.

If the specified parameter element is already present in the configuration file, the existing parameter value in the <database> subsection is updated with the value that you specify with the **-parameter[s]** option.

Special characters, such as path separators in the value, must be preceded by the escape character “\”.

The **db2cli writecfg** command does not verify the syntax or validate the value of the specified parameter.

**-sessionglobalvariables** *globvar\_string*

Where *globvar\_string* is in the following format:

"*globvar\_name*=*globvar\_value*[;...;*globvar\_nameN*=*globvarN\_value*]"

Specifies the session global variable information to add or update a parameter element for the specified database name in the db2dsdriver.cfg configuration file.

If you specify a new session global variable parameter that is not found in the <database> subsection of the db2dsdriver.cfg configuration file, a new session global variable parameter element is added to the <database> subsection.

If the specified session global variable parameter element is already present in the configuration file, the session global variable value in the <database> subsection is updated with the value that you specify with the **-sessionglobalvariables** option.

Special characters, such as path separators in the value, must be preceded by the escape character "\".

The **db2cli writecfg** command does not verify the syntax or validate the value of the specified session global variable parameter.

**-specialregisters**

"*register\_name*=*register\_value*[;...;*register\_nameN*=*registerN\_value*]"

Specifies special register information that is used to add or update a parameter element for the specified database name in the db2dsdriver.cfg configuration file.

If you specify a special register parameter that is not in the <database> subsection of the db2dsdriver.cfg configuration file, a special register parameter element is added to that subsection. If the specified special register parameter element is already in the configuration file, the special register value in the <database> subsection is updated with the value that you specify for the **-specialregisters** parameter.

You must precede any special characters in the special register value (*registerN\_value*) with the escape character "\".

The **db2cli writecfg** command does not verify the syntax or validate the value of the specified special register parameter.

**-parameter[s]** "*parameter\_name1*=*par1\_val*[;...;*parN*=*parN\_val*]"

Specifies the parameter information to add or update a parameter element for all databases and DSNs in the db2dsdriver.cfg configuration file.

To add a parameter to the global <parameters> section, specify the parameter information without indicating a database or a data source.

If you specify a new parameter element that is not found in the <parameters> subsection of the db2dsdriver.cfg configuration file, a new parameter element is added to the <parameters> subsection.

If the specified parameter element is already present in the configuration file, the existing parameter value in the <parameters> subsection is updated with the value that you specify with the **-parameter[s]** option.

Special characters, such as path separators in the value, must be preceded by the escape character “\”.

The **db2cli writecfg** command does not verify the syntax or validate the value of the specified parameter.

#### **-sessionglobalvariables** *globvar\_string*

Where *globvar\_string* is in the following format:

"*globvar\_name*=*globvar\_value*[;*globvar\_nameN*=*globvarN\_value*]"

Specifies the parameter information to add or update a parameter element for all databases or DSNs in the db2dsdriver.cfg configuration file.

If you specify a new session global variable parameter that is not found in the <parameters> subsection of the db2dsdriver.cfg configuration file, a new session global variable parameter element is added to the <parameters> subsection.

If the specified session global variable parameter element is already present in the configuration file, the session global variable value in the <parameters> subsection is updated with the value that you specify with the **-sessionglobalvariables** option.

Special characters, such as path separators in the value, must be preceded by the escape character “\”.

The **db2cli writecfg** command does not verify the syntax or validate the value of the specified parameter.

#### **-specialregisters** *register\_string*

Where *register\_string* is in the following format:

"*register\_name*=*register\_value*[;*register\_nameN*=*registerN\_value*]"

Specifies special register information that is used to add or update a parameter element for all databases in the db2dsdriver.cfg configuration file.

If you specify a special register parameter that is not in the <parameters> subsection of the db2dsdriver.cfg configuration file, a special register parameter element is added to the <parameters> subsection. If the specified special register parameter element is already in the configuration file, the special register value in the

<parameters> subsection is updated with the value that you specify for the **-specialregisters** parameter.

You must precede any special characters in the special register value (*registerN\_value*) with the escape character "\\".

The **db2cli writecfg** command does not verify the syntax or validate the value of the specified special register parameter.

**remove -dsn | -database | -parameter[s]**

Removes information about the DSN, database, or parameters from the db2dsdriver.cfg configuration file.

**-dsn *dsn\_name***

Specifies the DSN for which you want to remove the parameter elements, the session global variable parameter element, or the entire <dsn> subsection in the configuration file. If the *dsn\_name* has white space in the middle, surround it with double quotation marks.

To remove parameter elements or session global variable parameter elements information, specify the corresponding DSN and the parameter or session global variable information.

To remove the entire data source subsection, specify only the DSN without any parameters or session global variables information.

**-parameter[s] “*parameter\_name1[...;parameter\_nameN]*”**

Specifies the parameter information to remove from the specified DSN in the db2dsdriver.cfg configuration file.

If the indicated parameter is not in the specified <dsn> subsection of the configuration file, no action is taken.

**-sessionglobalvariables “*globvar\_name1[...;globvar\_nameN]*”**

Specifies the session global variable information to remove from the specified DSN in the db2dsdriver.cfg configuration file.

If the indicated session global variable is not in the specified <dsn> subsection of the configuration file, no action is taken.

**-sessionglobalvariables -force**

Removes all the session global variable information from the specified <dsn> subsection in the db2dsdriver.cfg configuration file. No action is taken if the session global variables are not in the <dsn> subsection.

**-specialregisters “*register\_name1[...;register\_nameN]*”**

Specifies the special register information to remove from the specified <dsn> subsection in the db2dsdriver.cfg configuration file. If the indicated

special register is not in the specified <dsn> subsection of the configuration file, no action is taken.

**-specialregisters -force**

Removes all the special register information from the specified <dsn> subsection in the db2dsdriver.cfg configuration file. If the special registers are not in the <dsn> subsection, no action is taken.

**-database *db\_name* -host *host\_name* -port *port\_number***

Specifies the database name for which you want to remove parameter elements, session global variable parameter elements, or the entire <database> subsection in the configuration file.

To remove parameter elements or session global variable parameter elements information, specify the corresponding database name and the parameter or session global variable information.

To remove the entire database subsection, specify only the database name without any parameter or session global variable information.

**-parameter[s] “*parameter\_name1*;...;*parameter\_nameN*”**

Specifies the parameter information to remove from the specified database name in the db2dsdriver.cfg configuration file.

If the indicated parameter is not in the <database> subsection of the configuration file, no action is taken.

**-sessionglobalvariables “*globvar\_name1*;...;*globvar\_nameN*”**

Specifies the session global variable information to remove from the specified database name in the db2dsdriver.cfg configuration file.

If the indicated session global variable is not specified in the <database> subsection of the configuration file, no action is taken.

**-sessionglobalvariables -force**

Removes all the session global variable information from the specified database name in the db2dsdriver.cfg configuration file. No action is taken if the session global variables are not in the <database> subsection.

**-specialregisters “*register\_name1*;...;*register\_nameN*”**

Specifies the special register information to remove from the specified database name in the db2dsdriver.cfg configuration file. If the indicated special register is not in the specified <database> subsection of the configuration file, no action is taken.

**-specialregisters -force**

Removes all the special register information from

the specified database name in the db2dsdriver.cfg configuration file. No action is taken if the special registers are not in the <database> subsection.

**-parameter[s] "parameter\_name1[...;parameter\_nameN]"**

Specifies the parameter information that is to be removed from the <parameters> section in the db2dsdriver.cfg configuration file.

If the indicated parameter is not in the <parameters> section of the configuration file, no action is taken.

**-sessionglobalvariables "globvar\_name[...;globvar\_nameN]"**

Specifies the session global variable information that is to be removed from the <parameters> section in the db2dsdriver.cfg configuration file.

If the indicated session global variable is not in the <parameters> section of the configuration file, no action is taken.

**-sessionglobalvariables -force**

Removes all the session global variable information from the <parameters> section in the db2dsdriver.cfg configuration file. No action is taken if the session global variables are not in the <parameters> subsection.

**-specialregisters**

**"register\_name=register\_value[...;register\_nameN=registerN\_value]"**

Specifies the special register information to remove from the <parameters> section in the db2dsdriver.cfg configuration file. If the indicated special register is not in the <parameters> subsection of the configuration file, no action is taken.

**-specialregisters -force**

Removes all the special register information from the <parameters> section in the db2dsdriver.cfg configuration file. No action is taken if the special registers are not in the <parameters> subsection.

**-help** Shows the help information that is related to the usage of the **writetcfg** parameter.

**refreshldap**

Updates and appends all configuration information in the IBM data server driver configuration file (db2dsdriver.cfg) with the configuration information that are specified on the Lightweight Directory Access Protocol (LDAP) server. The **db2cli refreshldap** command retrieves the configuration information that is specified for the current user ID, which is used to connect to the LDAP server. All DSN entries in the IBM data server driver configuration file that were created using the **db2cli refreshldap** command contains the LDAP=1 attribute.

The authentication type that is defined for a database in the LDAP server is appended or updated to the <dsn> section for that DSN alias in the IBM data server driver configuration file.

The **Protocol** parameter that is defined for a database in the LDAP server is appended or updated to the <dsn> section for that DSN alias only if the

value is not TCPIP. The following table lists the DCS parameters and equivalent keywords that are supported in the IBM data server driver configuration file. Only the listed DCS parameters can be appended or updated with the refreshldap option.

*Table 50. DCS parameters and equivalent IBM data server driver configuration keywords*

DCS parameter	Equivalent keyword
<i>map-file</i>	<b>SQLCODEMAP</b>
<b>INTERRUPT_ENABLED</b>	<b>InterruptProcessingMode</b>
<b>SYSPLEX</b>	<b>ConnectionLevelLoadBalancing</b>
<b>BIDI</b>	<b>BiDiCCSID</b>

All supported DCS parameters except the SYSPLEX parameter are appended or updated to the <dsn> section. The SYSPLEX parameter that is present in the LDAP server is appended or updated to the corresponding <database> section. When you are using the refreshldap option to update the IBM data server driver configuration file, you can avoid unexpected behaviors by not configuring the db2cli.ini file. The db2cli.ini file configuration takes precedences over the IBM data server driver configuration file.

The **db2cli refreshldap** command creates the IBM data server driver configuration file if it is not present. The **db2cli refreshldap** command updates the IBM data server driver configuration file with keywords that are equivalent to the CLI keywords, which are specified in the LDAP server. Any CLI keywords that are specified on the LDAP server that does not have equivalent IBM data server driver configuration keyword results in a warning message. Any gateway settings on the LDAP server, which are specified through GWNODE option are not appended or updated, and results in a warning message. The alternate server settings on the LDAP server are not appended or updated, and results in a warning message.

If there is a DSN entry on the LDAP server that matches an existing DSN entry in the IBM data server driver configuration file that is not created from the LDAP server entry (without the LDAP=1 attribute), a warning is returned and the DSN entry is not updated. If multiple DSN entries exist on the IBM data server driver configuration file for a same database but with different alias, only the DSN entries that were created from the LDAP server entry (with the LDAP=1 attribute) are removed when the DSN entry on the LDAP server is deleted.

The **db2cli refreshldap** command can be issued only with the IBM Data Server Driver Package and IBM Data Server Driver for ODBC and CLI products. The **db2cli refreshldap** command is similar to the **REFRESH LDAP IMMEDIATE ALL** command that can be issued from the IBM Data Server Client, IBM Data Server Runtime Client or IBM database server products.

#### **-global**

Updates and appends all configuration information in the IBM data server driver configuration file with the global configuration information, which is specified for all the user IDs, on the LDAP server.

**-help** Shows the **db2cli** command help information.

## Usage notes

The interactive CLI interface consists of a set of commands that you can use to design, prototype, and test CLI function calls. It is a testing tool that is provided for the convenience of those programmers who want to use it, and IBM makes no guarantees about its performance. This interface is not intended for users, and so does not have extensive error-checking capabilities.

Three types of commands are supported:

### CLI commands

Commands that correspond to (and have the same name as) each of the function calls that is supported by CLI.

### Support commands

Commands that do not have an equivalent CLI function.

### Additional modes

You can use the additional modes for the **db2cli** command to validate and test the CLI environment configuration.

You can issue commands interactively or from within a file. Similarly, you can display the command output on the terminal or write it to a file. A useful feature of the IBM Data Server Driver for ODBC and CLI is the ability to capture all of the commands that are entered during a session, and to write them to a file, thus creating a *command script* that you can rerun at a later time.

For IBM Data Server client packages on Windows 64-bit operating systems, the 32-bit version of **db2cli** (**db2cli32.exe**) is supported in addition to the 64-bit version of the **db2cli** command.

SQL statements are executed by using the `SQLExecDirect()` function. When executing SQL statements, the **db2cli execsql** command uses the database settings specified in the `db2cli.ini` and `db2dsdriver.cfg` files.

Error messages returned by the **db2cli** command are formatted using the same format as the `SQLGetDiagRec()` function.

*Command line ODBC Registration:* To configure and register DSN for Windows:

1. Catalog the server node. For more information, see "Cataloging a TCP/IP node from a client using the CLP".
2. Catalog the database that you want to connect to. For more information, see "Cataloging a database from a client by using the CLP".
3. (Optional) Catalog the Database Connection Services (DCS) directory. For more information, see "Catalog DCS database command".
4. Register the DSN by using the **db2cli** interactive tool.
  - For 32-bit ODBC DSN, use the **db2cli32** command.
  - For 64-bit ODBC DSN, use the **db2cli** command.

For 64-bit installations, you can use both the **db2cli** and **db2cli32** versions to register the DSN. The **db2cli** command registers a 64-bit DSN and the **db2cli32** command registers a 32-bit DSN.

For 32-bit installations, the **db2cli** command by default registers only 32-bit DSN.

The DSN that you want to register must be in the db2cli.ini or the db2dsdriver.cfg file.

## Examples

### db2cli validate

In the following example, the utility reads the [COMMON] section of db2cli.ini file, the [DSN] section for the **sample** DSN name in the db2cli.ini file, and the <dsn> element for the **sample** DSN name in the db2dsdriver.cfg file. Both valid and invalid keywords are displayed; invalid keywords are listed as UNKNOWN.

```
db2cli validate -dsn sample
```

In the next example, the utility reads the [COMMON] section of db2cli.ini file, the <database> section for the database **dbname1**, the server **server1.net1.com**, and port **50001**, in the db2dsdriver.cfg file. Both valid and invalid keywords are displayed; invalid keywords are listed as UNKNOWN.

```
db2cli validate -database dbname1:server1.net1.com:50001
```

In the next example, the utility is used with a data source name. The data source name is applied with double quotation marks ("").

```
db2cli validate -dsn "IBM - User Acceptance"
-connect -user <userid> -passwd <password>
```

### db2cli writecfg

For the examples that are described in this section, assume that the db2dsdriver.cfg file has the following content:

```
<configuration>
 <dsncollection>
 <dsn alias="alias1" name="name1" host="server1.net1.com" port="50001">
 <parameter name="DisableAutoCommit" value="TRUE"/>
 </dsn>
 </dsncollection>
 <databases>
 <database name="name1" host="server1.net1.com" port="50001">
 <parameter name="CurrentSchema" value="OWNER1"/>
 </database>
 </databases>
 <parameters>
 <parameter name="IsolationLevel" value="SQL_TXN_READ_COMMITTED"/>
 </parameters>
</configuration>
```

The following example adds a new data source element to the db2dsdriver.cfg configuration file:

```
db2cli writecfg add -dsn alias2 -database name2 -host server1.net1.com -port 50001
```

As a result of this command, the *dsncollection* section is modified as follows:

```
<dsncollection>
 <dsn alias="alias1" name="name1" host="server1.net1.com" port="50001">
 <parameter name="DisableAutoCommit" value="TRUE"/>
 </dsn>
 <dsn alias="alias2" name="name2" host="server1.net1.com" port="50001"/>
</dsncollection>
```

The following example adds a new data source element with a description to the db2dsdriver.cfg configuration file:

```
db2cli writecfg add -dsn alias3 -description alias3description -database name3 -host server1.net1.com -port 50001
```

As a result of this command, the *dsncollection* section is modified as follows:

```
<dsncollection>
<dsn alias="alias1" name="name1" host="server1.net1.com" port="50001">
 <parameter name="DisableAutoCommit" value="TRUE"/>
</dsn>
<dsn alias="alias2" name="name2" host="server1.net1.com" port="50001"/>
<dsn alias="alias3" description="alias3description" name="name3" host="server1.net1.com" port="50001"/>
</dsncollection>
```

The following example removes a *dsn* element in the configuration file:

```
db2cli writecfg remove -dsn alias3
```

As a result of this command, the *dsncollection* section is modified as follows:

```
<dsncollection>
<dsn alias="alias1" name="name1" host="server1.net1.com" port="50001">
 <parameter name="DisableAutoCommit" value="TRUE"/>
</dsn>
<dsn alias="alias2" name="name2" host="server1.net1.com" port="50001"/>
</dsncollection>
```

The following example adds parameter information to an existing data source in the configuration file:

```
db2cli writecfg add -dsn alias2 -parameters "DisableAutoCommit=FALSE;CurrentSchema=OWNER2;pureQueryXml=C:\\\\clico"
```

As a result of this command, the *dsncollection* section is modified as follows:

```
<dsncollection>
<dsn alias="alias1" name="name1" host="server1.net1.com" port="50001">
 <parameter name="DisableAutoCommit" value="TRUE"/>
</dsn>
<dsn alias="alias2" name="name2" host="server1.net1.com" port="50001">
 <parameter name="DisableAutoCommit" value="FALSE"/>
 <parameter name="CurrentSchema" value="OWNER2"/>
 ..<parameter name="pureQueryXml" value="C:\\clico"/>
</dsn>
</dsncollection>
```

The following example adds a new database element with parameters in the configuration file:

```
db2cli writecfg add -database name2 -host server1.net1.com -port 50001 -parameters "LockTimeout=20;KeepAliveTimeout=20000"
```

As a result of this command, the *databases* section is modified as follows:

```
<databases>
<database name="name1" host="server1.net1.com" port="50001">
 <parameter name="CurrentSchema" value="OWNER1"/>
</database>
<database name="name2" host="server1.net1.com" port="50001">
 parameter name=" LockTimeout" value="20"/>
 parameter name="KeepAliveTimeout" value="20000"/>
</database>
</databases>
```

The following example modifies an existing parameter for an existing *dsn* element in the configuration file:

```
db2cli writecfg add -dsn alias1 -parameter "DisableAutoCommit=FALSE"
```

As a result of this command, the *dsncollection* section is modified as follows:

```

<dsncollection>
 <dsn alias="alias1" name="name1" host="server1.net1.com" port="50001">
 <parameter name="DisableAutoCommit" value="FALSE"/>
 </dsn>
 <dsn alias="alias2" name="name2" host="server1.net1.com" port="50001">
 <parameter name="DisableAutoCommit" value="FALSE"/>
 <parameter name="CurrentSchema" value="OWNER2"/>
 ..<parameter name="pureQueryXml" value="C:\clico"/>
 </dsn>
</dsncollection>

```

The following example adds a parameter element to the global section in the configuration file:

```
db2cli writecfg add -parameter "ReceiveTimeout=20000"
```

As a result of this command, the global section is modified as follows:

```

<parameters>
 <parameter name="IsolationLevel" value="SQL_TXN_READ_COMMITTED"/>
 <parameter name="ReceiveTimeout" value="20000"/>
</parameters>

```

The following example removes a parameter element from a database in the configuration file:

```
db2cli writecfg remove -database name1 -host server1.net1.com -port 50001 -parameter "CurrentSchema"
```

As a result of this command, the *databases* section is modified as follows:

```

<databases>
 <database name="name1" host="server1.net1.com" port="50001">
 </database>
 <database name="name2" host="server1.net1.com" port="50001">
 parameter name="LockTimeout" value="20"/>
 parameter name="KeepAliveTimeout" value="20000"/>
 </database>
</databases>

```

The following example removes a *dsn* element in the configuration file:

```
db2cli writecfg remove -dsn alias1
```

As a result of this command, the *dsncollection* section is modified as follows:

```

<dsncollection>
 <dsn alias="alias2" name="name2" host="server1.net1.com" port="50001">
 <parameter name="DisableAutoCommit" value="FALSE"/>
 <parameter name="CurrentSchema" value="OWNER2"/>
 <parameter name="pureQueryXml" value="C:\clico"/>
 </dsn>
</dsncollection>

```

### **db2cli execsql**

In following example assume that the following table and procedures are created in the SAMPLE database:

```

create table employee(empid integer, empname varchar(100)

CREATE PROCEDURE proc1 ()
DYNAMIC RESULT SETS 1 P1:
BEGIN
 DECLARE cursor1 CURSOR WITH RETURN FOR SELECT * FROM fprem;
 OPEN cursor1;
END P1

CREATE PROCEDURE PROC2(IN ID1 INTEGER,OUT NAME VARCHAR(20))

```

```
BEGIN
DECLARE CUR1 CURSOR WITH RETURN TO CALLER FOR SELECT * FROM EMPLOYEE1 WHERE ID=ID1;
OPEN CUR1;
END
```

This example also assumes the SQL file test.sql contains the following text:

```
--Populate table(employee)
insert into employee(empid, empname) values(1, 'Adam')
insert into employee(empid, empname) values(2, 'Atul')
select empid, empname from employee

--Execute the stored procedure
Call proc1()
```

Enter the following **db2cli** command in a console window to run the SQL statements in the file:

```
db2cli execsql -dsn sample -inputsq1 test.sql
```

The following text is displayed in the console window:

```
IBM DATABASE 2 Interactive CLI Sample Program
(C) COPYRIGHT International Business Machines Corp. 1993,1996
All Rights Reserved
Licensed Materials - Property of IBM
US Government Users Restricted Rights - Use, duplication or
disclosure restricted by GSA ADP Schedule Contract with IBM Corp.
```

```
insert into employee(empid, empname) values(1, 'Adam')
The SQL command completed successfully.
```

```
insert into employee(empid, empname) values(2, 'Atul')
The SQL command completed successfully.
```

```
select empid, empname from employee
```

```
EMPID EMPNAME
1, Adam
2, Atul
```

```
Call proc1()
```

```
EMPID EMPNAME
1, Adam
2, Atul
```

Run a CALL statement for a stored procedure that has OUT arguments. The question mark (?) can be used as an OUT parameter.

The following example assumes that an SQL script file test2.sql contains the following text:

```
CALL PROC2(1, ?)
```

Enter the following **db2cli** command in a console window to run the SQL statements in the file:

```
db2cli execsql -dsn sample -inputsq1 test2.sql
```

The following text is displayed in the console window:

```
Value of output parameters
```

```

Parameter Name : NAME
Parameter Value : -
```

ID
-----
1

Specify the **-prepareonly** option to prepare the SQL statements without running them. The DDL statements that are needed for the SQL statements must be run before you run the **db2cli execsql** command with the **-prepareonly** option.

The following example assumes that the SQL file test3.sql contains the following text:

```
--populate table(employee)
insert into employee(empid, empname) values(1, 'Adam');
insert into employee(empid, empname) values(2, 'Atul');
select empid, empname from employee;
```

Also, assume that the table EMPLOYEE was created in the database. Enter the following **db2cli** command in a console window to prepare the SQL statements in the file:

```
db2cli execsql -prepareonly -dsn sample -inputsq1 test3.sql
```

The following text is displayed in the console window:

```
IBM DATABASE 2 Interactive CLI Sample Program
(C) COPYRIGHT International Business Machines Corp. 1993,1996
All Rights Reserved
Licensed Materials - Property of IBM
US Government Users Restricted Rights - Use, duplication or
disclosure restricted by GSA ADP Schedule Contract with IBM Corp.
```

```
insert into employee(empid, empname) values(1, 'Adam')
The SQL command prepared successfully.
```

```
insert into employee(empid, empname) values(2, 'Atul')
The SQL command prepared successfully.
```

```
select empid, empname from employee
The SQL command prepared successfully.
If you place DDL statements that are required for DML statements in
the same file, the DML statements that require the DDL statements
fail. For example, assume that the following text is in the file
test4.sql, and assume that and the EMPLOYEE table has not been
created in the database:
```

```
--create and populate table(employee)
create table employee(empid integer, empname varchar(100));
insert into employee(empid, empname) values(1, 'Adam');
insert into employee(empid, empname) values(2, 'Atul');
select empid, empname from employee;

-- try to create another table with the same name
create table employee(empid integer, empname varchar(100));
```

The CREATE TABLE statement must be run before the INSERT and SELECT statements can be run successfully.

Enter the following **db2cli** command in a console window to prepare the SQL statements in the file:

```
db2cli execsql -prepareonly -dsn sample -inputsq1 test4.sql
```

The following text is displayed in the console window:

```
IBM DATABASE 2 Interactive CLI Sample Program
(C) COPYRIGHT International Business Machines Corp. 1993,1996
All Rights Reserved
```

Licensed Materials - Property of IBM  
US Government Users Restricted Rights - Use, duplication or  
disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

```
create table employee(empid integer, empname varchar(100))
The SQL command prepared successfully.

insert into employee(empid, empname) values(1, 'Adam')
The SQL command failed. During SQL processing it returned:
[IBM][CLI Driver][DB2/6000] SQL0204N "EMPLOYEE" is an undefined name. SQLSTATE=42704

insert into employee(empid, empname) values(2, 'Atul')
The SQL command failed. During SQL processing it returned:
[IBM][CLI Driver][DB2/6000] SQL0204N "EMPLOYEE" is an undefined name. SQLSTATE=42704

select empid, empname from employee
The SQL command failed. During SQL processing it returned:
[IBM][CLI Driver][DB2/6000] SQL0204N "EMPLOYEE" is an undefined name. SQLSTATE=42704

create table employee(empid integer, empname varchar(100))
The SQL command prepared successfully.
```

In this example, the two CREATE SQL statements prepared successfully, however the EMPLOYEE table was not created in the database. The INSERT and SELECT statements did not prepare successfully because the EMPLOYEE table was not in the database.

#### db2cli bind

The following example binds the db2cli.lst list file:

```
$ db2cli bind @db2cli.lst -database "mydb:test.torolab.ibm.com:446"
-options "BLOCKING unambig REOPT always ISOLATION RR"
LINE MESSAGES FOR db2cli.lst

SQL0061W The binder is in progress.
SQL0091N Binding was ended with "0" errors and "0" warnings.
```

#### db2cli refreshldap

The following db2dsdriver.cfg file is modified by the **db2cli refreshldap** command:

```
<configuration>
<dsncollection>
<dsn alias="sample" name="sample" host="hotel53.ibm.com" port="40576" ldap=1>
<parameter name="DisableAutoCommit" value="0"/>
<parameter name="AllowDeferredPrepare" value="1"/>
</dsn>
<dsn alias="EC205" name="STLEC1" host="INEC005.ibm.com" port="446" ldap=1>
<parameter name="InterruptProcessingMode" value="1"/>
</dsn>
<dsn alias="test1" name="test" host="xyz.ibm.com" port="446" ldap=1>
<parameter name="QueryTimeoutInterval" value="15"/>
<parameter name="Authentication" value="SERVER"/>
</dsn>
</dsncollection>
<databases>
<database name="sample" host="hotel53.ibm.com" port="40576"/>
<database name="STLEC1" host="INEC006.ibm.com" port="446">
<parameter name="ConnectionLevelLoadBalancing" value="1"/>
</database>
<database name="test" host="xyz.ibm.com" port="446"/>
</databases>
</configuration>
```

## db2cluster - Manage Db2 cluster services

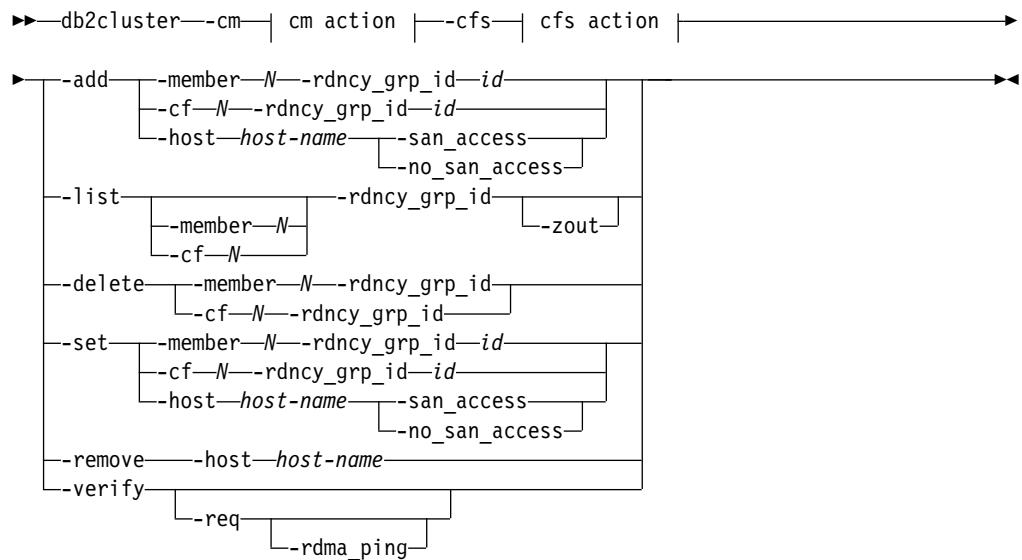
The **db2cluster** command is used to perform management operations that are related to Db2 cluster services.

The **db2cluster** command is functionally similar to the interactive **db2haicu** tool, but it contains a much wider array of options for administering in a Db2 pureScale environment.

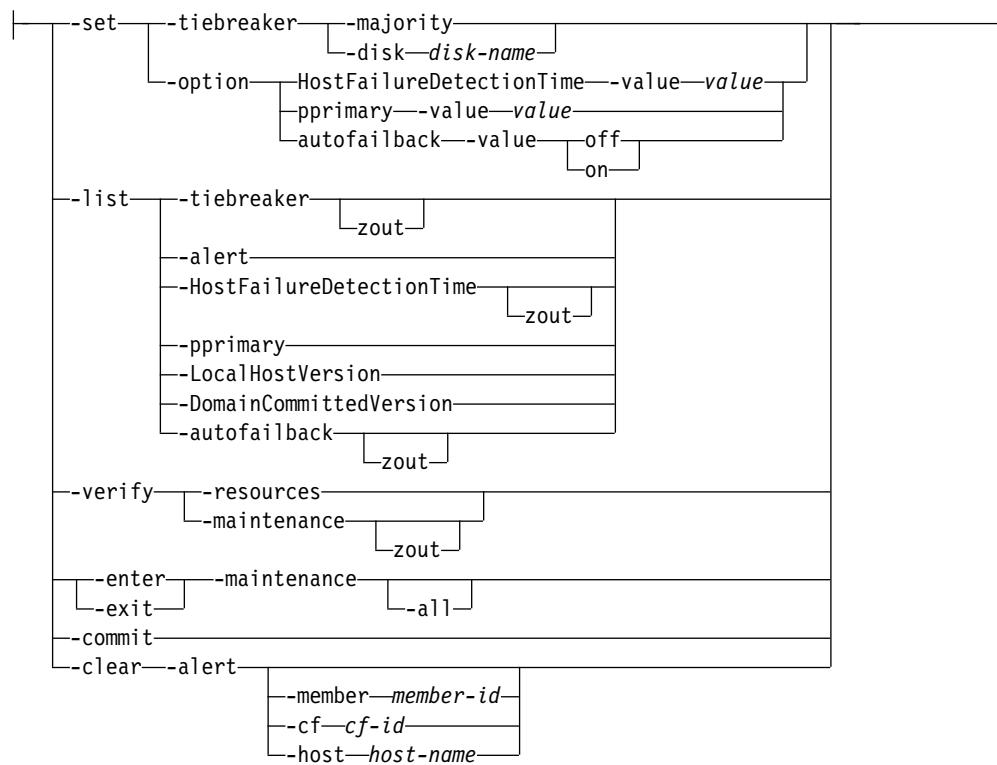
## Authorization

The options of the **db2cluster** command that you can use depend on your authorization level. Some options can be specified only by the Db2 cluster services administrator. Other options can be specified only if you are part of the SYSADM, SYSCTL, or SYSMAINT group, and a smaller subset of commands can be run by any user ID on the system. See the “Command parameters” on page 737 section for information on the authorities that are required for each option. In addition, there is a set of advanced troubleshooting options for the **db2cluster** command, which can be used only under the guidance of service.

### Command syntax - standard options

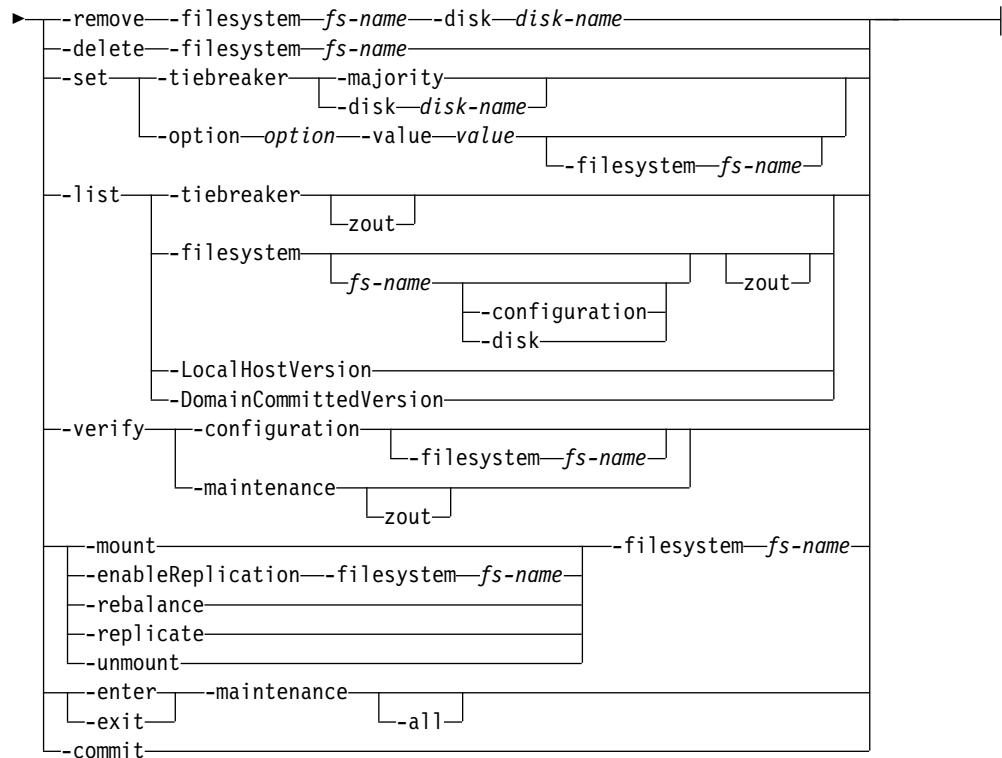


#### cm action:



#### cfs action:





#### **cfs-create:**

```

 |---create--filesystem--fs-name--disk--disk1...diskN
 ➤--rdnyc_grp_id--id--disk--disk1...diskN--rdnyc_grp_id--id
 ➤--fstiebreaker--fstbdisk
 |-----host--tbhost
 |-----mount--directory-name

```

#### **cfs-add:**

```

 |---add--filesystem--fs-name--disk--disk1...diskN
 ➤--rdnyc_grp_id--id--disk--disk1...diskN--rdnyc_grp_id--id
 ➤--fstiebreaker--fstbdisk
 |-----host--tbhost

```

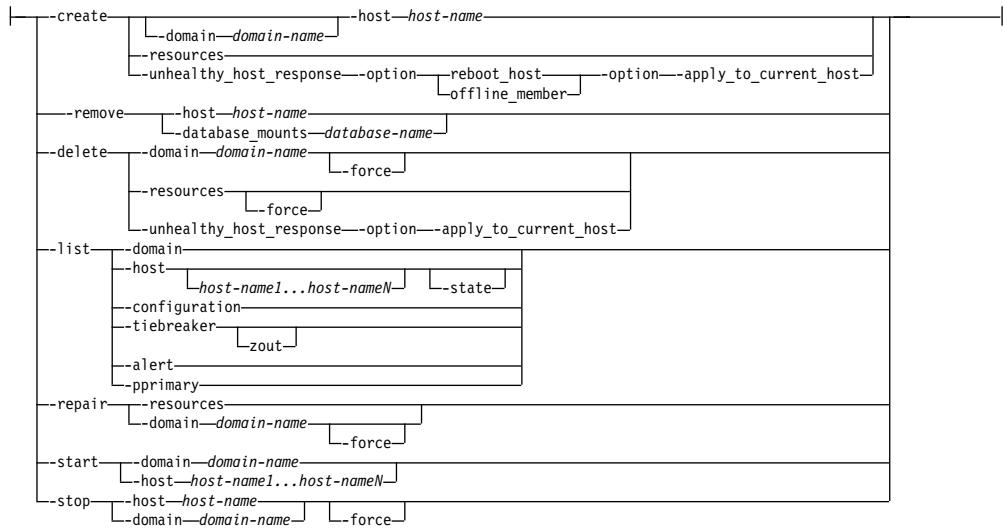
### **Command syntax - advanced options**

```

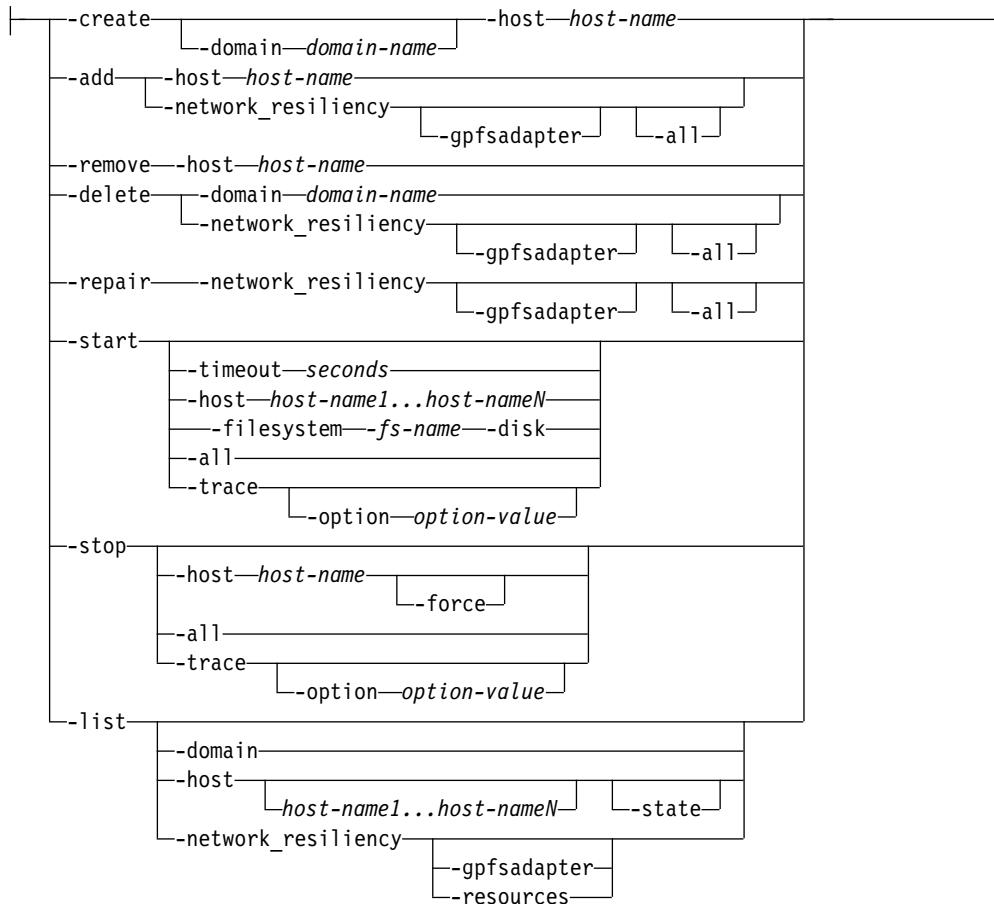
 ➤--db2cluster
 |-----cm
 |-----(1)
 |-----cfs
 |-----cfs action

```

#### **cm action:**



#### cfs action:



#### Notes:

- These command options are only displayed in the command line help if you include the **-advanced** option as follows: `db2cluster -cm -help -advanced` or `db2cluster -cfs -help -advanced`

## Command parameters

### **-cm**

Specifies a resource-based command or maintenance operation.

### **-set**

Specifies the tiebreaker device for the cluster manager, the host failure detection time, or the preferred primary cluster caching facility.

#### **-tiebreaker**

Specifies the type of device to be used as the Db2 cluster services tiebreaker. This option is only available to the Db2 cluster services administrator.

#### **-majority**

Specifies that the surviving group of hosts with the majority has operational quorum.

#### **-disk *disk-name***

Specifies a shared disk partition that determines which group of hosts has operational quorum.

### **-option**

#### **HostFailureDetectionTime -value *value***

Specifies the length of time (a range of 1 to 60 seconds) for detecting a host failure or network partition in the cluster. This option is only available to the Db2 cluster services administrator.

#### **pprimary -value *value***

Specifies which cluster caching facility Db2 cluster services will attempt to start in the primary role. This option is only available to a user in the SYSADM, SYSCTL, or SYSMAINT group.

#### **autofailback -value**

Specifies whether automatic failback of a member to its home host is immediate (enabled) or automatic failback is delayed (disabled) until automatic failback is manually enabled by the administrator. Initially, automatic failback is enabled by default. The change to this parameter will become effective after the instance is restarted.

##### **off**

Specify the **off** parameter to disable immediate automatic failback of the member to its home host when the home host becomes available. This setting provides time to verify the health of the restarted home host before reintegrating it into the cluster.

**on** Specify the **on** parameter to enable immediate automatic failback of the member to its home host when the home host becomes available.

### **-list**

Returns details about the following:

#### **-tiebreaker**

Lists the type of device being used as the Db2 cluster services tiebreaker.

#### **zout**

Displays output in a format that can be consumed by an application.

**-alert**

Lists any alerts for cluster elements.

**-HostFailureDetectionTime**

Lists how long it will take for Db2 cluster services to detect a host failure or network partition.

**zout**

Displays output in a format that can be consumed by an application.

**-LocalHostVersion**

Lists the version of SA MP (or IBM Spectrum Scale) which is currently installed on the host where this command is invoked.

**-DomainCommittedVersin**

Lists the version of SA MP (or IBM Spectrum Scale) which is currently committed in the domain where this command is invoked.

**-pprimary**

Lists which cluster caching facility Db2 cluster services is designated as the preferred primary. This option is only available to a user in the SYSADM, SYSCTL, or SYSMAINT group.

**-autofailback**

Lists automatic failback status.

**zout**

Displays output in a format that can be consumed by an application.

**-verify****-resources**

Verifies that the resource model for the instance is correct, and that there are no inconsistencies in the resource model.

**-maintenance**

Ensures that the cluster manager is offline on the host so that the binaries can be updated.

**zout**

Displays output in a format that can be consumed by an application.

**-enter -maintenance**

Puts the host on which this command was issued into maintenance mode. This option is only available to the Db2 cluster services administrator. The instance name must be specified by setting the DB2INSTANCE environment variable. Internally, this option issues an asynchronous command to stop the cluster manager on the host. The command polls the state of the cluster manager to determine when the stop operation has completed. On less responsive systems, it may time out and report an error while the cluster manager is in the process of shutting down. Individual hosts can be put into maintenance mode one at a time. Starting from v11.1.3.3, multiple hosts can be put into maintenance mode one at a time by using the **db2cluster** command while maintaining the quorum.

**-all**

Puts the entire cluster domain into maintenance mode, stopping the

cluster manager on all hosts in the instance. If you use the **-all** option to enter maintenance mode, you must use the **-all** option to exit maintenance mode.

**-exit -maintenance**

Removes the host on which this command was issued from maintenance mode, and puts the domain online if it is currently offline. This option is only available to the Db2 cluster services administrator. The instance name must be specified by setting the DB2INSTANCE environment variable. If the entire peer domain was put into maintenance mode using the **-all** option, you cannot use this option to exit maintenance mode on individual hosts.

**-all**

Removes the cluster domain from maintenance mode, starting the entire cluster manager peer domain, thus bringing the cluster manager online on all hosts in the instance. You must use the **-all** option to exit maintenance mode if you used the **-all** option to enter maintenance mode.

**-commit**

Commits the updates that are made to Db2 cluster services and makes them available to the Db2 database system. This option is only available to the Db2 cluster services administrator.

**-clear -alert**

Clears current alerts on the specified cluster element. This option is only available to a user in the SYSADM, SYSCTL, or SYSMAINT group.

**-member *member-id***

**-cf *cf-id***

**-host *host-name***

**-cfs**

Specifies a cluster-file-system-based command or a maintenance operation.

**-create**

Creates a shared file system according to the following options.

**-filesystem *fs-name***

Specifies the name of the shared file system that is created.

**-disk *disk1...diskN***

Specifies the storage paths for the shared file system.

**-rdnky\_grp\_id *id***

Refers to a group of resources that are independent of other redundancy groups, where together they provide the active-active and transient failover capability in a Db2 pureScale environment. The valid values of this option are 1, and 2. The values 1 and 2 are referred to as the primary and secondary respectively. The tiebreaker disks for each GPFS cluster file system belong to a special group known as file system tiebreaker group. In a geographically dispersed pureScale cluster (GDPC), the host that owns this file system tiebreaker group is also known as the tiebreaker host or site. In a single-site pureScale environment, the resources that are represented by this ID include the storage only. In a geographically dispersed pureScale cluster (GDPC), the resources include the members and CFs that reside in the same

physical location as the storage. If two sets of disks are specified by using -disk option, then the associated redundancy group IDs must not be the same.

**-fstiebreaker *fstbdisk* -host *tbhost***

Specifies the tiebreaker disk for the target file system. This option is used only when creating a replicated file system. The option **-host *tbhost***, when specified, indicates the *fstbdisk* is only accessible by other hosts in the cluster through TCP/IP connection through this host. If the *fstbdisk* is on SAN storage and accessible by all hosts in the cluster, the **-host *tbhost*** option is not required.

**-mount *directory-name***

Specifies the mount point for the shared file system. If no mount point is provided, the file system is created under a root file system name of /db2fs.

**-add**

Adds additional disks to an existing shared file system cluster.

**-filesystem *fs-name***

Specifies the name of the shared file system to which the disks are to be added.

**-host *hostname***

The host name where the list of disks that are specified are located. This option is only valid for non-pureScale instance.

**-disk *disk-list***

Specifies the disks to be added to the shared file system cluster.

**-rdnry\_grp\_id *id***

Refers to a group of resources that are independent of other redundancy groups, where together they provide the active-active and transient failover capability in a Db2 pureScale environment. The valid values of this option are 1, and 2. The values 1 and 2 are referred to as the primary and secondary respectively. The tiebreaker disks for each GPFS cluster file system belong to a special group known as file system tiebreaker group. In a geographically dispersed pureScale cluster (GDPC), the host that owns this file system tiebreaker group is also known as the tiebreaker host or site. In a single-site pureScale environment, the resources that are represented by this ID include the storage only. In a geographically dispersed pureScale cluster (GDPC), the resources include the members and CFs that reside in the same physical location as the storage. If two sets of disks are specified by using -disk option, then the associated redundancy group IDs must not be the same.

**-fstiebreaker *fstbdisk* -host *tbhost***

Specifies the tiebreaker disk for the target file system. This option is used only when creating a replicated file system. The option **-host *tbhost***, when specified, indicates the *fstbdisk* is only accessible by other hosts in the cluster through TCP/IP connection through this host. If the *fstbdisk* is on SAN storage and accessible by all hosts in the cluster, the **-host *tbhost*** option is not required.

**-remove**

Removes disks from an existing file system cluster.

**-filesystem *fs-name***

Specifies the name of the shared file system from which the disks are to be removed.

**-host *hostname***

The host name where the list of disks that are specified are located. This option is only valid for non-pureScale instance.

**-disk *disk-name***

Specifies the disk to be removed from the shared file system cluster. The command fails if the specified disk is the last disk in the file system or if it is the tiebreaker disk.

**-enableReplication**

Converts an existing non-replicated file system to a replicated file system by assigning the list of disks that are currently assigned to the file system to redundancy group ID 1. During this process, GPFS replication is not enabled. GPFS replication is enabled immediately after the redundancy group ID 2 is created for the same file system.

**-delete**

Deletes a shared file system. This option is only available to the Db2 cluster services administrator.

**-filesystem *fs-name***

Specifies the name of the shared file system that is to be deleted. The command fails if the file system is not empty.

**-set**

Specifies the tiebreaker type or sets configuration options. This option is only available to the Db2 cluster services administrator.

**-tiebreaker**

Specifies the type of device to be used as the IBM Spectrum Scale tiebreaker:

**-majority**

Specifies that the surviving group of hosts with the majority has operational quorum.

**-disk *disk-name***

Specifies a shared disk partition that determines which group of hosts has operational quorum.

**-option *option***

Explicitly sets a configuration option for the cluster file system. In most cases, you do not need to set any of these values because they are automatically set to optimal values when the cluster is created. The cluster verification that runs implicitly after installation and updates returns an error message if any of the options is not set to its mandatory value.

**adminMode**

Specifies whether all nodes in the cluster, or just a subset of the nodes, are to be used for issuing IBM Spectrum Scale administration commands. The default and mandatory value is allToAll.

**maxFilesToCache**

Specifies the number of nodes to cache for recently used files that are closed. The default and minimum mandatory value is 10000.

**maxMBpS**

Specifies an estimate of how many megabytes of data can be transferred per second into or out of a single node. The default value is 150. Increase this value if more I/O is required.

**pagepool**

Specifies the size in megabytes of the cache on each node. The default and minimum mandatory value is 512.

**remoteFileCopyCommand**

Specifies the fully-qualified path name for the remote file copy program to be used by IBM Spectrum Scale. The remote copy command must adhere to the same syntax format as the `scp` command, but may implement an alternate authentication mechanism.

**remoteShellCommand**

Specifies the fully-qualified path name for the remote shell program to be used by IBM Spectrum Scale. The remote shell command must adhere to the same syntax format as the `ssh` command, but may implement an alternate authentication mechanism.

**sharedMemLimit (AIX only)**

Specifies the amount of memory, in megabytes, available to store various IBM Spectrum Scale structures. The default and minimum mandatory value is 2047.

**totalPingTimeout**

Specifies the length of time in seconds that IBM Spectrum Scale waits before expelling nodes it cannot communicate with when the primary subnet is not used for IBM Spectrum Scale communication. The default value is 45 in clusters that have use SCSI-3 Persistent Reserve (PR) and 75 in clusters that do not have PR enabled.

**usePersistentReserve**

Specifies whether to enable or disable PR on the disks. The default value is YES. If you change the setting to NO, then fast failure recovery is replaced with a longer GPFS lease timeout wait period, resulting in a slower failure recovery. This feature is not available on Linux operating systems and the lease timeout is always used for file system recovery.

**verifyGpfsReady**

Specifies that the peer domain is to be coordinated with the IBM Spectrum Scale cluster, ensuring that the IBM Spectrum Scale mounts the file system at the appropriate time. The default and mandatory value is YES.

**worker1Threads**

Specifies the maximum number of concurrent file operations. The default value is 500.

**-value value**

Specifies a value for the option.

**-filesystem *fs-name***

Specifies which file system the configuration option is applied to.

**-list**

Returns details about the following:

**-tiebreaker**

Lists the type of device that is being used as the IBM Spectrum Scale tiebreaker.

**zout**

Displays output in a format that can be consumed by an application.

**-filesystem**

Returns details about the following:

**zout**

Displays output in a format that can be consumed by an application.

**-filesystem *fs-name***

Returns details about the following:

**-configuration**

Lists the current configuration of the file system and configuration parameters that can be changed.

**-disk**

Lists the current disks in the file system.

**-LocalHostVersion**

Lists the version of IBM Tivoli System Automation for Multiplatforms (SA MP) (or IBM Spectrum Scale) which is currently installed on the host where this command is invoked.

**-DomainCommittedVersion**

Lists the version of SA MP (or IBM Spectrum Scale) which is currently committed in the domain where this command is invoked.

**-verify****-configuration**

Verifies the code version and the release level of the IBM Spectrum Scale cluster, and checks certain configuration settings for the cluster file system, including the following options:

- **adminMode**
- **maxFilesToCache**
- **pagepool**
- **sharedMemLimit**
- **verifyGpfssReady**
- **HostFailureDetectionTime**

If any of these options are not set to the recommended value for optimal cluster file system performance, a warning message is returned by the **db2cluster** command that contains information that the relevant option is not optimally set.

**-maintenance**

Ensures that the shared file system cluster host is offline to allow for updates to the binaries.

**`zout`**

Displays output in a format that can be consumed by an application.

**`-mount -filesystem fs-name`**

Makes the specified file system available to the operating system for read and write access by users.

**`-rebalance -filesystem fs-name`**

Restripes the data on disk across all disks in the file system. This option should be run during periods of lower system activity for the file system being rebalanced.

**`-replicate -filesystem fs-name`**

Triggers data replication of the specified file system.

**`-unmount -filesystem fs-name`**

Makes the specified file system inaccessible to the operating system.

**`-enter -filesystem -maintenance`**

Puts the host on which this command was issued into maintenance mode. This option is only available to the Db2 cluster services administrator. The cfs action **db2cluster -cfs -enter -maintenance** command requires that the host already be entered into CM maintenance state.

**`-all`**

Puts all hosts in the shared file system cluster into maintenance mode.

**`-exit -maintenance`**

Removes the host on which this command was issued from maintenance mode. This option is only available to the Db2 cluster services administrator. The cfs action **db2cluster -cfs -exit -maintenance** command requires that the host not be in CM maintenance state.

**`-all`**

Ensures that all hosts in the shared file system cluster are started.

**`-commit`**

Commits the updates that are made to Db2 cluster services and makes them available to the Db2 database system. This option is only available to the Db2 cluster services administrator.

**`-add`**

Associates the target member or CF with a redundancy group ID in cluster manager domain. This operation is only valid when the target member or CF does not have any redundancy group ID association before.

**`-member N -rdnyc_grp_id id`**

Associates the target member with the specified redundancy group ID. Use this option to associate the relationship for the first time. If the target member has an existing association, use the **-set** option to modify it.

**`-cf N -rdnyc_grp_id id`**

Associates the target CF with the specified redundancy group ID. Use this option to associate the relationship for the first time. If the target CF has an existing association, use the **-set** option to modify it.

**`-host host-name`****`-san_access`**

Specifies that the target host has access to the shared storage on SAN network. This is the default value of all the members and CFs, if not specified.

**-no\_san\_access**

Specifies that the target host does not have access to the shared storage on SAN network. This value is specified for adding a dedicated tiebreaker host only.

**-list**

Displays the target member or CF's current redundancy group ID association in cluster manager domain. If **-member** or **-cf** option is not specified, it displays each member and CF's redundancy group ID association.

**-rdnyc\_grp\_id**

Displays all members and CFs current redundancy group ID association.

**-member N -rdnyc\_grp\_id**

Displays the target member's redundancy group ID association.

**-cf N -rdnyc\_grp\_id**

Displays the target CF's redundancy group ID association.

**-delete**

Removes the target member or CF's redundancy group ID association in cluster manager domain. This operation is only valid when the target member or CF currently has a redundancy group ID association.

**-member N -rdnyc\_grp\_id**

Removes the target member's current redundancy group ID association.

**-cf N -rdnyc\_grp\_id**

Removes the target CF's current redundancy group ID association.

**-set**

Associates the target member or CF with a different redundancy group ID in cluster manager domain. This operation is only valid when the target member or CF currently has a redundancy group ID association.

**-member N -rdnyc\_grp\_id id**

Modifies the target member's current redundancy group ID association to the specified one. Do not use this option when the target member has no current redundancy group ID association.

**-cf N -rdnyc\_grp\_id id**

Modifies the target CF's current redundancy group ID association to the specified one. Do not use this option when the target CF has no current redundancy group ID association.

**-host host-name**

Modifies the intended usage of the target host. This option is used to convert a dedicated tiebreaker host to a member by granting SAN access to the defined member.

**-san\_access**

Specifies that the target host has access to the shared storage on SAN network. This is the default value of all the members and CFs, if not specified.

**-no\_san\_access**

Specifies that the target host does not have access to the shared storage on SAN network. This value is specified for adding a dedicated tiebreaker host only.

**-remove**

**-host *host-name***  
     Removes a single host from the cluster manager domain.

**-verify**  
     Defaults to **-verify -req**

**-req**  
     Performs a comprehensive list of checks to validate the health of the pureScale cluster. Accordingly, an alert is raised for each failed criterion and is displayed in the instance monitoring command **db2instance -list**. The validations performed include, but are not limited to, the following:

- Configuration settings in peer domain and IBM Spectrum Scale cluster
- Communications between members and CFs
- Replication setting for each file system
- Status of each disk in the file system
- Remote access with db2sshid among all nodes through db2locssh and db2scp

**-rdma\_ping**  
     Verifies communication between members and CFs only.

## Advanced command parameters

**-cm**

**-create**  
     Creates a peer domain or a resource model. This option is not normally needed unless directed by service.

**-domain *domain-name* -host *host-name***  
     Creates a peer domain. The host named in the command must be the local host and must have the Db2 cluster services software already installed. Specify a domain name if you want to change the name of the peer domain to something other than the default: db2domain. This option is only available to the Db2 cluster services administrator.

**-resources**  
     Creates the cluster manager resource model for the instance based on the information in the db2nodes.cfg file. This option is only available to a user in the SYSADM, SYSCTL, or SYSMAINT group.

Upon completion of this command, the HA registry is populated with the resource metadata.

If resource metadata exists in the HA registry, then this command fails. Either invoke the **db2cluster** command with the **-delete -resources -force** to remove the HA registry metadata or invoke **db2cluster -repair -resources** to recreate the resource model using the resource metadata in the HA registry.

**-unhealthy\_host\_response -option**  
     Specifies that Db2 cluster services is to take one of the following actions if a host experiences excessive load or paging that could impact throughput or availability in the rest of the cluster. The criteria for this response are as follows:  
 $PctTotalPgSpFree < 95\%$  and  $VMPgInRate > 20$  per second  
     where  $PctTotalPgSpFree$  is the percentage of free page space (meaning that page file usage is greater than 5%) and  $VMPgInRate$  is the page-in rate.

**-reboot\_host**

Reboots the host. Any resident member on the host will restart in light mode on a guest host until its home host has successfully rebooted. If the primary cluster caching facility is on the host, the secondary cluster caching facility will take over as the new primary; after the old primary's host has successfully rebooted, it will rejoin the cluster as the secondary cluster caching facility.

**-offline\_member**

Forces any member or cluster caching facility on the host offline. An offlined cluster caching facility will not restart until the resulting alert is manually cleared. An offlined member restarts in light mode on a guest host and will not restart on its home host until the resulting alert is manually cleared.

**-option -apply\_to\_current\_host**

Specifies that the unhealthy host response is to be applied to the current host.

**Note:** This option should be used with caution and can only be run as the Db2 cluster services administrator. For more information, see the "Related links" section.

**-add**

Adds either a host or database mounts to the cluster manager domain. To add a host, you must run the command from an online host that is already in the peer domain. This option is only available to the Db2 cluster services administrator and is not normally needed unless directed by service.

**-host host-name**

Adds a host (one at a time) to the cluster manager domain. The software must already be installed on the host that is added to the cluster and be ready for usage.

**-database\_mounts database-name**

Adds mount resources for a database that was not created with the instance that is being used. You would use this, for example, if the database is migrated from version 9.7 or if the database was created with another instance and then cataloged to be used with the current instance.

**-remove**

Removes either a host or database mounts from the cluster manager domain. To remove a host, you must run the command from an online host that is in the peer domain. This option is only available to the Db2 cluster services administrator and is not normally needed unless directed by service.

**-host host-name**

Removes a single host from the cluster manager domain. Any members or cluster caching facilities must have already been removed from the host.

**-database\_mounts database-name**

Removes mount resources for a database.

**-delete**

Deletes either a peer domain or the resource model. This option is not normally needed unless directed by service.

**-domain *domain-name***

Deletes the peer domain. This option is only available to the Db2 cluster services administrator.

**-force**

The force option can be used to force the instance domain resources to be deleted, even if there are any online cluster resources on the domain.

**Note:** The **-force** option deletes all the metadata for the resource model, so the instance configuration will be lost.

**-resources**

Deletes the cluster manager resource model. After resources are deleted, the Db2 instance cannot start until the resource model is properly re-created. This option is only available to a user in the SYSADM, SYSCTL, or SYSCMAINT group. The contents of db2nodes.cfg are compared to the HA registry metadata. The command fails if there is a discrepancy. The main reason for a discrepancy is if one or more members are currently failed over to a guest host. In such a case, the cause of the failure should be determined and repaired so that the member can fail back to its home host.

**-force**

Bypasses the db2nodes.cfg comparison and deletes the HA registry metadata that exist for the resource model. This option should only be used when directed to do so by IBM support.

**-unhealthy\_host\_response**

Deletes the automated response (either rebooting the host reboot or taking any member or cluster caching facility on the host offline) on hosts that experience excessive load or paging. If this condition occurs, the instance takes no action and the condition is logged by the member or cluster caching facility (the default behavior).

**-list**

Returns information about these options:

**-domain**

Returns the name of the cluster manager peer domain.

**-host *host-name1...host-nameN***

Lists the hosts that are in the peer domain.

**-state**

Returns the state of the hosts that are in the peer domain.

**configuration**

Lists the current configuration of the file system and configuration parameters that can be changed.

**-tiebreaker**

Lists the type of device being used as the Db2 cluster services tiebreaker.

**zout**

Displays output in a format that can be consumed by an application.

**alert**

Lists any alerts for cluster elements.

**pprimary**

Lists which cluster caching facility Db2 cluster services is designated as the preferred primary. This option is only available to a user in the SYSADM, SYSCTL, or SYSMAINT group.

**-repair**

Repairs an inconsistent resource model or domain for an instance. The Db2 instance resources are re-created based on the last good instance configuration; that is, the instance configuration from which the **db2start** command was last successful.

**-resources**

Specifies to repair the resource model of the instance.

**-domain *domain-name***

Specifies to repair the cluster manager domain. The domain is re-created using the same topology configuration as the existing cluster manager domain. This includes the existing set of cluster hosts in addition to initializing the Db2 cluster services tiebreaker and host failure detection time. Currently only one instance per cluster is supported, and this instance must be specified by setting the **DB2INSTANCE** environment variable. This command can only be run as the Db2 cluster services administrator. For more information, see the "Related links" section.

**-force**

Deletes and re-creates the resource model of the instance using the resource metadata found in the HA registry. If there is no metadata in the HA registry this command fails and the resource model is not deleted.

**-start**

Starts one of these options:

**-domain *domain-name***

Starts the peer domain. The start can only start other nodes if the domain is already started on the current host. This option is only available to the Db2 cluster services administrator and is not normally needed unless directed by service.

**-filesystem *fs-name* -disk**

Starts all the disks that are in Down state in the target file system.

**-host *host-name1*...*host-nameN***

Specifies which hosts the peer domain is to be started on. This option is only available to the Db2 cluster services administrator and is not normally needed unless directed by service.

**-stop**

Stops one of these options:

**-domain *domain-name***

Stops the cluster manager across the entire peer domain. This option is only available to the Db2 cluster services administrator and is not normally needed unless directed by service.

**-host *host-name1*...*host-nameN***

Stops the cluster manager on the specified hosts if the instance is stopped. This option is only available to the Db2 cluster services administrator and is not normally needed unless directed by service.

**-force**

Forces the shutdown of the entire cluster manager peer domain without performing checks such as ensuring that operational quorum is kept. When this option is run with the **-host** option only the specified host is shutdown.

**-cfs****-create -domain *domain-name* -host *host-name***

Creates a shared file system cluster. The host named in the command must be the local host and must have the Db2 cluster services software already installed. Specify a domain name if you want to change the name of the shared file system cluster to something other than the default: db2gpfsdomain. This option is only available to the Db2 cluster services administrator and is not normally needed unless directed by service.

**-add**

Adds either a host or network resiliency to the shared file system cluster. The command must be run from an online host that is already in the peer domain. This option is only available to the Db2 cluster services administrator and is not normally needed unless directed by service.

**-host *host-name***

Adds a host (one at a time) to the shared file system cluster. The software must already be installed on the host that will be added to the cluster and be ready for usage.

**-network\_resiliency**

Adds condition and response resources for the adapter used by the cluster file system. When the adapter changes state (going offline or online) the cluster manager invokes a response script which takes appropriate action.

**-gpfsadapter**

Specifies that the IBM Spectrum Scale adapter should be operated on. It is not required because this is currently the only network resiliency resource that can be operated upon.

**-remove -host *host-name***

Removes a single host from shared file system cluster. Any members or cluster caching facilities must have already been removed from the host. This command must be run from an online host that is in the shared file system cluster. This option is only available to the Db2 cluster services administrator and is not normally needed unless directed by service.

**-delete**

Deletes either the shared file system cluster or the network resiliency. This option is only available to the Db2 cluster services administrator and is not normally needed unless directed by service.

**-domain *domain-name***

Deletes the shared file system cluster.

**-network\_resiliency**

Deletes the condition and response resources for the adapter used by the cluster file system.

**-gpfsadapter**

Specifies the IBM Spectrum Scale adapter for the network

**-network\_resiliency** that is being deleted.

**-start**

This option is only available to the Db2 cluster services administrator and is not normally needed unless directed by service.

**-host host-name1...host-nameN**

Starts the shared file system processes on the specified hosts.

**-all**

Starts the shared file system processes on all hosts.

**-trace**

Enables AIX tracing of the IBM Spectrum Scale component.

**-stop**

This option is only available to the Db2 cluster services administrator and is not normally needed unless directed by service.

**-host host-name**

Stops the shared file system daemons on the specified host.

**-force**

Specifies that there is no check to ensure that operational quorum is kept.

**-all**

Stops the shared file system daemons on all hosts.

**-trace**

Stops the AIX tracing of the IBM Spectrum Scale component.

**-list**

Returns information about these options:

**-domain**

Returns the name of the shared file system cluster.

**-host host-name1...host-nameN**

Lists the hosts that are in the shared file system cluster.

**-state**

Returns the state of the hosts that are in the shared file system cluster.

**-network\_resiliency**

Lists the names of the network resiliency condition and response resources in the cluster.

**-gpfsadapter**

Lists the IBM Spectrum Scale adapter for the network

**-network\_resiliency**.**-resources**

Lists the contents of the network resiliency condition and response resources in the cluster.

## Examples

### Example 1

To list the file systems, use the following **db2cluster** command:

```
db2cluster -cfs -list -filesystem
```

### Example 2

To list any alerts for cluster elements, use the following **db2cluster** command:

```
db2cluster -cm -list -alert
```

The following is a sample output when you run the command:

```
Alert: Db2 member '0' failed to start on its home host 'HostA'.
The cluster manager will attempt to restart the Db2 member
in restart light mode on another host. Check the db2diag.log
for messages concerning failures on host 'HostA' for member '0'."
```

Action: This alert must be cleared manually with the command:  
'db2cluster -cm -clear -alert'.

Impact: Db2 member '%0' will not be able to service requests  
until this alert has been cleared and the Db2 member  
returns to its home host.

## Usage notes

If the ALERT column has a YES entry after running the command `db2instance -list`, the `db2cluster -cm -list -alert` command can be used to find out more information about corrective action.

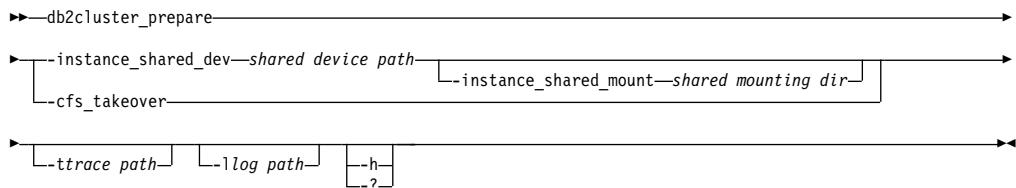
## **db2cluster\_prepare - Create a Db2 managed GPFS cluster and file system**

Create a Db2 managed IBM Spectrum Scale cluster and file system.

### Authorization

Root user authority

### Command syntax



### Command parameters

#### **-instance\_shared\_dev shared device path**

Specifies a shared raw disk device to store instance shared files and default database path when the Db2 pureScale instance is created. For example, /dev/hdisk1.

#### **-instance\_shared\_mount shared mounting dir**

Specifies the mount point for a new IBM Spectrum Scale. The specified path must be a new and empty path that is not nested inside an existing IBM Spectrum Scale file system.

#### **-cfs\_takeover**

Specifies for Db2 to take control of a cluster. The cluster configuration must meet the minimum requirements for a Db2 pureScale environment.

**-t trace path**

The full path and name of the trace file.

**-l log path**

The full path and name of the log file. If this parameter is not specified, the utility creates the log file at the default file path:/tmp/db2cluster\_prepare.log.

**-h or -?**

Displays the usage information.

## Usage notes

In a Db2 pureScale environment, all data and logs must be on a IBM Spectrum Scale file system. Existing data and logs that are not on IBM Spectrum Scale file system must be moved to one before upgrading to a Db2 pureScale environment.

The **db2cluster\_prepare** command is used to set up a IBM Spectrum Scale cluster and file system that are managed by Db2 cluster services. The command creates the IBM Spectrum Scale cluster and file system, so that the data and logs can be moved to it in preparation for the upgrade to a Db2 pureScale.

To have Db2 cluster services manage an existing IBM Spectrum Scale cluster, specify the **-cfs\_takeover** option. This command does not support creating multiple file systems.

## db2cmd - Open Db2 command window

Opens the CLP-enabled Db2 window, and initializes the Db2 command line environment. Issuing this command is equivalent to clicking the **Db2 Command Window** icon.

This command is only available on Windows operating systems.

### Authorization

None

### Required connection

None

### Command syntax

```
►—db2cmd— [option-flag] [command]
```

### Command parameters

**-c | /c** Run command following the **-c** option in a new Db2 command window, and then terminate. For example, **db2cmd -c dir** causes the **dir** command to be invoked in a new Db2 command window, and then the Db2 command window closes.

**-w | /w**

Run command following the **-w** option in a new Db2 command window, and wait for the new Db2 command window to be closed before you

terminate the process. For example, **db2cmd /w dir** invokes the **dir** command, and the process does not end until the new Db2 command window closes.

- i | /i Run command following the **-i** option while sharing Db2 command window and inheriting file handles. For example, **db2cmd -i dir** runs the **dir** command in the same Db2 command window.
- t | /t Run command following the **-t** option in a new Db2 CLP window with the specified command as the title of this new window.

### Usage notes

If DB21061E ("Command line environment not initialized.") is returned when you open the CLP-enabled Db2 window, the operating system might be running out of environment space. Check the config.sys file for the **SHELL** environment setup parameter, and increase its value. For example:

```
SHELL=C:\COMMAND.COM C:\ /P /E:32768
```

## db2convert - Convert row-organized tables into column-organized tables

Converts one or all row-organized user tables in a specified database into column-organized tables.

The row-organized tables remain online during command processing. For monitoring purposes, the command displays statistics about the conversion.

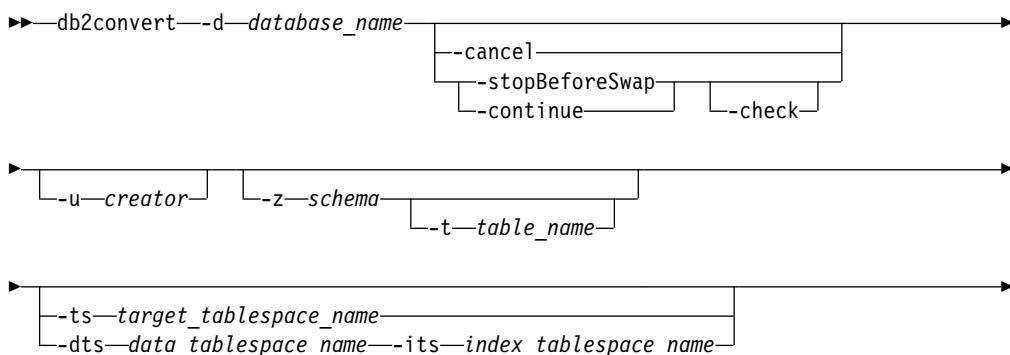
### Authorization

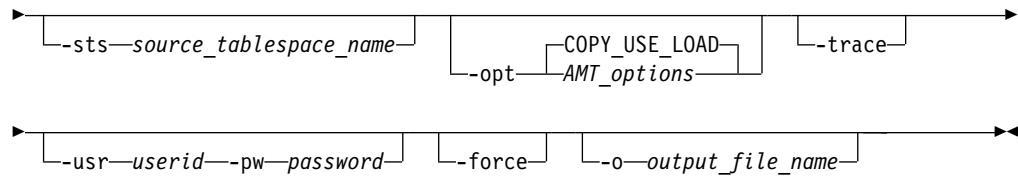
You must have SQLADM or DBADM authority to invoke the ADMIN\_MOVE\_TABLE stored procedure, on which the **db2convert** command depends. You must also have the appropriate object creation authorities, including the authority to issue the SELECT statement on the source table.

### Required Connection

None

### Command syntax





## Command parameters

**-d database\_name**

Specifies the name of the database that contains the row-organized tables that you want to convert into column-organized tables. You can convert only user-defined tables into column-organized tables.

**-cancel**

Specifies that all failed conversion operations are to be canceled. The command removes all intermediate data.

**-stopBeforeSwap**

Specifies that the utility stops before it performs the SWAP phase of the ADMIN\_MOVE\_TABLE stored procedure and prompts you to complete an online backup operation before continuing. Only the INIT, COPY, and REPLAY phases of the stored procedure are performed.

**-continue**

Specifies that the utility performs the SWAP and CLEANUP phases of the ADMIN\_MOVE\_TABLE stored procedure to complete the conversion process. Afterward, the original table is kept or removed, as specified by the *AMT\_options* option.

**-check** Specifies that only conversion notes are displayed. No tables are converted.

**-u creator**

Specifies the creator ID for one or more tables to convert.

**-z schema**

Specifies the schema name of one or more tables to convert.

**-t table\_name**

Specifies the unqualified name of the table to convert.

**-ts target\_tablespace\_name**

Specifies the table space in which the column-organized tables are created.

**-dts data\_tablespace\_name**

Specifies the table space for the column-organized data.

**-its index\_tablespace\_name**

Specifies the table space for the unique indexes on the column-organized tables.

These indexes are restricted to page map indexes and modification state indexes in support of enforced primary key constraints and unique constraints.

**-sts source\_tablespace\_name**

Specifies that only tables in the named table space are converted.

**-opt** Species options for the conversion operation.

**COPY\_USE\_LOAD**

Specifies that the ADMIN\_MOVE\_TABLE procedure is to copy the data by default.

### *AMT\_options*

Specifies a string that contains one or more ADMIN\_MOVE\_TABLE procedure options. If you specify more than one option, you must separate the options by commas; for example, -opt 'COPY\_USE\_LOAD, COPY YES, COPY\_STATS, KEEP'.

**-trace** Specifies that an ADMIN\_MOVE\_TABLE procedure trace is generated for diagnostic purposes.

**-usr userid**

Specifies the user ID that the **db2convert** command uses to log on to a remote system.

**-pw password**

Specifies the password that the **db2convert** command uses to log on to a remote system.

**-force** Specifies that all table types are to be converted, including range partitioned tables, multidimensional clustering (MDC) tables, and insert time clustering (ITC) tables.

**-o output\_file\_name**

Specifies the file to which all messages are written.

## Usage notes

IBM InfoSphere® Optim™ Query Workload Tuner Version 4.1 includes the Workload Table Organization Advisor, which examines all of the tables that are referenced by the statements in a query workload. Its recommendations lead to the best estimated performance improvement for the query workload as a whole. The advisor presents its analysis and rationales so that you can see the tables that are recommended for conversion from row to column organization. For complete details about the Workload Table Organization Advisor, see [http://www.ibm.com/support/knowledgecenter/SS62YD\\_4.1.1/com.ibm.datatools.qrytune.workloadtunedb2luw.doc/topics/genrecswtoa.html](http://www.ibm.com/support/knowledgecenter/SS62YD_4.1.1/com.ibm.datatools.qrytune.workloadtunedb2luw.doc/topics/genrecswtoa.html).

Table conversion is permanent and cannot be undone.

Because this command calls the ADMIN\_MOVE\_TABLE stored procedure, the command inherits all restrictions that apply to the procedure.

You cannot convert the following table types into column-organized tables:

- Range clustered tables
- Typed tables
- Materialized query tables
- Declared global temporary tables
- Created global temporary tables

**Important:** Range partitioned tables, MDC tables, and ITC tables are not converted by default. To convert these table types, use the **-force** option.

Tables in nonautomatic storage table spaces and tables with columns of type BLOB, BLOB, CLOB, or XML cannot be converted into column-organized tables.

The following table attributes are not used during conversion to column-organized tables:

- Triggers

- Secondary indexes

If they are not required, drop any dependent objects that cannot be transferred to column-organized tables before invoking the **db2convert** command.

The following table attributes are used as NOT ENFORCED during conversion to column-organized tables:

- Foreign keys
- Check constraints

The table conversion process temporarily requires space for both the source and the target tables.

Because there is no online process to convert column-organized tables back to row-organized tables, the best practice is to perform a backup before you convert the tables to column organization.

If the database is recoverable and you don't specify **-opt** parameter, or in **-opt** parameter, you don't specify **COPY\_USE\_LOAD** with sub-option **COPY YES**, performing the conversion in three separate steps is strongly recommended in order to ensure recoverability:

1. Invoke the **db2convert** command, specifying the **-stopBeforeSwap** option.
2. Perform a manual online backup of the target table space or table spaces.
3. Invoke the **db2convert** command, specifying the **-continue** option.

If the table being converted has foreign key (referential integrity) constraints, expect a long offline phase for the table during conversion.

## Examples

### Full database conversion

To convert all the tables in MYDATABASE into column-organized tables, issue the following command after you perform a full database backup:

```
db2convert -d mydatabase
```

After an initialization period, the command output shows information about the table size and compression ratios, as shown in the following example:

Table	NumRows	RowsComm	InitSize(MB)	FinalSize(MB)	CompRate(%)	Progress(%)
USER.TABLE1	1500000	0	105.47	0.26	99.76	0
USER.TABLE2	1500000	0	105.47	0.26	99.76	0
USER.TABLE3	1500000	0	105.47	0.26	99.76	0
Total Pre-Conversion Size (MB): 316.42						
Total Post-Conversion Size (MB): 0.77						
Total Compression Rate (Percent): 99.76						

**RowsComm** represents the number of rows that were converted so far.

### Single table conversion

To convert a single table (TABLE1 with schema USER in MYDATABASE) that the Workload Table Organization Advisor identified as a good candidate for conversion, issue the following command:

```
db2convert -d mydatabase -z user -t table1
```

This command returns the following sample output:

Table	NumRows	RowsComm	InitSize(MB)	FinalSize(MB)	CompRate(%)	Progress(%)
USER.TABLE1	1500000	0	105.47	0.26	99.76	0

```
Total Pre-Conversion Size (MB): 105.47
Total Post-Conversion Size (MB): 0.26
Total Compression Rate (Percent): 99.76
```

#### Related information:

-  Technical article: Convert row-organized tables to column-organized tables in Db2 with BLU Acceleration

## db2cptsa - Install or update Db2 HA scripts

Installs or updates the Db2 high availability (HA) scripts in /usr/sbin/rsct/sapolicies/db2 on UNIX and Linux operating systems. You need these Db2 HA scripts to use IBM Tivoli System Automation for Multiplatforms (SA MP) with the Db2 High Availability Feature.

### Authorization

Root user authority

### Required connection

None

### Command syntax

```
►►db2cptsa [-c] [-f] [-r] [-h] [-?] ►►
```

### Command parameters

- c** Verifies that the Db2 HA scripts exist in /usr/sbin/rsct/sapolicies/db2, and that they are at the proper level.
- f** Forces a reinstall of the Db2 HA scripts in /usr/sbin/rsct/sapolicies/db2. Without this argument, if the version of the Db2 HA scripts that are already installed is the same as or higher than the version of the scripts being installed, then the installed scripts are not overwritten.

When there are multiple versions of Db2 installed on the same server and one of them is using IBM Tivoli System Automation for Multiplatforms Base Component (SA MP Base Component) with the Db2 HA feature, then during db2 install, the HA scripts are overwritten by the new db2 installation in /usr/sbin/rsct/sapolicies/db2.

These Db2 HA scripts are needed to use the IBM Tivoli System Automation for Multiplatforms Base Component (SA MP Base Component) with the Db2 HA feature.

To put back the previous version for HA scripts, use this option.

- r** Removes the directory /usr/sbin/rsct/sapolicies/db2. This directory is where the Db2 HA scripts for SA MP are located. These scripts and this directory will only be removed if SA MP is not installed.

**-h | -?**

Displays help information.

## Usage notes

By default, this utility installs the Db2 HA scripts in /usr/sbin/rsct/sapolicies/db2 if they aren't already installed there, or if the version of the scripts already installed is older than the version of the scripts being installed. This utility installs or updates the Db2 HA scripts if and only if SA MP is already installed.

This command can be found on the Db2 install media in the db2/*plat*/tsamp directory, where *plat* is:

- aix for Db2 for AIX 5L™
- linux for Db2 for Linux on 32-bit AMD and Intel systems (x86)
- linuxamd64 for Db2 for Linux on AMD64 and Intel EM64T systems (x64)
- linuxppc for Db2 for Linux on POWER® (System i and IBM Power Systems™) systems
- linux390 for Db2 for Linux on System z9® and zSeries

The command is also available at *DB2DIR*/install/tsamp directory where *DB2DIR* is the installation path of the Db2 database product for UNIX and Linux operating systems.

## db2credman - Credential and security key management

Use this tool for credential and key management tasks.

### Authorization

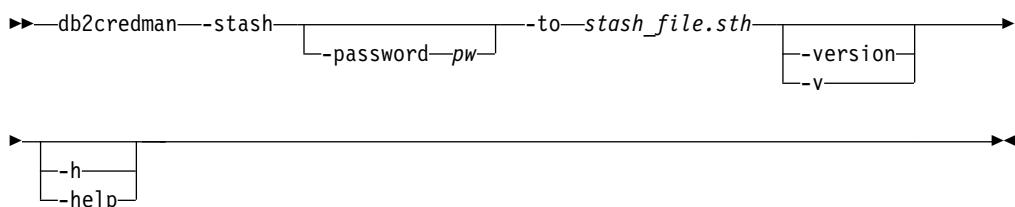
SYSADM

### Required connection

None

### Command syntax

#### db2credman command



### Command parameters

#### -stash

Stores the password in obfuscated form in a stash file. A stash file allows the database manager to read the obfuscated password when the PKCS #11 keystore is accessed.

#### -password *pw*

Specifies the keystore password to be stashed. If a password is not specified, you will be prompted to provide one.

#### -to *stash\_file.sth*

Specifies the path to the file where the password is stashed.

**-version or -v**

Prints the program's version.

**-h or -help**

Displays the help for this command.

## Examples

- To stash the password to a file:

```
db2credman -stash -password Str0ngPassw0rd -to ~/pkcs11_pwd.sth
```

This example stashes the provided password to the file pkcs11\_pwd.sth

- To prompt for the password and stash it to a file:

```
db2credman -stash -to ~/pkcs11_pwd.sth
```

- To print the **db2credman** description and syntax information, type either of the following commands:

```
db2credman -help
```

or

```
db2credman -h
```

## Usage notes

- The **-stash** parameter is mandatory.
- The **-to** parameter is mandatory.

## db2dart - Database analysis and reporting tool

Examines databases for architectural correctness and reports any encountered errors.

Reports generated by the **db2dart** command are encoded in the same code page as the database being analyzed by the command. Similarly, parameter values specified as part of the **db2dart** command are interpreted with the same code page as the database being analyzed. The character string that is in the **db2dart** report file and input value is encoded in the database code page.

The **db2dart** command does not perform code page conversions.

When invoking the **db2dart** command, you can specify only one action. An action can support a varying number of options.

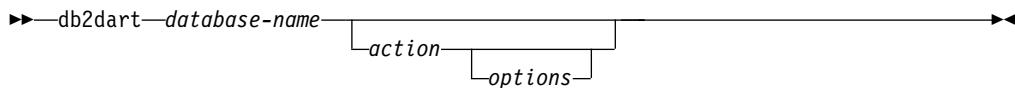
## Authorization

You must have SYSADM authority to use the **db2dart** command.

## Required connection

None. **db2dart** must be run with no users connected to the database.

## Command syntax



## Command parameters

### Inspection actions

- /DB** Inspects the entire database. This is the default option.
- /T** Inspects one or more tables. Requires two inputs: a table space ID, and either, the table object ID or a list of table object IDs, or the table name.
- /TSF** Inspects only storage group and table space files and containers.
- /TSC** Inspects the table space constructs of one or more table spaces, but does not inspect tables. Requires one input: the table space ID or a list of table space IDs.
- /TS** Inspects one or more table spaces and their tables. Requires one input: the table space ID or a list of table space IDs.
- /ATSC** Inspects constructs of all table spaces, but not their tables.

### Data formatting actions

- /DC** Dumps formatted column-organized table data. Requires five input values: a table object ID or table name, table space ID, starting page number, number of pages, and verbose choice.
- /DD** Dumps formatted table data. If present, inline LOB data is also shown. Requires five input values: either a table object ID or table name, table space ID, page number to start with, number of pages, and verbose choice.
- /DI** Dumps formatted index data. Requires five input values: either a table object ID or table name, table space ID, page number to start with, number of pages, and verbose choice.
  - For nonpartitioned indexes on partitioned tables, the **/DI** action uses INDEX\_OBJECTID and TBSPACEID from SYSCAT.INDEXES as the first two inputs to the **/OI** and **/TSI** options. The table name (**/TN**) option is not supported for the action.
  - For partitioned indexes on partitioned tables, the **/DI** action uses PARTITIONOBJECTID and TBSPACEID from SYSCAT.DATAPARTITIONS. The table name (**/TN**) option is not supported for the action.
- /DM** Dumps formatted block map data. Requires five input values: either a table object ID or table name, table space ID, page number to start with, number of pages, and verbose choice. The data shows whether a block has been reclaimed for use by the table space following a reorganization to reclaim multidimensional clustering (MDC) or insert time clustering (ITC) table blocks that were empty.
- /DP** Dumps pages in hex format.

- For permanent object in DMS table space, action **/DP** requires three input values consisting of table space ID, page number to start with, and number of pages.
- For permanent object in SMS table space, action **/DP** requires five input values consisting of table space ID, object ID, page number to start with, number of pages, and object type.

**/DTSF** Dumps formatted table space and storage group file information.

#### **/DEMP**

Dumps formatted extent map page (EMP) information for a DMS table. Requires two input values: table space ID and the table object ID or table name.

#### **/DDEL**

Dumps formatted table data in delimited ASCII format. Requires four input values: a table object ID or table name, table space ID, page number to start with, and number of pages.

For column-organized tables, the **/DDEL** parameter accepts a range of logical row numbers instead of a range of pages. The logical row number uniquely identifies a row in a column-organized table and is analogous to a RID in a row-organized table. If both the first logical row number and the number of logical rows are 0, all rows in the column-organized table are dumped. If only the number of logical rows is 0, all rows from first logical row number to the last row of the table are dumped.

The dumped delimited ASCII file is encoded in the database code page. The **db2dart** command does not perform code page conversions.

The **/DDEL** parameter supports only the following column data types. If a table contains columns with any other data type, the column is skipped and not included in the delimited ASCII file.

- SMALLINT
- FLOAT
- REAL
- INTEGER
- TIME
- DECIMAL
- CHAR()
- VARCHAR()
- DATE
- TIMESTAMP
- BIGINT

If a column of type CHAR and VARCHAR contains any binary data, or is defined with FOR BIT DATA, the **/DDEL** parameter generates the DEL file which contains the binary data. When you load data from the DEL file to the table using the **LOAD** command, ensure that you always specify the modified by delprioritychar option. When you insert data into the table from the DEL file using the **IMPORT** command, make sure that you always specify the modified by delprioritychar codepage=x option where x is the code page of the data in the input data set.

#### /DHWM

Dumps high water mark information. Requires one input value: table space ID.

**/DXA** Dumps formatted XML column data in ASCII format. Requires five input values: either a table object ID or table name, table space ID, page number to start with, number of pages, and verbose choice.

**/DXH** Dumps formatted XML column data in HEX format. Requires five input values: either a table object ID or table name, table space ID, page number to start with, number of pages, and verbose choice.

#### /LHWM

Suggests ways of lowering the high water mark. Requires two input values: table space ID and number of pages (required high water mark).

### Repair actions

**/ETS** Extends the table limit in a 4 KB table space (DMS only), if possible. Requires one input value: table space ID.

**/MI** Marks index as invalid. When specifying this parameter the database must be offline. Requires two input values: table space ID and index object ID. For partitioned indexes, these values can be obtained from INDPARTITIONOBJECTID and INDPARTITIONTBSpaceID for SYSCAT.INDEXPARTITIONS.

#### /RHWM

Reduces high water mark through empty SMP extents. When specifying this parameter the database must be offline. Requires one input value: table space ID.

**Note:** You must use the **ALTER TABLESPACE REDUCE** command to remove empty SMP extents. You can also use the **ALTER TABLESPACE LOWER HIGH WATER MARK** command to remove empty SMP extents and lower high water mark if the table space is enabled with reclaimable storage. You can use the **ALTER TABLESPACE** command while the database is online.

### Change state actions

#### /CHST

Change the state of a database. When specifying this parameter the database must be offline. Requires one input value: database backup pending state.

### Help

**/H** Displays help information.

### Input value options

#### /OI *object-id*

Specifies the object ID. For the **/T** action, a comma-separated list of up to 64 objects IDs can be specified. If the corresponding **/TSI** option contains more than one input ID, only the first ID is used. Duplicate IDs are skipped. Logical IDs can be specified for the **/T** action.

#### /TN *table-name*

Specifies the table name in upper case unless it is a delimited identifier.

**/TSI** *tablespace-id*

Specifies the table space ID. For the **/TS** or **/TSC** actions, a comma-separated list of up to 64 physical table space IDs can be specified. Duplicate IDs are skipped.

**/ROW** *sum*

Identifies whether long field descriptors, LOB descriptors, and control information should be checked. You can specify just one option or add the values to specify more than one option.

- 1** Checks control information in rows.
- 2** Checks long field and LOB descriptors.

**/RPT** *path*

Optional path for the report output file.

**/RPTN** *file-name*

Optional name for the report output file.

**/PS** *number*

Specifies the page number to start with. When used with the **/DP** action, the p suffix can be used for pool relative addressing. Specifying **/PS 0 /NP 0** will cause all pages in the specified object to be dumped.

**/NP** *number*

Specifies the number of pages. Specifying **/PS 0 /NP 0** will cause all pages in the specified object to be dumped.

**/V** *option*

Specifies whether or not the verbose option should be implemented. Valid values are:

- Y** Specifies that the verbose option should be implemented.
- N** Specifies that the verbose option should not be implemented.

**/SCR** *option*

Specifies type of screen output, if any. Valid values are:

- Y** Normal screen output is produced.
- M** Minimized screen output is produced.
- N** No screen output is produced.

**/RPTF** *option*

Specifies type of report file output, if any. Valid values are:

- Y** Normal report file output is produced.
- E** Only error information is produced to the report file.
- N** No report file output is produced.

**/ERR** *option*

Specifies type of log to produce in DART.INF, if any. Valid values are:

- Y** Produces normal log in DART.INF file.
- N** Minimizes output to log DART.INF file.
- E** Minimizes DART.INF file and screen output. Only error information is sent to the report file.

#### **/WHAT DBBP option**

Specifies the database backup pending state. Valid values are:

- OFF** Off state.
- ON** On state.

#### **/QCK sum**

Specifies which quick option to perform. You can specify one option or add the values together to perform multiple quick options.

- 1** The **/QCK 1** option applies to only the **/DB**, **/T**, and **/TS** actions. This option inspects page 0 of the DAT objects and partially inspects the index objects (does not inspect BMP, LOB, LF objects and does not traverse the entirety of the DAT or INX objects). This is the default option.
- 2** The **/QCK 2** option applies to only the **/DB**, **/T**, **/TS**, **/DD**, **/DI**, **/DM**, **/DEMP**, **/DDEL**, **/DXA**, and **/DXH** actions. This option skips the system catalog table lookup on nonpartitioned database environments and on the catalog partition of partitioned database environments. This option has no effect on non-catalog partitions of partitioned database environments. The **/QCK 2** option does not apply to the actions mentioned earlier if the **/TN** option is specified with a table name or if the **/OI** and **/TSI** options are specified with logical IDs.
- 4** The **/QCK 4** option applies to only the **/T**, **/TS**, and **/TSC** actions. This option skips special system catalog table inspection or system catalog table space inspection. For the **/TS**, and **/TSC** actions, the **/QCK 4** option skips the special system catalog table inspection. For the **/T** action, the **/QCK 4** option skips inspection of the system catalog table space constructs.
- 8** The **/QCK 8** option applies to only the **/T**, and **/TS** actions. This option skips the inspection of containers. For the **/T** action, the **/QCK 8** option skips the inspection of all container files. For the **/TS** action, the **/QCK 8** option inspects only container files that are associated with the specified table space.

#### **/TYP option**

Specifies the type of object. Valid values are:

- DAT** Object type is DAT.
- INX** Object type is INDEX.
- BKM** Object type is BMP.

#### **Keystore password options**

The following options are valid for an encrypted database if the keystore password is not stashed.

#### **/KPW password**

Specifies the password to use when opening the keystore.

#### **/KPWA fd:file\_descriptor | filename:file\_name**

Specifies the keystore password arguments. The *file\_descriptor* parameter specifies a file descriptor that identifies an open and

readable file or pipe that contains the password to use. The *file\_name* parameter specifies the fully qualified name of the file that contains the password to use.

#### /KPWP

Specifies that the user is to be prompted for a password.

### Examples

#### Example 1

To dump 1000 pages of formatted index data on a non-range partitioned table with object ID 4 in a table space with ID 2 and starting with page zero, use the following **db2dart** command:

```
db2dart IXMLDB /DI /TSI 2 /OI 4 /V Y /PS 0 /NP 1000
```

#### Example 2

To dump formatted block map data on range partitioned tables, use the following **db2dart** command:

```
db2dart IXMLDB /DM /TSI 2 /OI 8 /V Y /PS 0 /NP 1000
```

Where 8 is the value of **partitionobjectid** and 2 is the value of **tbspaceid** from SYSCAT.DATAPARTITIONS.

#### Example 3

To dump formatted table space and storage group file information for database testdb, use the following command:

```
db2dart testdb /DTSF
```

The following is an example output generated by the previous command:

```
Storage group file (automatic storage) report phase start.
```

```
Header version: 33
Header flavour: 1
Checksum: 0x5402d18f
Number of storage groups: 1
Default storage group ID: 0
Header Last LSN: 0x0000000000003D4A4

Storage group ID: 0
Storage group name: IBMSTOGROUP
Data Tag: 5
Flavour: 3
Version: 5
State flags: 0x0000000000000000
Last LSN: 0x0000000000003D4A4
Initial LSN: 0x0000000000000000
Checksum: 0x1e587275

Number of storage paths: 1
Storage path # 0: /filesystem1 (id = 0, state = 0x0)
```

```
Storage group file (automatic storage) report phase end.
```

```
Tablespace file report phase start.
```

```
Tablespace information for current database:

```

```
Number of defined tablespaces: 4
High water mark of used pools: 3
Number of disabled tablespaces: 0
```

```
Individual tablespace details:

```

```
Information for Tablespace ID: 0
```

```

Tablespace name: SYSCATSPACE
Table space flags (HEX): 3102
Table space type: Database Managed Space (DMS), Automatic Storage, Auto-Resize
Page size: 4096
Extent size: 4
Prefetch size: 4
Version: 104
Tablespace state: 0
Number of quiescers: 0
Storage Group ID: 0
Source Storage Group ID: -1
Data Tag: 0
Usable pages in tablespace: 25340
Total pages in tablespace: 25344
Initial Size: 1048576 bytes
Increment : -4096 bytes
Maximum Size: None
Last Resize: None
Last Resize Failed: No
SMP page for first free extent: 4
SMP page for last allocated tablespace extent. 4
SMP extent number of the last initialized SMP extent: 0
High Water Mark: 25164
. . .
```

#### Example 4

To inspect table spaces with IDs 3, 4, 5, 8, 9, and 11, and to skip the system catalog table lookup and the special system catalog table inspection, use the following **db2dart** command. Only the containers associated with the specified table spaces are inspected.

```
db2dart <dbname> /TS /TSI 3,4,5,6,9,11 /QCK 14
```

Where the /QCK 14 option represents the addition of quick options 2, 4, and 8. The /QCK 14 option performs all the individual operations of quick options 2, 4, and 8.

#### Example 5

To dump formatted table data in delimited ASCII format, use the following command:

```
db2dart inspdb /ddel
```

The following is an example output generated by the previous command:

Connecting to Buffer Pool Services...

```
Table object data formatting start.
Please enter
Table ID or name, tablespace ID, first page or logical row,
num of pages or logical rows (may suffix page number with
'p' for pool relative if working with a pool-relative
tablespace):
39,2,0,0
```

```
4 of 4 columns in the table will be dumped.
Column numbers and datatypes of the columns dumped:
0 INTEGER
1 INTEGER
2 BIGINT
3 BIGINT
```

```
Default filename for output data file is BLUDB_TS2T39.DEL,
Do you wish to change filename used? y/n
n
```

Filename used for output data file is BLUDB\_TS2T39.DEL.  
If the file exists, the data will be overwritten.

Dumping delimited ASCII data of COL object ...  
Table object data formatting end.

### Usage notes

- If you do not specify all the required input values when you invoke the **db2dart** command, you will be prompted for the values. For the **/DDEL** action, the options cannot be specified from the command line, and must be entered when prompted by **db2dart**.
- The **/ROW**, **/RPT**, **/RPTN**, **/SCR**, **/RPTF**, **/ERR**, and **/WHAT DBBP** options can all be invoked in addition to the action. They are not required by any of the actions.
- The **/DB**, **/T** and **/TS** options inspect the specified objects, including associated XML storage objects. The **/DB** option includes all XML storage objects in the database, the **/T** option includes XML storage objects associated with the specified table, and the **/TS** option inspects all XML storage objects whose parent objects exist in the specified table space. As well, the **/DEMP** option will dump formatted EMP information including that for associated XML storage objects.
- When **db2dart** is run against a single table space, all dependent objects for a parent table in that table space are checked, irrespective of the table space in which the dependent objects reside. However, extent map page (EMP) information is not captured for dependent objects that reside outside of the specified table space. EMP information is captured for dependent objects found in the specified table space even when the parent object resides in a table space other than the one specified.
- For partitioned tables, the **/DD**, **/DM**, **/DEMP**, **/DDEL**, **/DP**, **/DXA**, **/DXH** actions use partitionobjectid and tbspaceid from syscat.datapartitions as the input to the table object ID (**/OI**) and table space ID (**/TSI**) for a specific partition. The table name option (**/TN**) is not supported for these actions. The **/T** action supports the table name or global table object ID when use with global table space ID to check the entire table, and also supports using partitionobjectid and tbspaceid from syscat.datapartitions as the input to **/OI** and **/TSI** to check a specific partition.
- In general, run the **db2dart** command when the database is offline. However, you do not need an offline database if you are specifying either the **/DHWM** and **/LHWM** actions. The report could be generated without the database being offline, but the reliability of the results will vary depending on how much write/update activity has occurred recently (less activity implies more reliable results).
- **db2dart** does not process log records or read bufferpool pages. So false error messages can be generated if the report is run when Db2 is either in a recovery pending state or in an active state. When the "database is not consistent" message is raised, apply the required transaction log record to make the database consistent. Then, evaluate the error messages carefully before you decide to restore the database. If the database is online, either stop the database or use the **INSPECT** command.

### db2daslevel - Show DAS level

Shows the current level of the DAS on the system.

Output from this command goes to the console by default.

**Important:** This command has been deprecated and might be removed in a future release because the Db2 administration server (DAS) has been deprecated in

Version 9.7. For more information, see “Db2 administration server (DAS) has been deprecated” at [http://www.ibm.com/support/knowledgecenter/SSEPGG\\_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0059276.html](http://www.ibm.com/support/knowledgecenter/SSEPGG_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0059276.html).

## Authorization

None

## Required Connection

None

## Command Syntax

►—db2daslevel—►

## Command parameters

None

# db2dclgn - Declaration generator

Generates declarations for a specified database table, eliminating the need to look up those declarations in the documentation. The generated declarations can be modified as necessary. The supported host languages are C/C++, COBOL, JAVA, and FORTRAN.

## Authorization

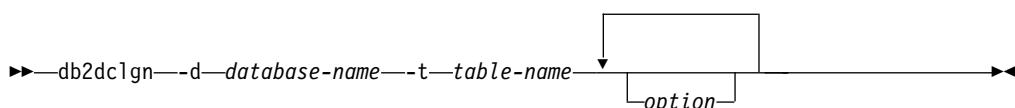
None

## Required connection

None

## Command syntax

►—db2dclgn—*d*—*database-name*—*t*—*table-name*—►



## Command parameters

### -d *database-name*

Specifies the name of the database to which a connection is to be established.

### -t *table-name*

Specifies the name of the table from which column information is to be retrieved to generate declarations.

### *option*

One or more of the following options:

#### -a *action*

Specifies whether declarations are to be added or replaced. Valid values are ADD and REPLACE. The default value is ADD.

**-b *lob-var-type***

Specifies the type of variable to be generated for a LOB column. Valid values are:

**LOB (default)**

For example, in C, SQL TYPE is CLOB(5K) x.

**LOCATOR**

For example, in C, SQL TYPE is CLOB\_LOCATOR x.

**FILE**

For example, in C, SQL TYPE is CLOB\_FILE x.

**-c** Specifies whether the column name is to be used as a suffix in the field name when a prefix (-n) is specified. If no prefix is specified, this option is ignored. The default behavior is to not use the column name as a suffix, but instead to use the column number, which starts at 1.

**-i** Specifies whether indicator variables are to be generated. Since host structures are supported in C and COBOL, an indicator table of size equal to the number of columns is generated, whereas for JAVA and FORTRAN, individual indicator variables are generated for each column. The names of the indicator table and the variable are the same as the table name and the column name, prefixed by "IND-" (for COBOL) or "ind\_" (for the other languages). The default behavior is to not generate indicator variables.

**-l *language***

Specifies the host language in which the declarations are to be generated. Valid values are C, COBOL, JAVA, and FORTRAN. The default behavior is to generate C declarations, which are also valid for C++.

**-n *name***

Specifies a prefix for each of the field names. A prefix must be specified if the -c option is used. If it is not specified, the column name is used as the field name.

**-o *output-file***

Specifies the name of the output file for the declarations. The default behavior is to use the table name as the base file name, with an extension that reflects the generated host language:

.h for C  
.cbl for COBOL  
.java for JAVA  
.f for FORTRAN (UNIX)  
.for for FORTRAN (INTEL)

**-p *password***

Specifies the password to be used to connect to the database. It must be specified if a user ID is specified. The default behavior is to provide no password when establishing a connection.

**-r *remarks***

Specifies whether column remarks, if available, are to be used as comments in the declarations, to provide more detailed descriptions of the fields.

**-s *structure-name***

Specifies the structure name that is to be generated to group all the fields in the declarations. The default behavior is to use the unqualified table name.

**-u *userid***

Specifies the user ID to be used to connect to the database. It must be

specified if a password is specified. The default behavior is to provide no user ID when establishing a connection.

- v Specifies whether the status (for example, the connection status) of the utility is to be displayed. The default behavior is to display only error messages.

**-w DBCS-var-type**

Specifies whether sqldbchar or wchar\_t is to be used for a GRAPHIC, VARGRAPHIC, or DBCLOB column in C.

**-y DBCS-symbol**

Specifies whether G or N is to be used as the DBCS symbol in COBOL.

**-z encoding**

Specifies the encoding the coding convention in accordance to the particular server. Encoding can be either LUW or OS390. If OS390 is specified, the generated file would look identical to a file generated by OS/390.

## Examples

```
db2dc1gn -d sample -t emp_resume -l cobol -a replace
```

## db2diag - db2diag logs analysis tool

Filters and formats both single and rotating db2diag log files. The **db2diag** command reads from rotating db2diag log files if setting the **diagsize** database manager configuration parameter. Otherwise, by default, the command reads from the default db2diag.log file.

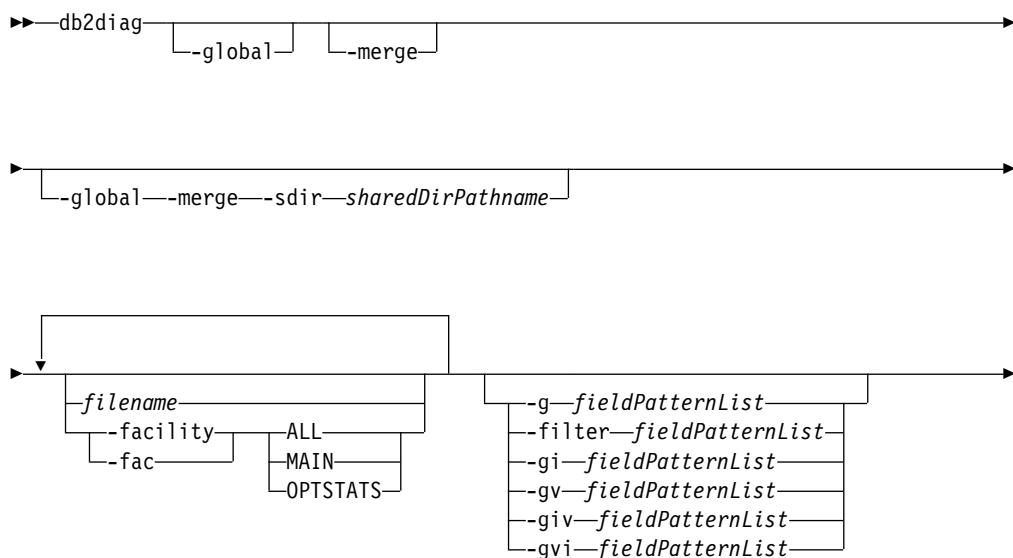
## Authorization

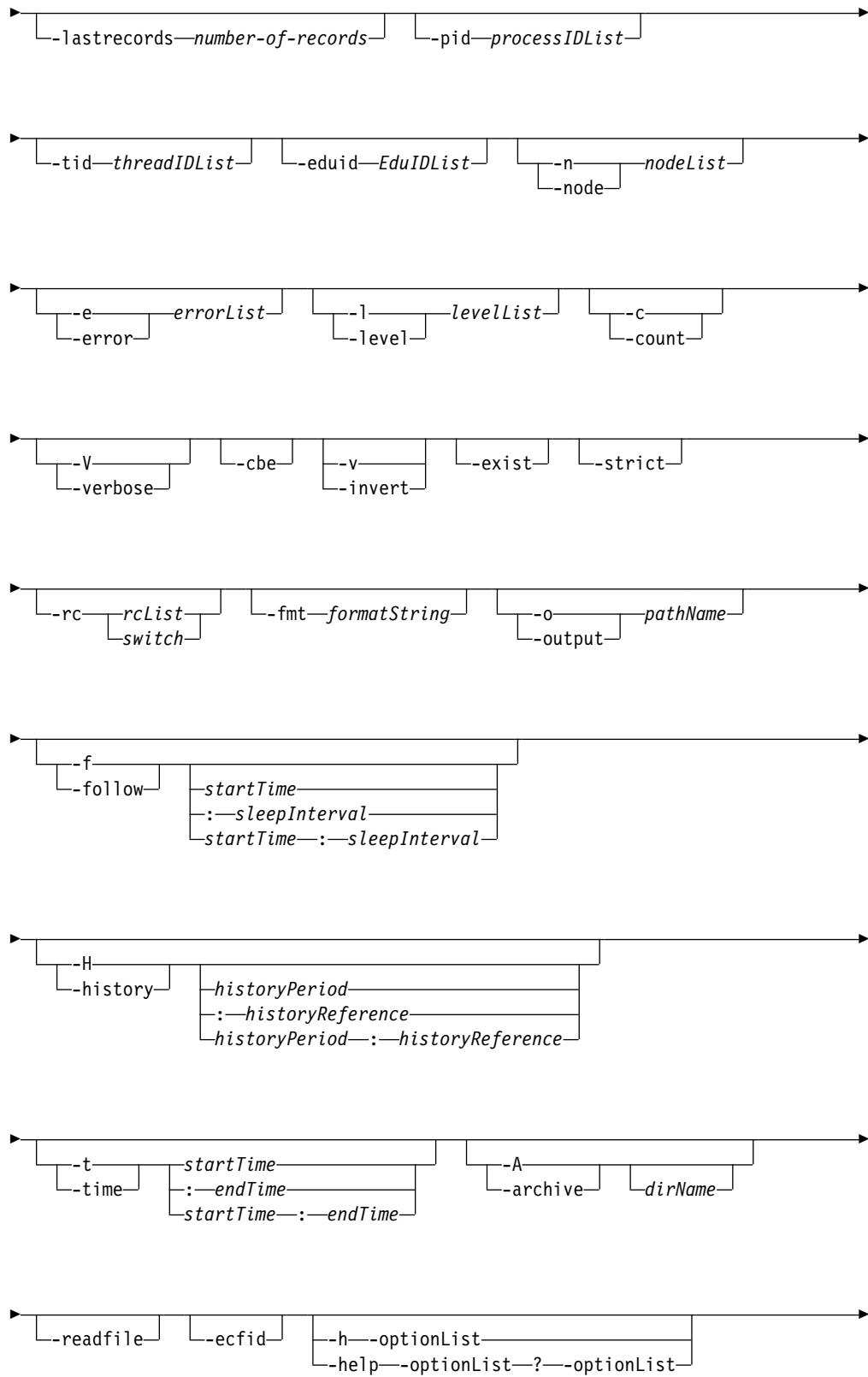
None

## Required connection

None

## Command syntax







## Command parameters

### **-global**

Specifies that all the **db2diag** log files from all the database partitions on all the hosts are included in the log file processing.

**Note:** This option supports rotating diagnostic log files and files located in split diagnostic data directories. This option can also be used in combination with the **-follow** option.

### **-merge**

Merges diagnostic log files and sorts the records based on the timestamp. This option supports rotating diagnostic log files and files located in split diagnostic data directories.

If this parameter is not followed by two or more space-separated *filename* values, the **db2diag** log files in the directory or directories specified by the **diagpath** database manager configuration parameter and **alt\_diagpath** database manager configuration parameter are merged. If the diagnostic data directory path is split across multiple database partitions, only the **db2diag** log files in the database partitions of the current host are merged.

If only one *filename* is specified, or only one diagnostic file exists in the path specified in the **diagpath** database manager configuration parameter and if **alt\_diagpath** database manager configuration parameter is not set, then the single diagnostic log file is processed by the command as though the **-merge** command parameter was not specified.

This parameter is not allowed with the **-facility**, **-follow**, or **-archive** parameter. Starting with Db2 Version 9.7 Fix Pack 7, the **-merge** parameter supports automatically merging db2diag.log files in the alt\_diagpath directory.

### **-global -merge -sdir sharedDirPathname**

Specifying the **-global** and **-merge** options together results in all the **db2diag** log files from all the database partitions on all the hosts to be merged, and the records sorted based on the timestamp. This parameter supports rotating diagnostic log files and files located in split diagnostic data directories.

Must specify the **-sdir** *sharedDirPathname* parameter to temporarily store the merged diagnostic log files that are obtained from the different hosts. The temporary merged diagnostic log files are deleted after processing is complete. The *sharedDirPathname* variable must specify a shared directory to which all hosts have access and write permission.

### *filename*

Specifies one or more space-separated path names of Db2 diagnostic logs to process. If the file name is omitted, the **db2diag** log file from the current directory is processed. If the file is not found, the directory or directories set by the **diagpath** database manager configuration parameter is searched.

### **-facility | -fac**

Reads the files from the corresponding facility. A facility is a logical grouping of records. For example, all optimizer statistics records are

grouped into the OPTSTATS facility. The output will be in text format by default. Valid facility options are the following values:

**ALL** Returns records from all facilities.

**MAIN** Returns records from Db2 general diagnostic logs, such as the **db2diag** log file, and rotating event logs.

#### **OPTSTATS**

Returns records related to optimizer statistics.

#### **-fmt** *formatString*

Formats the **db2diag** output using a format string, *formatString*, containing record fields in the form `%field`, `#{@field}`, or `@{field}`. The `%{field}` and `@{field}` are used to separate a field name from the alphanumeric (or any other allowed character) that may follow the field name. All field names are case-insensitive. Field names can be shortened to the several first characters that are necessary to recognize a field name without ambiguity. In addition, aliases can be used for fields with long names. A prefix before a field name, %, or @, specifies whether a text preceding the field will be displayed (%) or not (@), if the field is empty.

The following fields are currently available:

#### **timestamp | ts**

Time stamp. This field can be divided into its constituent fields: `%tsyear`, `%tsmonth`, `%tsday`, `%tshour`, `%tsmin` (minute), `%tssec` (second), `%tsmsec` (microsecond for UNIX operating systems, millisecond for Windows operating systems).

#### **timezone | tz**

Number of minutes difference from UTC (Universal Coordinated Time). For example, -300 is Eastern Time.

#### **recordid | recid**

A unique alphanumeric identifier for a record, such as I11455A696.

#### **audience**

Intended audience for a logged message. 'E' indicates external users (IBM customers, service analysts, and developers). 'I' indicates internal users (service analysts and developers). 'D' indicates debugging information for developers.

**level** The diagnostic level of a message. The levels are Info, Warning, Error, Severe, Critical, and Event.

**source** Location from which the logged error originated: Origin, OS, Received, or Sent.

#### **instance | inst**

Instance name.

**node** Database partition server number.

#### **database | db**

Database name.

**pid** Process ID.

**tid** Thread ID.

**eduid** EDU ID.

#### **eduname**

EDU name.

<b>process</b>	Name associated with the process ID, in double quotation marks. For example, "db2sysc.exe".
<b>product</b>	Product name. For example, DB2 COMMON.
<b>component</b>	Component name.
<b>funcname</b>	Function name.
<b>probe</b>	Probe number.
<b>function</b>	Full function description: %prod, %comp, %funcname, probe:%probe.
<b>appid</b>	The application ID. This value is the same as the <b>appl_id</b> monitor element data. For detailed information about how to interpret this value, see <b>appl_id</b> - Application ID monitor element.
<b>coordnode</b>	Coordinator partition.
<b>coordindex</b>	Coordinator index.
<b>apphdl</b>	Application handle: %coordnode - %coordindex.
<b>message   msg</b>	Error message.
<b>calledprod</b>	Product name of the function that returned an error.
<b>calledcomp</b>	Component name of the function that returned an error.
<b>calledfunc</b>	Name of the function that returned an error.
<b>called</b>	Full description of the function that returned an error, in the form: %calledprod, %calledcomp, %calledfunc.
<b>rcval</b>	Return code value (32 bytes).
<b>rcdesc</b>	Error description.
<b>retcode   rc</b>	Return code returned by the function called: %rcval %rcdesc.
<b>errno</b>	System error number.
<b>errname</b>	System-specific error name.
<b>oserror</b>	Operating system error returned by a system call in the form: %errno %errname.
<b>callstack</b>	Call stack.
<b>datadesc</b>	Data description.

**dataobject**  
     Data object.

**data**    Full data section of a message in the form: %datadesc %dataobject.

**argdesc**  
     Argument description.

**argobject**  
     Argument object.

**arg**    Arguments of a function call that returned an error: %argdesc  
           %argobject.

**Event descriptions:**

**impact**  User impact (for events only).

**startevent**  
     Start event description (\*).

**stopevent**  
     Stop event description (\*).

**changeevent**  
     Change event description (\*).

**init**    Initialization event description (\*).

**fini**    Finish or finalize event description (\*).

**startup**  
     Startup event description (\*).

**terminate**  
     Terminate event description (\*).

**bringdown**  
     Bringdown event description (\*).

**interrupt**  
     Interrupt event description (\*).

**associate**  
     Associate event description (\*).

**disassociate**  
     Disassociate event description (\*).

**changecfg**  
     Change configuration event description (\*).

**transfer**  
     Transfer event description (\*).

**dispatch**  
     Dispatch event description (\*).

**switch**  Switch event description (\*).

**report**  Report event description (\*).

**get**     Get event description (\*).

**free**    Free event description (\*).

**open**    Open event description (\*).

**close**   Close event description (\*).

**work** Work event description (\*).  
**wait** Wait event description (\*).  
**available** Available event description (\*).  
**connect** Connect event description (\*).  
**disconnect** Disconnect event description (\*).  
**accept** Accept event description (\*).  
**recv** Receive event description (\*).  
**send** Send event description (\*).  
**create** Create event description (\*).  
**destroy** Destroy event description (\*).  
**request** Request event description (\*).  
**reply** Reply event description (\*).  
**dependency** Dependency event description (\*).  
**write** Write event description (\*).  
**read** Read event description (\*).  
**reset** Reset event description (\*).  
**collect** Collect event description (\*).  
**add** Add event description (\*).  
**alter** Alter event description (\*).  
**drop** Drop event description (\*).  
**invalidate** Invalidate event description (\*).  
**grant** Grant event description (\*).  
**revoke** Revoke event description (\*).

(\*) Each event field has the following subfields:

**{event}type**  
Event type (START, STOP, READ, WRITE, GET).

**{event}desc**  
Event description (header with event information).

**{event}state**  
Event state (success, failure, start, stop, in progress, idle) or event progress (in %).

**{event}attr**  
Event attributes (business level, cached, sync,

async, internal, external, logical, physical, auto, manual, temporary, permanent).

**{event}objid**

Unique object identifier (TABLE, CFG, DBM).

**{event}objname**

Event object name (for example, "schema.tablename").

**{event}objdata**

Object data (used if object is not a string or simple integer type, for example, data structure or some complex type).

**{event}qtype**

Event qualifier type (FROM, TO, ON, FOR, AT, BY, CONTEXT).

**{event}qname**

Event qualifier name or value (for example, FOR "DB ABC").

**{event}qdhdr**

Event qualifier data header (contains type, text description and size of data). Used together with the %{event}qdata field.

**{event}qdata**

Event qualifier data (used if qualifier is not a string or simple integer type, for example, some data structure or complex type).

In the preceding list, the *{event}* keyword should be substituted by event type for a specific event (for example, start, stop, change, read, or write).

To always display the text preceding a field name (for example, for the required fields), the % field prefix should be used. To display the text preceding a field name when this field contains some data, the @ prefix should be used. Any combination of required and optional fields with the corresponding text descriptions is allowed.

The following special characters are recognized within a format string: \n, \r, \f, \v, and \t.

In contrast to other fields, the data and argument fields can contain several sections. To output a specific section, add the [n] after the field name where n is a section number ( $1 \leq n \leq 64$ ). For example, to output the first data object and the second data description sections, use %{dataobj}[1] and %{datadesc}[2]. When [n] is not used, all sections logged are output using pre-formatted logged data exactly as appears in a log message, so there is no need to add the applicable text description and separating newline before each data field, argument field, or section.

**-filter fieldPatternList | -g fieldPatternList**

*fieldPatternList* is a comma-separated list of field-pattern pairs in the following format: *fieldName operator searchPattern*.

The operator can be one of the following values:

- = Selects only those records that contain matches that form whole words. (Word search.)

<b><code>:=</code></b>	Selects those records that contain matches in which a search pattern can be part of a larger expression.
<b><code>!=</code></b>	Selects only non-matching lines. (Invert word match.)
<b><code>!:=</code></b>	Selects only non-matching lines in which the search pattern can be part of a larger expression.
<b><code>^=</code></b>	Selects records for which the field value starts with the search pattern specified.
<b><code>!^=</code></b>	Selects records for which the field value does not start with the search pattern specified.

The same fields are available as described for the **`-fmt`** option, except that the % and @ prefixes are not used for this option.

**`-gi fieldPatternList`**

Same as the **`-gv`** parameter, but case insensitive.

**`-gv fieldPatternList`**

Searches for messages that do not match the specified pattern.

**`-gvi | -giv fieldPatternList`**

Same as **`-gv`**, but case-insensitive.

**`-lastrecords number-of-records`**

Displays and filters the last number of records specified from the db2diag log file. For each db2diag log file, this parameter checks whether the number of records specified are available. If the number of records available in the log file is less than the number of records you specified, the **db2diag** command processes all the records available in the file. If split diagnostic data directory paths are used, the last number of records specified is returned for each db2diag log file in each path.

**`-pid processIDList`**

Displays only log messages with the process IDs listed.

**`-tid threadIDList`**

Displays only log messages with the thread IDs listed.

**`-eduid EduIDList`**

Finds all records with a specified EDU ID from a list of EDU IDs containing one or more comma separated numeric values.

**`-n | -node nodeList`**

Displays only log messages with the database partition numbers listed.

**`-e | -error errorList`**

Displays only log messages with the error numbers listed.

**`-l | -level levelList`**

Finds all records with a specified severity level from a list of severity levels containing one or more comma separated text values, namely: Info, Warning, Error, Severe, Critical and Event.

**`-c | -count`**

Displays the number of records found.

**`-v | -invert`**

Inverts the pattern matching to select all records that do not match the specified pattern

**-strict**

Displays records using only one field: value pair per line. All empty fields are skipped. This can be used for scripts to simplify parsing.

**-V | -verbose**

Outputs all fields, including empty fields.

**-exist** Defines how fields in a record are processed when a search is requested. If this option is specified, a field must exist in order to be processed.

**-cbe** Common Base Event (CBE) Canonical Situation Data.

**-o | -output *pathName***

Saves the output to a file specified by a fully qualified *pathName*.

**-f | -follow**

If the input file is a single or rotating **db2diag** log file, specifies that the tool will not terminate after the last record of the input file has been processed. Instead, the command sleeps for a specified interval of time (*sleepInterval*), and then attempts to read and process further records from the input file as they become available. Only the records from the last 8 kilobytes of the input file are processed.

The **-f** parameter can handle rotating db2diag log files. For example, if the latest rotating diagnostic log file in use is db2diag.23.log, the command reads that file. When that file meets its size limit, the command then reads the next rotating log file that is created, which is db2diag.24.log.

This option can be used when monitoring records being written to a file by another process. The *startTime* option can be specified to show all the records logged after this time. The *startTime* option is specified using the following format: YYYY-MM-DD-hh.mm.ss.nnnnnn, where

**YYYY** Specifies a year.

**MM** Specifies a month of a year (01 through 12).

**DD** Specifies a day of a month (01 through 31).

**hh** Specifies an hour of a day (00 through 23).

**mm** Specifies a minute of an hour (00 through 59).

**ss** Specifies a second of a minute (00 through 59).

**nnnnnn**

Specifies microseconds on UNIX operating systems, or milliseconds on Windows operating systems.

Some or all of the fields that follow the year field can be omitted. If they are omitted, the default values will be used. The default values are 1 for the month and day, and 0 for all other fields.

If an exact match for the record time stamp does not exist in the diagnostic log file, the closest time earlier than the specified time stamp will be used.

The *sleepInterval* option specifies a sleep interval in seconds. If a smaller time unit is required, it can be specified as a floating point value. The default value is 2 seconds

**-H | -history**

Displays the history of logged messages for the specified time interval.

This option can be specified with the following options:

#### *historyPeriod*

Specifies that logged messages are displayed starting from the most recent logged record, for the duration specified by *historyPeriod*. The *historyPeriod* option is specified using the following format: *Number timeUnit*, where *Number* is the number of time units and *timeUnit* indicates the type of time unit: M (month), d (day), h (hour), m (minute), and s (second). The default value for *Number* is 30, and for *timeUnit* is m.

#### *historyPeriod:historyReference*

Specifies that logged messages are displayed that were recorded within the time period after the start time specified by *historyReference* (if an explicit positive value for *historyPeriod* is given), or logged messages are displayed that were recorded within the time period before the end time specified by *historyReference* (if a negative value for *historyPeriod* is given, or by default).

The format is YYYY-MM-DD-hh.mm.ss.nnnnnnn, where:

**YYYY** Specifies a year.

**MM** Specifies a month of a year (01 through 12).

**DD** Specifies a day of a month (01 through 31).

**hh** Specifies an hour of a day (00 through 23).

**mm** Specifies a minute of an hour (00 through 59).

**ss** Specifies a second of a minute (00 through 59).

**nnnnnnn**

Specifies microseconds (UNIX operating systems) or milliseconds (Windows operating systems).

#### **-t | -time**

Specifies a time stamp value. This option can be specified with one or both of the following options:

##### *startTime*

Displays all messages that are logged at *startTime* and after the *startTime*.

##### *endTime*

Displays all messages that are logged before *endTime* and at *endTime*.

To display messages that are logged from *startTime* to *endTime*, specify **-t startTime:endTime**.

The format is YYYY-MM-DD-hh.mm.ss.nnnnnnn, where:

**YYYY** Specifies a year.

**MM** Specifies a month of a year (01 through 12).

**DD** Specifies a day of a month (01 through 31).

**hh** Specifies an hour of a day (00 through 23).

**mm** Specifies a minute of an hour (00 through 59).

**ss** Specifies a second of a minute (00 through 59).

*nnnnnnn*

Specifies microseconds (UNIX operating systems) or milliseconds (Windows operating systems).

Some or all of the fields that follow the year field can be omitted. If they are omitted, the default values will be used. The default values are 1 for the month and day, and 0 for all other fields.

If an exact match for the record time stamp does not exist in the diagnostic log file, the time closest to the time stamp specified will be used.

**-A | -archive *dirName***

Archives both single and rotating diagnostic log files. When this option is specified, all other options are ignored. If one or more file names are specified, each file is processed individually. A timestamp, in the format YYYY-MM-DD-hh.mm.ss, is appended to the file name.

You can specify the name of the file and directory where it is to be archived. If the directory is not specified, the file is archived in the directory where the file is located and the directory name is extracted from the file name.

If you specify a directory but no file name, the current directory is searched for the **db2diag** log file. If found, the file will be archived in the specified directory. If the file is not found, the directories specified by the **diagpath** and **alt\_diagpath** configuration parameters are searched for the **db2diag** log file. If found, it is archived in the directory specified.

If you do not specify a file or a directory, the current directory is searched for the **db2diag** log file. If found, it is archived in the current directory. If the file is not found, the directories specified by the **diagpath** and **alt\_diagpath** configuration parameters are searched for the **db2diag** log file. If found, it is archived in the directory specified by the **diagpath** or **alt\_diagpath** configuration parameter.

The **db2diag -archive** option is available with IBM Data Server Driver Package and IBM Data Server for ODBC and CLI. This option enables you to archive the diagnostic log file on an instance-less client. For example:

```
$ db2diag -A
db2diag: Moving "/home/usr1/clidriver/db2dump/db2diag.log"
 to "/home/usr1/clidriver/db2dump/db2diag.log_2010-09-14-01.16.26"
```

**-readfile**

Forces reading from a diagnostic log file ignoring any terminal input. This option can be used in scripts to guarantee that **db2diag** will read from a file and not from a terminal, especially in situations when **stdin** is disabled or when automated tools are used. Running the **db2diag** command using **rah** or **db2\_all** also requires the **-readfile** option to be used.

**-rc *rcList* | switch**

Displays descriptions of Db2 internal error return codes for a space separated list, *rcList*, of the particular ZRC or ECF hexadecimal or negative decimal return codes. A full list of ZRC or ECF return codes can be displayed by specifying one of the following switches:

**zrc** Displays short descriptions of Db2 ZRC return codes.

**ecf** Displays short descriptions of Db2 ECF return codes.

**html** Displays short descriptions of Db2 ZRC return codes in the HTML format.

When this option is specified, all other options are ignored and output is directed to a display.

**-ecfid** *ecfId*

Displays function information extracted from the numeric *ecfId*. When this option is specified, all other options are ignored.

**-h | -help | ?**

Displays help information. When this option is specified, all other options are ignored, and only the help information is displayed. If a list of options, *optionList*, containing one or more comma separated command parameters is omitted, a list of all available options with short descriptions is displayed. For each option specified in the *optionList*, more detailed information and usage examples are displayed. Help output can be modified by using one of the following switches in place of the *optionList* argument to display more information about the tool and its usage:

**brief** Displays help information for all options without examples.

**examples**

Displays a few typical examples to assist in using the tool.

**tutorial**

Displays examples that describe advanced features.

**notes** Displays usage notes and restrictions.

**all** Displays complete information about all options, including usage examples for each option.

**-lastlines** *number-of-lines*

Displays and filters the last number of lines specified from the db2diag log file. For each db2diag log file, this parameter checks whether the number of lines specified are available. If the number of lines available in the log file is less than the number of records you specified, the db2diag command processes all the lines available in the file. If split diagnostic data directory paths are used, the last number of lines specified is returned for each db2diag log file in each path.

## Examples

The following is a list of some examples which illustrate how to use the **db2diag** command under various circumstances:

- To merge all **db2diag** log files in the diagnostic data directory path, enter the following command:

```
db2diag -merge
```

If the diagnostic data directory path is split according to database partitions, this command merges the **db2diag** log files from all the database partitions of the current host. If the diagnostic data directory path is not split, the single diagnostic log file is processed by the command as though the **-merge** option was not specified.

- In this example, the default diagnostic data directory path is split according to physical host and database partition by setting the **diagpath** database manager configuration parameter using the following command:

```
db2 update dbm cfg using diagpath '"hn"
```

This example shows how to obtain an output of all the records from all the diagnostic logs and merge the diagnostic log files from three database partitions on each of two hosts, bower and horton. The following is a list of the six **db2diag** log files:

- ~/sql1lib/db2dump/HOST\_bower/NODE0000/db2diag.log
- ~/sql1lib/db2dump/HOST\_bower/NODE0001/db2diag.log
- ~/sql1lib/db2dump/HOST\_bower/NODE0002/db2diag.log
- ~/sql1lib/db2dump/HOST\_horton/NODE0003/db2diag.log
- ~/sql1lib/db2dump/HOST\_horton/NODE0004/db2diag.log
- ~/sql1lib/db2dump/HOST\_horton/NODE0005/db2diag.log

To output the records from all six **db2diag** log files, run the following command:

```
db2diag -global
```

To merge all six **db2diag** log files in the diagnostic data directory path from all three database partitions on each of the hosts bower and horton and format the output based on the timestamp, enter the following command:

```
db2diag -global -merge -sdir /temp/keon -fmt %{ts}
```

where /temp/keon is a shared directory, shared by the hosts bower and horton, to store temporary merged files from each host during processing.

- To display all critical error messages, enter either of the following commands:  

```
db2diag -level critical
```

or

```
db2diag -g 'level=Critical'
```
- To display all severe error messages produced by the process with the process ID (PID) 52356 and on database partition 1, 2 or 3, enter the following command:  

```
db2diag -g level=Severe,pid=952356 -n 1,2,3
```
- To display all messages containing database SAMPLE and instance aab rashk, enter the following command:  

```
db2diag -g db=SAMPLE,instance=aab rashk
```
- To display all severe error messages containing the database field, enter the following command:  

```
db2diag -g db:= -gi level=severe
```
- To display all error messages containing the Db2 ZRC return code 0x87040055, and the application ID G916625D.NA8C.068149162729, enter the following command:  

```
db2diag -g msg:=0x87040055 -l Error | db2diag -gi appid^=G916625D.NA
```
- To display all messages not containing the LOADID data, enter the following command:  

```
db2diag -gv data:=LOADID
```
- To display only logged records not containing the LOCAL pattern in the application ID field, enter either of the following commands:  

```
db2diag -gi appid!:=local
```

or

```
db2diag -g appid!:=LOCAL
```

All records that don't match will be displayed. To output only messages that have the application ID field, enter the following command:

- ```
db2diag -gvi appid:=local -exist
```
- To display all messages logged after the one with timestamp 2003-03-03-12.16.26.230520 inclusively, enter the following command:
`db2diag -time 2003-03-03-12.16.26.230520`
 - To display severe errors logged for the last three days, enter the following command:
`db2diag -gi "level=severe" -H 3d`
 - To display all log messages not matching the pdLog pattern for the funcname field, enter one of the following commands:
`db2diag -g 'funcname!=pdLog'`

or

- ```
db2diag -gv 'funcn=pdLog'
```
- To display all severe error messages containing component names starting from the "base sys, enter the following command:  
`db2diag -l severe | db2diag -g "comp^=base sys"`
  - To view the growth of the db2diag.log file, enter the following command:  
`db2diag -f db2diag.log`

This displays all records written to the db2diag.log file in the current directory. Records are displayed as they are added to the file. The display continues until you press Ctrl-C.

- To write the context of the db2diag.log into the db2diag\_123.log file located in the /home/user/Logs directory, enter the following command:  
`db2diag -o /home/user/Logs/db2diag_123.log`
- To call **db2diag** from a Perl script using default settings, enter:  
`system("db2diag -readfile");`
- This will force **db2diag** to process db2diag.log/db2diag.\*.log files (Rotating logs if the database manager **diagsize** configuration parameter is set) from a directory specified by the **diagpath** configuration parameter.
- To read the db2diag.log1 file from a specified directory ignoring any terminal input, enter:  
`system("db2diag -readfile /u/usr/sql1ib/db2dump/db2diag.log1");`
- To display function information corresponding to ecfId = 0x1C30000E, enter either of the following commands:  
`db2diag -ecfid 0x1C30000E`  
`db2diag -ecfid 472907790`

This will display function name, component and product name.

- To display only logged records containing eduid = 123, enter the following command:  
`db2diag -eduid 123`
- To display all records containing eduid = 123 or eduid = 5678, enter the following command:  
`db2diag -eduid "123,5678"`
- To display all severe error messages produced by a thread with eduid = 15, enter either of the following commands:  
`db2diag -g "level=Severe, eduid=15"`  
`db2diag -g level=Severe | db2diag -eduid 15`
- To display the last 5 formatted records from database partition 1, enter:

- ```
db2diag -lastrecords 5 -node 1 -fmt "%{ts} %{node}"
```
- To read last 10 lines from all the db2diag.log files, enter the following command:
`db2diag -lastlines 10`
 - To merge the records in last 20 lines of each log file:
`db2diag -merge file1 file2 file3... -lastlines 20`
 - To display the records in last 20 lines of each db2diag.log file from all hosts:
`db2diag -global -lastlines 20`
 - To display all the records in last 100 lines which have Level=Error:
`db2diag -g level=Error -lastlines 100`

Usage notes

- Each option can appear only once. They can be specified in any order and can have optional parameters. You cannot combine short names of parameters. For example, use `-l -e` and not `-le`.
- By default, **db2diag** looks for the **db2diag** log file in the current directory. If the file is not found, the directory set by the **diagpath** configuration parameter is searched next. If the **db2diag** log file is not found, **db2diag** returns an error and exits.
- Filtering and formatting options can be combined on a single command line to perform complex searches using pipes. The formatting options **-fmt**, **-strict**, **-cbe**, and **-verbose** should be used only after all filtering is done to ensure that only original logged messages with standard fields will be filtered, not those fields either defined or omitted by the user. It is not necessary to use **-** when using pipes.
- When pipes are used and one or more files names are specified on the command line, the **db2diag** input is processed differently depending on whether the **-** has been specified or not. If the **-** is omitted, input is taken from the specified files. In contrast, when the **-** option is specified, file names (even if present on the command line) are ignored and input from a terminal is used. When a pipe is used and a file name is not specified, the **db2diag** input is processed exactly the same way with or without the **-** specified on the command line.
- The **-exist** option overrides the default **db2diag** behavior for invert match searches when all records that do not match a pattern are output independent of whether they contain the proper fields or not. When the **-exist** option is specified, only the records containing fields requested are processed and output.
- If the **-fmt** (format) option is not specified, all messages (filtered or not) are output exactly as they are written in the diagnostic log file. Output record format can be changed by using the **-strict**, **-cbe**, and **-verbose** options.
- The **-fmt** option overrides the **-strict**, **-cbe** and **-verbose** options.
- Some restrictions apply when the **-cbe** option is specified and the **db2diag** log file has been transferred over a network from the original computer. The **db2diag** tool collects information about Db2 and the computer host name locally, meaning that the Db2 version and the source or reporter componentID location field for the local system can be different from the corresponding values that were used on the original computer.
- It is recommended to specify the **-readfile** option when using **db2diag** in scripts. It will ensure reading from a file ignoring any terminal input.
- Ordinarily, the exit status is 0 if matches were found, and 1 if no matches were found. The exit status is 2 if there are syntax errors in the input data and patterns, the input files are inaccessible, or other errors are found.

- Severe errors resulting from Db2 Text Search can be found logged in the **db2diag** log file.
- Be aware that using this tool to read and filter rotating **db2diag** log files (when the **diagsize** database configuration parameter is nonzero) will result in all the rotating diagnostic log files, to a series maximum of 10 files, to be read and filtered.
- Attempts to connect to the database while a restore is in progress will result in error messages in the db2diag.log. These error messages are ignorable if the restore command succeeds.

db2drdat - DRDA trace

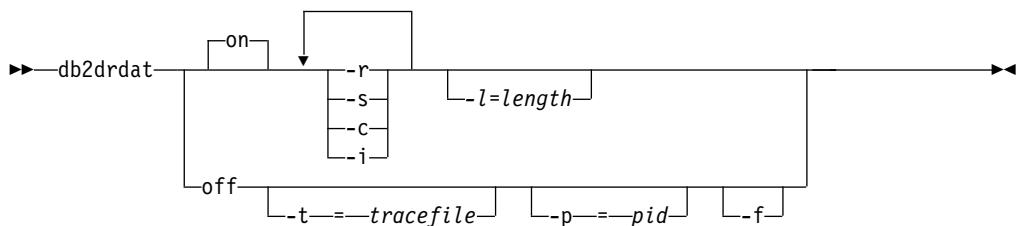
Allows the user to capture the DRDA data stream exchanged between a DRDA Application Requestor (AR) and the Db2 DRDA Application Server (AS).

Although this tool is most often used for problem determination, by determining how many sends and receives are required to execute an application, it can also be used for performance tuning in a client/server environment.

Authorization

None

Command syntax



Command parameters

- on** Turns on AS trace events (all if none specified).
- off** Turns off AS trace events.
- r** Traces DRDA requests received from the DRDA AR.
- s** Traces DRDA replies sent to the DRDA AR.
- c** Traces the SQLCA received from the DRDA server on the host system. This is a formatted, easy-to-read version of *not null* SQLCAs.
- i** Includes time stamps in the trace information.
- l** Specifies the size of the buffer used to store the trace information.
- p** Traces events only for this process. If **-p** is not specified, all agents with incoming DRDA connections on the server are traced. The *pid* to be traced can be found in the agent field returned by the **LIST APPLICATIONS** command.
- t** Specifies the destination for the trace. If a file name is specified without a complete path, missing information is taken from the current path. If *tracefile* is not specified, messages are directed to db2drdat.dmp in the current directory.

-f Formats communications buffers.

Usage notes

Do not issue **db2trc** commands while **db2drdat** is active.

db2drdat writes the following information to *tracefile*:

1. **-r**

- Type of DRDA request
- Receive buffer

2. **-s**

- Type of DRDA reply/object
- Send buffer

The command returns an exit code. A zero value indicates that the command completed successfully, and a nonzero value indicates that the command was not successful. If **db2drdat** sends the output to a file that already exists, the old file will be erased unless the permissions on the file do not allow it to be erased, in which case the operating system will return an error.

db2drvmp - Map Db2 database drive

Maps a database drive for Microsoft Cluster Server (MSCS). This command is available only on Windows operating systems.

Authorization

Read/write access to the Windows registry and the cluster registry.

Required connection

Instance. The application creates a default instance attachment if one is not present.

Command syntax

```
►►db2drvmp—add—dbpartition_number—from_drive—to_drive————►►
      |-----+-----+
      |       |-----+
      |       |   drop
      |       |   query
      |       |   reconcile
```

Command parameters

add Assigns a new database drive map.

drop Removes an existing database drive map.

query Queries a database map.

reconcile

Reapplies the database drive mapping to the registry when the registry contents are damaged or dropped accidentally.

dbpartition_number

The database partition number. This parameter is required for add and drop operations. If this parameter is not specified for a reconcile operation, **db2drvmp** reconciles the mapping for all database partitions.

from_drive

The drive letter from which to map. This parameter is required for add and drop operations. If this parameter is not specified for a reconcile operation, **db2drvmp** reconciles the mapping for all drives.

to_drive

The drive letter to which to map. This parameter is required for add operations. It is not applicable to other operations.

Examples

To set up database drive mapping from F: to E: for NODE0, issue the following command:

```
db2drvmp add 0 F E
```

To set up database drive mapping from E: to F: for NODE1, issue the following command:

```
db2drvmp add 1 E F
```

Usage notes

1. Database drive mapping does not apply to table spaces, containers, or any other database storage objects.
2. Any setup of or change to the database drive mapping does not take effect immediately. To activate the database drive mapping, use the Microsoft Cluster Administrator tool to bring the Db2 resource offline, then online.
3. Using the **TARGET_DRVMAP_DISK** keyword in the DB2MSCS.CFG file will enable drive mapping to be done automatically.

db2empfa - Enable multi-page file allocation

Enables the use of multi-page file allocation for a database. With multi-page file allocation enabled for SMS table spaces, disk space is allocated one extent at a time rather than one page at a time.

Scope

This command only affects the database partition on which it is executed.

Authorization

SYSADM

Required connection

None. This command establishes a database connection.

Command syntax

```
►►—db2empfa—database-alias—————►►
```

Command parameters

database-alias

Specifies the alias of the database for which multi-page file allocation is to be enabled.

Usage notes

This utility:

- Connects to the database partition (where applicable) in exclusive mode
- In all SMS table spaces, allocates empty pages to fill up the last extent in all data and index files which are larger than one extent
- Changes the value of the database configuration parameter `multipage_alloc` to YES
- Disconnects.

Since `db2empfa` connects to the database partition in exclusive mode, it cannot be run concurrently on the catalog database partition, or on any other database partition.

db2envar.bat - Set environment of the current command window

Sets the environment of your current command window for the Db2 copy that `db2envar.bat` is executed from. This is useful if you want to switch between different Db2 copies from the command line.

This command is only available on Windows operating systems.

Authorization

None

Required Connection

None

Command Syntax

►►—db2envar.bat—►►

Command parameters

None

Usage notes

When there are multiple Db2 copies on a machine, the full path should be used to indicate which `db2envar.bat` is to be executed. For example, if you want to set up the environment for the Db2 copy that is installed under `e:\sql1lib`, you should issue `e:\sql1lib\bin\db2envar.bat`.

db2evmon - Event monitor productivity tool

Formats event monitor file and named pipe output, and writes it to standard output.

Authorization

None, unless connecting to the database (`-db -evm`) in which case, all of the following authorization is required:

- CONNECT authority (or an authority that implicitly includes CONNECT)
- SELECT privilege on the following catalog tables (or an authority that implicitly includes SELECT on the catalog tables):
 - SYSIBM.SYSTABLES
 - SYSIBM.SYSEVENTMONITORS

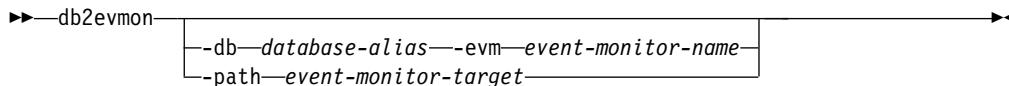
If the event monitor is db2detaildeadlock, then one of the following authorities or privilege is additionally required:

- SYSMON
- SYSMAINT
- SYSCTRL
- SYSADM
- EXECUTE privilege on the MON_GET_DATABASE table function.
- DATAACCESS

Required connection

None

Command syntax



Command parameters

-db database-alias

Specifies the database whose data is to be displayed. This parameter is case sensitive.

-evm event-monitor-name

The one-part name of the event monitor. An ordinary or delimited SQL identifier. This parameter is case sensitive.

-path event-monitor-target

Specifies the directory containing the event monitor trace files.

Usage notes

db2evmon generates the same output regardless of whether the command is issued while connecting to the database or specifying the path option.

- If the instance is not already started when **db2evmon** is issued with the **-db** and **-evm** options, the command will start the instance.
- If the instance is not already started when **db2evmon** is issued with the **-path** option, the command will not start the instance. The instance needs to be started explicitly.

If the data is being written to files, the tool formats the files for display using standard output. In this case, the monitor is turned on first, and any event data in the files is displayed by the tool. To view any data written to files after the tool has been run, reissue **db2evmon**.

If the data is being written to a pipe, the tool formats the output for display using standard output as events occur. In this case, the tool is started *before* the monitor is turned on.

db2evtbl - Generate event monitor target table definitions

Generates sample CREATE EVENT MONITOR SQL statements that can be used when defining event monitors that write to SQL tables.

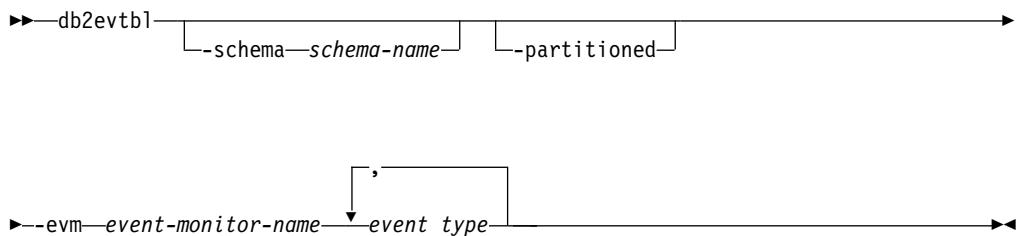
Authorization

None

Required connection

None

Command syntax



Command parameters

-schema *schema-name*

Schema name. If not specified, the table names are unqualified.

-partitioned

If specified, elements that are only applicable for a partitioned database environment are also generated.

-evm *event-monitor-name*

The name of the event monitor.

event type

Any of the event types available on the FOR clause of the CREATE EVENT MONITOR statement. The values possible are:

- ACTIVITIES
- BUFFERPOOLS
- CONNECTIONS
- CHANGE HISTORY
- DATABASE
- DEADLOCKS (also DEADLOCKS WITH DETAILS, DEADLOCKS WITH DETAILS HISTORY, DEADLOCKS WITH DETAILS HISTORY VALUES)*
- LOCKING
- PACKAGE CACHE
- STATEMENTS
- STATISTICS
- TABLES

- TABLESPACES
- THRESHOLD VIOLATIONS
- TRANSACTIONS*
- UNIT OF WORK

* This event monitor type is deprecated.

Examples

```
db2evtbl -schema smith -evm test01 database, tables, tablespaces, bufferpools
```

Usage notes

Output is written to standard output.

Defining WRITE TO TABLE event monitors is more straightforward when using the **db2evtbl** tool. For example, the following steps can be followed to define and activate an event monitor.

1. Use **db2evtbl** to generate the CREATE EVENT MONITOR statement.
2. Edit the SQL statement, removing any unwanted columns.
3. Use the CLP to process the SQL statement. (When the CREATE EVENT MONITOR statement is executing, target tables are created.)
4. Issue SET EVENT MONITOR STATE to activate the new event monitor.

Since all events other than deadlock event monitors can be flushed, creating more than one record per event, users who do not use the FLUSH EVENT MONITOR statement can leave the element **evmon_flushes** out of any target tables.

When a LOCKING, UNIT OF WORK or PACKAGE CACHE event monitor is among the event monitors to be created, the DDL produced by **db2evtbl** creates regular, not UE tables.

db2exfmt - Explain table format

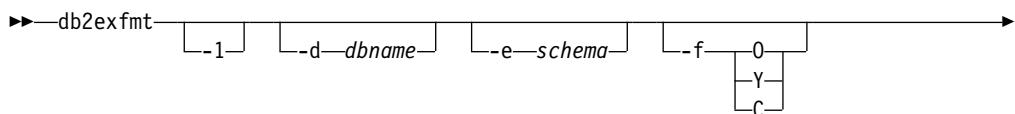
Formats the contents of the EXPLAIN tables.

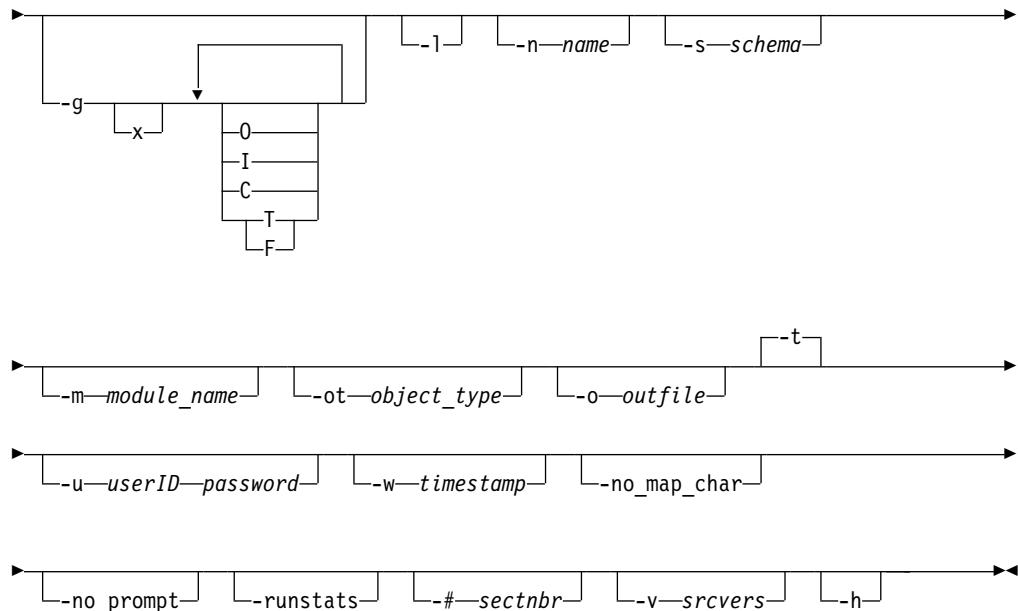
This tool is in the `misc` subdirectory of the instance `sql1ib` directory. This tool uses the statistics from the EXPLAIN snapshot, if the snapshot is available.

Authorization

To use the tool, you require read access to the explain tables being formatted.

Command syntax





Command parameters

db2exfmt

If no options are specified, then the command enters interactive mode and you are prompted to make entries.

-1 Use defaults **-e % -n % -s % -v % -w -1 -# 0**

If Explain schema is not supplied, the contents of the environment variable **\$USER**, or **\$USERNAME** is used as a default. If this variable is not found, you are prompted for an Explain schema.

-d dbname

Name of the database containing packages.

-e schema

Explain table SQL schema.

-f Formatting flags. Multiple flags can be combined together as a string. For example, to achieve an output similar to the previous versions of Db2 database products, the C option and Y option can be combined as **-f CY**.

O Operator summary.

Y Force formatting of the original statement even if column EXPLAIN STATEMENT.EXPLAIN_TEXT contains formatting. The default behavior is to automatically detect if the statement requires formatting and use the original formatting when it exists.

C Use a more compact mode when formatting statements and predicates. The default is an expanded mode that is easier to read. If Y is not specified then C takes effect only if automatic detection determines that the statement requires formatting.

-g Graph plan.

x Turn OFF options (default is to turn them ON).

If only **-g** is specified, a graph, followed by formatted information for all of the tables, is generated. Otherwise, any combination of the following valid values can be specified:

- O** Generate a graph only. Do not format the table contents.
- T** Include total cost under each operator in the graph.
- F** Include first tuple cost in graph.
- I** Include I/O cost under each operator in the graph.
- C** Include the expected output cardinality (number of tuples) of each operator in the graph.

Any combination of these options is allowed, except **F** and **T**, which are mutually exclusive.

-l Respect case when processing package names.

-m module_name

Module name of the routine when the **-ot** option is **P**, **SP**, **F**, or **SF**. Module routines are ignored if this parameter is not specified. This parameter is case sensitive.

-n name

Package name (SOURCE_NAME) or object name for the explain request. Package is assumed if the **-ot** is not specified. This parameter is case sensitive.

-no_map_char

Prevents the mapping of non-printable single characters to '.'. This mapping can happen for multi-byte characters where a single byte is non-printable and for non-printable binary characters.

-no_prompt

Prevents **db2exfmt** from prompting for missing input options. The default value for missing inputs is used.

-s schema

Package schema (SOURCE_SCHEMA) of the package request. If a package schema is not specified, this option is set to '%'. If the object type is a procedure, function, or trigger, this is the schema of the associated object. If the object type is not a procedure, function, or trigger, the schema is set to the value of the CURRENT SCHEMA special register. When a module is provided for the procedure or function, then this option corresponds to the module schema. This parameter is case sensitive.

-ot Type of the object specified with the **-n** option. The default type is package.

- PK** Package name
- P** SQL procedure name
- SP** A specific SQL procedure name
- F** Compiled function
- SF** A specific compiled function name
- T** Compiled trigger

-runstats

Forces **runstats** to execute on the explain tables. You do not need to specify this option if automatic statistics collection is enabled.

- o *outfile***
 - Output file name.
- t**
 - Direct the output to the terminal.
- u *userID password***
 - When connecting to a database, use the provided user ID and password.
 - Both the user ID and password must be valid according to naming conventions and be recognized by the database.
- w *timestamp***
 - Explain time stamp. Specify -1 to obtain the latest explain request.
- # *sectnbr***
 - Section number in the source. To request all sections, specify zero.
- v *srcvers***
 - Package version (SOURCE_VERSION) of the explain request. The default value is %.
- h**
 - Display help information. When this option is specified, all other options are ignored, and only the help information is returned.

Usage notes

You are prompted for any parameter values that are not supplied, or that are incompletely specified, except in the case of the **-h** and the **-1** options.

If an explain table SQL schema is not provided, the value of the environment variable **USER** is used as the default. If this variable is not found, you are prompted for an explain table SQL schema.

When you are formatting explain information using a package name, the source name, source SQL schema, and explain time stamp can be supplied in LIKE predicate form, which allows the percent sign (%) and the underscore (_) to be used as pattern matching characters to select multiple sources with one invocation. For the latest explained statement, the explain time can be specified as -1.

If **-o** is specified without a file name, and **-t** is not specified, the user is prompted for a file name (the default name is **db2exfmt.out**). If **-o** or **-t** is not specified, you are prompted for a file name (the default option is terminal output). If **-o** and **-t** are both specified, the output is directed to the terminal.

The **db2exfmt** command returns the statistics from the EXPLAIN snapshot, if the snapshot is available. Otherwise, **db2exfmt** returns statistics stored in the EXPLAIN_OBJECT table and also returns some statistics retrieved directly from the system catalog.

The per-partition usage, transferrate and prefetchsize values returned are retrieved when the **db2exfmt** command is run. Therefore, the values can differ from the actual values used when the statement was explained.

OVERHEAD, TRANSFERRATE, and PREFETCHSIZE values returned in the **db2exfmt** output can differ from the actual values used when the statement was compiled.

When a procedure, function, or compiled trigger type is specified, every section available in the explain tables pertaining to that routine is formatted. If a

procedure or function is overloaded, you must provide the specific name of the procedure or function.

Examples

EXPLAIN snapshot examples.

```
db2 explain plan with snapshot for query
db2exfmt
```

or,

```
db2 set current explain mode yes
db2 set current explain snapshot yes
query
db2exfmt
```

Explain all sections in a compiled trigger PARAMNT."TRIG2" and format section number 4:

```
db2 "CALL SET_ROUTINE_OPTS('EXPLAIN YES')"
db2 "CALL REBIND_ROUTINE_PACKAGE('T', 'PARAMNT', '', 'TRIG2', '')"
db2exfmt -d MYDB -rt T -s PARAMNT -n \"TRIG2\" -no_prompt
db2exfmt -d MYDB -rt T -s PARAMNT -n \"TRIG2\" -#4 -no_prompt
```

db2exmig - Migrate explain tables

Migrates explain tables. The explain tables migration tool renames the existing explain tables, creates a new set of tables using the EXPLAIN.DDL, and copies the contents of the existing explain tables to the new tables. Finally, it drops the existing explain tables.

The explain tables belonging to the user ID that is issuing the **db2exmig** command, or that is used to connect to the database, are migrated.

The **db2exmig** command will preserve any user added columns on the explain tables.

Authorization

If the **db2exmig** application package is bound then the required authorization is one of the following authorities:

- DBADM authority
- EXECUTE authority on the **db2exmig** application package and SELECT privilege or CONTROL privilege on the following system catalogs:
 - SYSCAT.COLUMNS
 - SYSCAT.TABLES
 - SYSCAT.REFERENCES
 - SYSCAT.ROUTINES
 - SYSCAT.ROUTINEAUTH
 - SYSCAT.TABAUTH
 - SYSCAT.COLAUTH

If the **db2exmig** application package is not bound then the required authorization is DBADM authority.

Required Connection

None

Command Syntax

```
>>>db2exmig -d dbname -e explain_schema [-u userID -p password] >>>
```

Command parameters

-d *dbname*

Specifies the database name.

-e *explain_schema*

Specifies the schema name of the explain tables to be migrated.

-u *userID* *password*

Specifies the current user's ID and password.

Usage notes

You can determine the **db2exmig** application package name by using the command: db2bfd -b db2exmig.bnd. The db2exmig.bnd files are located in the sql1lib/bnd folder.

db2expln - SQL and XQuery Explain

The **db2expln** tool describes the access plan selected for SQL and XQuery statements.

Use the tool to obtain a quick explanation of the chosen access plan when explain data was not captured. For static SQL and XQuery statements, **db2expln** examines the packages stored in the system catalog tables. For dynamic SQL and XQuery statements, **db2expln** examines the query cache sections.

Authorization

DBADM or one of the following authorizations or privileges:

- For static statements, SELECT privilege on the catalog tables
- For dynamic statements, SELECT privilege on the catalog tables plus one of the following authorizations or privileges:
 - Sufficient privileges to compile the statement
 - EXPLAIN authority
 - SQLADM authority

Command syntax

```
>>>db2expln [connection-options] [output-options] >>>  
>>> [package-options] [dynamic-options] [explain-options] >>>
```

```
▶ [ event-monitor-options ] [-help]
```

connection-options:

```
|---database=database-name [ -user=user-id -password ]
```

output-options:

```
[ -output=output-file | -terminal ]
```

package-options:

```
|--- -schema=schema-name --package=package-name →
```

```
▶ [ -version=version-identifier | -escape=escape-character ] →
```

```
[ -noupper | -section=section-number ]
```

dynamic-options:

```
[ -cache=anchID-stmtUID-envID-varID | -statement=query-statement ] →
```

```
▶ [ -stmtfile=query-statement-file | -terminator=termination-character ] →
```

```
[ -noenv ]
```

explain-options:

```
[ -graph | -opids | -setup=setup-file ]
```

event-monitor-options:

```
|--- -actevm=event-monitor-name [ -appid=application_id | -uowid=uow_id ] →
```

```
▶ [ -actid=activity_id | [ -actid2=0 | -actid2=activity_secondary_id ] ]
```

Command parameters

The options can be specified in any order.

connection-options:

These options specify the database to connect to and any options necessary to make the connection. The connection options are required except when the **-help** option is specified.

-database *database-name*

The name of the database that contains the packages to be explained.

For backward compatibility, you can use **-d** instead of **-database**.

-user *user-id* *password*

The authorization ID and password to use when establishing the database connection. Both *user-id* and *password* must be valid according to Db2 naming conventions and must be recognized by the database.

For backward compatibility, you can use **-u** instead of **-user**.

output-options:

These options specify where the **db2expln** output should be directed. Except when the **-help** option is specified, you must specify at least one output option. If you specify both options, output is sent to a file as well as to the terminal.

-output *output-file*

The output of **db2expln** is written to the file that you specify.

For backward compatibility, you can use **-o** instead of **-output**.

-terminal

The **db2expln** output is directed to the terminal.

For backward compatibility, you can use **-t** instead of **-terminal**.

package-options:

These options specify one or more packages and sections to be explained. Only static queries in the packages and sections are explained.

As in a LIKE predicate, you can use the pattern matching characters, which are percent sign (%) and underscore (_), to specify the *schema-name*, *package-name*, and *version-identifier*.

-schema *schema-name*

The SQL schema of the package or packages to be explained.

For backward compatibility, you can use **-c** instead of **-schema**.

-package *package-name*

The name of the package or packages to be explained.

For backward compatibility, you can use **-p** instead of **-package**.

-version *version-identifier*

The version identifier of the package or packages to be explained. The default version is the empty string.

-escape *escape-character*

The character, *escape-character* to be used as the escape character for pattern matching in the *schema-name*, *package-name*, and *version-identifier*.

For example, the **db2expln** command to explain the package TESTID.CALC% is as follows:

```
db2expln -schema TESTID -package CALC% ....
```

However, this command would also explain any other plans that start with CALC. To explain only the TESTID.CALC% package, you must use an escape character. If you specify the exclamation point (!) as the escape character, you can change the command to read: db2expln -schema TESTID -escape ! -package CALC!% Then the ! character is used as an escape character and thus !% is interpreted as the % character and not as the "match anything" pattern. There is no default escape character.

For backward compatibility, you can use **-e** instead of **-escape**.

To avoid problems, do not specify the operating system escape character as the **db2expln** escape character.

-noupper

Specifies that the *schema-name*, *package-name*, and *version-identifier*, should not be converted to uppercase before searching for matching packages.

By default, these variables are converted to uppercase before searching for packages. This option indicates that these values should be used exactly as typed.

For backward compatibility, you can use **-l**, which is a lowercase L and not the number 1, instead of **-noupper**.

-section *section-number*

The section number to explain within the selected package or packages.

To explain all the sections in each package, use the number zero (0). This is the default behavior. If you do not specify this option, or if *schema-name*, *package-name*, or *version-identifier* contain a pattern-matching character, all sections are displayed.

To find section numbers, query the system catalog view SYSCAT.STATEMENTS. Refer to the *SQL Reference* for a description of the system catalog views.

For backward compatibility, you can use **-s** instead of **-section**.

dynamic-options:

These options specify one or more dynamic query statements to be explained.

-cache *anchID*, *stmtUID*, *envID*, *varID*

Specifies the dynamic SQL cache from which the statement, identified by the given identifiers (IDs), is retrieved. The IDs can be obtained using the **db2pd** command with the **-dynamic** option.

-statement *query-statement*

An SQL or XQuery query statement to be dynamically prepared and explained. To explain more than one statement, either use the

-stmtfile option to provide a file containing the query statements to explain, or use the **-terminator** option to define a termination character that can be used to separate statements in the **-statement** option.

-stmtfile *query-statement-file*

A file that contains one or more query statements to be dynamically prepared and explained. By default, each line of the file is assumed to be a distinct query statement. If statements must span lines, use the **-terminator** option to specify the character that marks the end of an query statement.

-terminator *termination-character*

The character that indicates the end of dynamic query statements. By default, the **-statement** option provides a single query statement and each line of the file in the **-stmtfile** is treated as a separate query statement. The termination character that you specify can be used to provide multiple query statements with **-statement** or to have statements span lines in the **-stmtfile** file.

-noenv

Specifies that dynamic statements that alter the compilation environment should not be executed after they have been explained.

By default, **db2expln** will execute any of the following statements after they have been explained:

```
SET CURRENT DEFAULT TRANSFORM GROUP  
SET CURRENT DEGREE  
SET CURRENT MAINTAINED TABLE TYPES FOR OPTIMIZATION  
SET CURRENT QUERY OPTIMIZATION  
SET CURRENT REFRESH AGE  
SET PATH  
SET SCHEMA
```

These statements make it possible to alter the plan chosen for subsequent dynamic query statements processed by **db2expln**.

If you specify **-noenv**, then these statement are explained, but not executed.

It is necessary to specify either **-statement** or **-stmtfile** to explain dynamic query. Both options can be specified in a single invocation of **db2expln**.

explain-options:

These options determine what additional information is provided in the explained plans.

-graph Show optimizer plan graphs. Each section is examined, and then the original optimizer plan graph is constructed. It is possible for the optimizer graph to show some gaps, based on the information contained within the section plan.

For backward compatibility, you can specify **-g** instead of **-graph**.

-opids Display operator ID numbers in the explained plan.

The operator ID numbers allow the output from **db2expln** to be matched to the output from the explain facility. Not all operators have an ID number and that some ID numbers that appear in the explain facility output do not appear in the **db2expln** output.

For backward compatibility, you can specify **-i** instead of **-opids**.

- help** Shows the help text for **db2expln**. If this option is specified no packages are explained.

Most of the command line is processed in the db2exsrv stored procedure. To get help on all the available options, it is necessary to provide **connection-options** along with **-help**. For example, use:

```
db2expln -help -database SAMPLE
```

For backward compatibility, you can specify **-h** or **-?**.

- setup setup-file**

A file that contains one or more statements needed to setup the environment for dynamic statements or for static statements that need to be recompiled (such as a static statement that references a declared temporary table). Each statement in the file will be executed and any errors or warnings will be reported. The statements in the file are not explained.

event-monitor-options:

These options specify one or more section environments from an activities event monitor to be explained.

- actevm event-monitor-name**

Specifies the name of the activities event monitor whose **activitystmt** logical grouping contains the section environments (in the **section_env** monitor element) to be explained.

- appid application-id**

Specifies the application identifier (**appl_id** monitor element) uniquely identifying the application that issued the activities whose section environments are to be explained. **-actevm** must be specified if **-appid** is specified.

- uowid uow-id**

Specifies the unit of work ID (**uow_id** monitor element) whose section environments are to be explained. The unit of work ID is unique only within a given application.

-actevm must be specified if **-uowid** is specified.

- actid activity-id**

Specifies the activity ID (**activity_id** monitor element) whose section environments are to be explained. The activity ID is only unique within a given unit of work.

-actevm must be specified if **-actid** is specified.

- actid2 activity-secondary-id**

Specifies the activity secondary ID (**activity_secondary_id** monitor element) whose section environments are to be explained. This defaults to zero if not specified. **-actevm** must be specified if **-actid2** is specified.

Usage notes

Unless you specify the **-help** option, you must specify either package-options or dynamic-options. You can explain both packages and dynamic SQL with a single invocation of **db2expln**.

Some of the option flags listed previously might have special meaning to your operating system and, as a result, might not be interpreted correctly in the **db2expln** command line. However, you might be able to enter these characters by preceding them with an operating system escape character. For more information, see your operating system documentation. Make sure that you do not inadvertently specify the operating system escape character as the **db2expln** escape character.

Help and initial status messages, produced by **db2expln**, are written to standard output. All prompts and other status messages produced by the explain tool are written to standard error. Explain text is written to standard output or to a file depending on the output option chosen.

The following messages can be returned by **db2expln**:

- No packages found for database package pattern: "<creator>".<package> with version "<version>"

This message will appear in the output if no packages were found in the database that matched the specified pattern.

- Bind messages can be found in db2expln.msg

This message will appear in the output if the bind of db2expln.bnd was not successful. Further information about the problems encountered will be found in the db2expln.msg file in the current directory.

- Section number overridden to 0 (all sections) for potential multiple packages.

This message will appear in the output if multiple packages might be encountered by **db2expln**. This action will be taken if one of the pattern matching characters is used in the package or creator input arguments.

- Bind messages for <bind file> can be found in <message file>

This message will appear if the bind of the specified bind file was not successful. Further information about the problems encountered will be found in the specified message file on the database server.

- No static sections qualify from package.

This message will appear in the output if the specified package only contains dynamic query statements, which means that there are no static sections.

- Package "<creator>".<package>", "<version>", is not valid. Rebind the package and then rerun db2expln.

This message will appear in the output if the specified package is currently not valid. Reissue the BIND or REBIND command for the plan to re-create a valid package in the database, and then rerun **db2expln**.

The following statements will not be explained:

- BEGIN/END COMPOUND
- BEGIN/END DECLARE SECTION
- CLOSE cursor
- COMMIT and ROLLBACK
- CONNECT
- DESCRIBE
- Dynamic DECLARE CURSOR
- EXECUTE
- EXECUTE IMMEDIATE

- FETCH
- INCLUDE
- OPEN cursor
- PREPARE
- SQL control statements
- WHENEVER

Each sub-statement within a compound SQL statement might have its own section, which can be explained by **db2expln**.

Note: The **db2expln** command does not exclude any XQuery statements.

Examples

To explain multiple plans with one invocation of **db2expln**, use the **-package**, **-schema**, and **-version** option and specify string constants for packages and creators with LIKE patterns. That is, the underscore (_) can be used to represent a single character, and the percent sign (%) can be used to represent the occurrence of zero or more characters.

To explain all sections for all packages in a database named SAMPLE, with the results being written to the file my.exp, enter

```
db2expln -database SAMPLE -schema % -package % -output my.exp
```

As another example, suppose a user has a CLP script file called "statements.db2" and wants to explain the statements in the file. The file contains the following statements:

```
SET PATH=SYSIBM, SYSFUN, DEPT01, DEPT93@  
SELECT EMPNO, TITLE(JOBID) FROM EMPLOYEE@
```

To explain these statements, enter the following command:

```
db2expln -database DEPTDATA -stmtfile statements.db2 -terminator @ -terminal
```

Explain the following statement:

```
SELECT e.lastname, e.job, d.deptname, d.location, p.projname  
      FROM employee AS e, department AS d, project AS p  
     WHERE e.workdept = d.deptno AND e.workdept = p.deptno
```

The following command:

```
db2expln -database SAMPLE  
-statement "SELECT e.lastname, e.job,  
           d.deptname, d.location, p.projname  
           FROM employee AS e, department AS d, project AS p  
          WHERE e.workdept = d.deptno AND e.workdept = p.deptno"  
-terminal
```

returns:

```
Db2 Enterprise Server Edition n.n, nnnn-nnn (c) Copyright IBM Corp. 1991, yyyy  
Licensed Material - Program Property of IBM  
IBM Db2 Database SQL and XQUERY Explain Tool
```

```
***** DYNAMIC *****
```

```
===== STATEMENT =====
```

| | |
|-----------------|-----------------------------|
| Isolation Level | = Cursor Stability |
| Blocking | = Block Unambiguous Cursors |

```

Query Optimization Class = 5

Partition Parallel      = No
Intra-Partition Parallel = No

SQL Path                = "SYSIBM", "SYSPROC", "SYSIBADM",
                           "SDINIRO"

```

Statement:

```

SELECT e.lastname, e.job, d.deptname, d.location, p.projname
FROM employee AS e, department AS d, project AS p
WHERE e.workdept =d.deptno AND e.workdept =p.deptno

```

Section Code Page = 1208

Estimated Cost = 22.802252
Estimated Cardinality = 105.000000

```

Access Table Name = SDINIRO.PROJECT ID = 2,10
| #Columns = 2
| Skip Inserted Rows
| Avoid Locking Committed Data
| Currently Committed for Cursor Stability
| Relation Scan
| | Prefetch: Eligible
| Lock Intents
| | Table: Intent Share
| | Row : Next Key Share
| Sargable Predicate(s)
| | Process Build Table for Hash Join
Hash Join
| Estimated Build Size: 4000
| Estimated Probe Size: 4000
Access Table Name = SDINIRO.DEPARTMENT ID = 2,6
| #Columns = 3
| Skip Inserted Rows
| Avoid Locking Committed Data
| Currently Committed for Cursor Stability
| Relation Scan
| | Prefetch: Eligible
| Lock Intents
| | Table: Intent Share
| | Row : Next Key Share
| Sargable Predicate(s)
| | Process Probe Table for Hash Join
Hash Join
| Estimated Build Size: 4000
| Estimated Probe Size: 4000
Access Table Name = SDINIRO.EMPLOYEE ID = 2,7
| #Columns = 3
| Skip Inserted Rows
| Avoid Locking Committed Data
| Currently Committed for Cursor Stability
| Relation Scan
| | Prefetch: Eligible
| Lock Intents
| | Table: Intent Share
| | Row : Next Key Share
| Sargable Predicate(s)
| | Process Probe Table for Hash Join
Return Data to Application
| #Columns = 5

```

End of section

db2extsec - Set permissions for Db2 objects

Sets the permissions for Db2 database objects (for example, files, directories, network shares, registry keys and services) on updated Db2 database system installations.

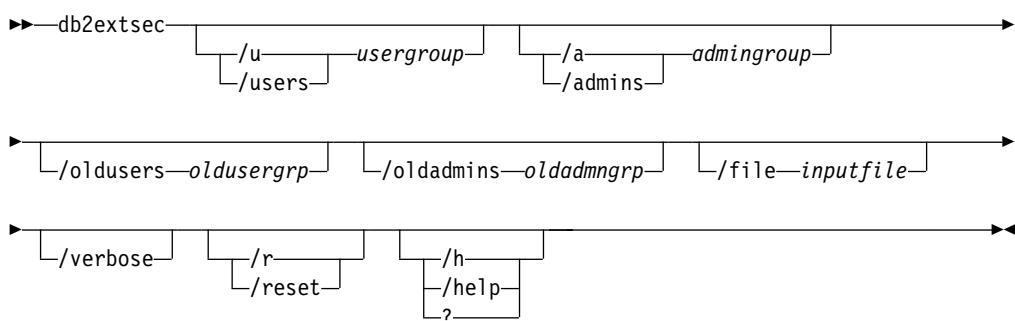
Authorization

SYSADM

Required connection

None

Command syntax



Command parameters

/u | /users *usergroup*

Specifies the name of the user group to be added. If this option is not specified, the default Db2 user group (DB2USERS) is used. The *usergroup* can be a local group or a domain group. To specify a local group, you can specify the group name with or without the machine name. For example, DB2USERS, or MYWKSTN\DB2USERS. To specify a domain group, you specify the *usergroup* in the form of DOMAIN\GROUP. For example, MYDOMAIN\DB2USERS.

/a | /admins *admingroup*

Specifies the name of the administration group to be added. If this option is not specified, the default Db2 administration group (DB2ADMNS) is used. The *admingroup* can be a local group or a domain group. To specify a local group, you can specify the group name with or without the machine name. For example, DB2ADMNS, or MYWKSTN\DB2ADMNS. To specify a domain group, you specify the *admingroup* in the form of DOMAIN\GROUP. For example, MYDOMAIN\DB2ADMNS.

Note: The following 3 parameters, */oldusers*, */oldadmins*, and */file*, are required when you are changing the extended security group names and have file or directory objects that have been created outside of the default locations (that is, the install directory or database directories). The **db2extsec** command can only change permissions to a known set of Db2 files. If the user had created private Db2 files with extended security, then the user will need to provide the locations of these file, so the **db2extsec** command can change the permissions on these files with the new extended security group names. The location of the files are to be supplied in the *inputfile* using the */file* option.

/oldusers *oldusergrp*
 The old Db2 users group name to be changed.

/oldadmins *oldadmngrp*
 The old Db2 admins group name to be changed.

/file *inputfile*
 File listing additional files/directories for which the permissions need to be updated.

/verbose
 Output extra information.

/r | /reset
 Specifies that the changes made by previously running **db2extsec** should be reversed. If you specify this option, all other options are ignored. This option will only work if no other Db2 commands have been issued since the **db2extsec** command was issued.

/h | /help | ?
 Displays the command help information.

Examples

To enable extended security and use the domain groups `mydom\db2users` and `mydom\db2admnns` to protect your Db2 objects:

```
db2extsec /u mydom\db2users /a mydom\db2admnns
```

To reset extended security to its previous setting (see the preceding section on **/reset** option):

```
db2extsec /reset
```

To enable extended security, but also change the security group for the files/directories listed in `c:\mylist.lst` from local group `db2admnns` and `db2users` to domain groups `mydom\db2admnns` and `mydom\db2users`:

```
db2extsec /users mydom\db2users /admins mydom\db2admnns /oldadmins db2admnns  

/oldusers db2users /file c:\mylist.lst
```

Note: The format of the input file is as follows:

```
* This is a comment  

D:\MYBACKUPDIR  

D:\MYEXPORTDIR  

D:\MYMISCFILE\myfile.dat  

* This is another comment  

E:\MYOTHERBACKUPDIR * These are more comments  

E:\MYOTHEREXPORTDIR
```

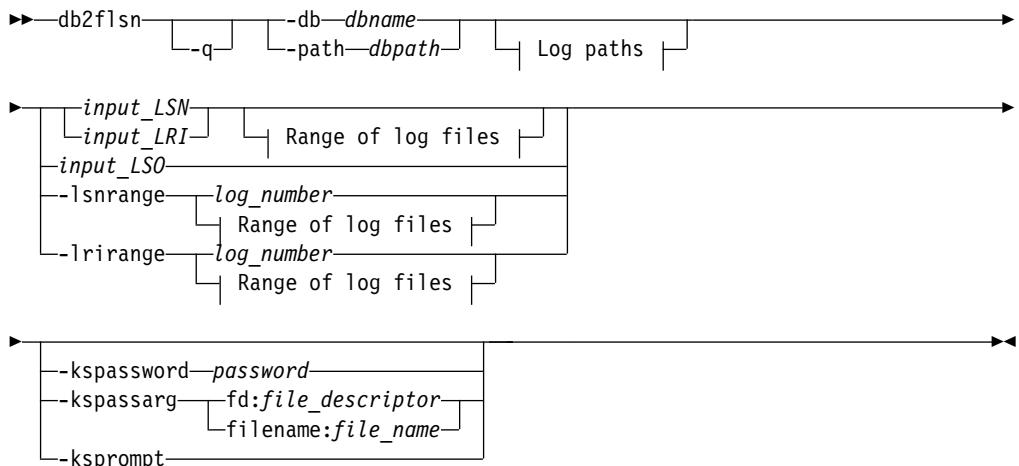
db2flsn - Find log sequence number

The **db2flsn** command returns the name of the file in a log stream that contains the log record identified by a specified log sequence number (LSN) or log record identifier (LRI).

Authorization

Instance owner

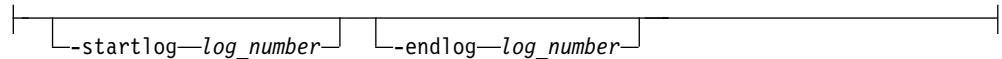
Command syntax



Log paths:



Range of log files:



Command parameters

- q** Specifies that only the log file name be printed. No error or warning messages will be printed, and status can be determined only through the return code. Valid error codes are:
 - 100 Invalid input
 - 101 Cannot open LFH file
 - 102 Failed to read LFH file
 - 103 Invalid LFH
 - 106 Invalid database
 - 108 The LSN or LRI is before the earliest log file **db2f1sn** could open.
 - 109 The LSN or LRI is before the log specified by **-startlog** parameter.
 - 110 The LSN or LRI could not be found as no log files could be opened.
 - 120 The LSN or LRI could not be found due to an error. Try using **-lsnrange** option.

Other valid return codes are:

- 0 Successful execution
- 100 Warning, the LSN or LRI could be in a later log file, returning the last file that **db2f1sn** could open.
- 101 Warning, LSN or LRI could be in a later log file, returning the file specified by **-endlog** parameter. To find the exact file, use a larger value for the **-endlog** parameter.

-db *dbname*

Specifies the database name which you want to investigate.

-path *dbpath*

Specifies the full path to the directory where the LFH files, SQLGCTL.LFH.1 and its mirror copy SQLGCTL.LFH.2, reside.

input_LSN

Specifies a 16 character string that represents an 8 byte hexadecimal value with leading zeros.

input_LRI

Specifies a 34 character string that represents a 17 byte hexadecimal value with leading zeros.

input_LSO

Specifies a character string that represents the decimal value of a log sequence offset.

-lsnrange

Specifies a log number or a range of log file numbers. The LSN value range is returned for each of the log numbers provided. For this option, log files must be present and readable.

-lrirange

Specifies a log number or a range of log file numbers. The LRI value range is returned for each of the log numbers provided. For this option, log files must be present and readable.

log_number

Specifies a number that represents a log file number, for example, 52 is the *log_number* for log file S0000052.LOG.

-logpath *primary_logpath*

Specifies the primary log path. If not provided, the database primary log path is used.

-logpath2 *secondary_logpath2*

Specifies the secondary or temporary log path. To use log files from archive, use a temporary directory for retrieval. That temporary path can then be as -logpath2 parameter, so that db2f1sn can read the specified logs. If logpath2 is not provided, the database mirror log path is used when available.

-startlog *log_number*

If *log_number* is provided, db2f1sn does not search for log files before *log_number*.

-endlog *log_number*

If *log_number* is provided, db2f1sn does not search for log files after *log_number*.

-kspassword *password*

Specifies the password to use when opening the keystore.

-kspassarg fd:*file_descriptor* | filename:*file_name*

Specifies the keystore password arguments. The *file_descriptor* parameter specifies a file descriptor that identifies an open and readable file or pipe that contains the password to use. The *file_name* parameter specifies the name of the file that contains the password to use.

-ksprompt

Specifies that the user is to be prompted for a password.

Examples

Finding an LSN:

```
db2flsn 000000BF0030  
Given LSN is contained in log file S0000002.LOG
```

```
db2flsn -q 000000BF0030  
S0000002.LOG
```

```
db2flsn -db flsntest 0000000000FA0000  
Given LSN is contained in log file S0000002.LOG
```

```
db2flsn -q -db flsntest 0000000000FA0000  
S0000002.LOG
```

```
db2flsn -path /db2/NODE0000/SQL00001 0000000000FA4368  
Given LSN is contained in log file S0000002.LOG
```

Using -lsnrange option:

```
db2flsn -lsnrange -startlog 20 -endlog 27  
S0000020.LOG: has LSN range 0000000000023B3D to 0000000000023E0A  
S0000021.LOG: has LSN range 0000000000023E0B to 00000000000240D8  
S0000022.LOG: is not empty, but has no log records starting within its boundaries.  
S0000023.LOG: has LSN range 00000000000240D9 to 00000000000243B9  
S0000024.LOG: is unused/blank.  
S0000025.LOG: is unused/blank.  
S0000026.LOG: could not be opened or was invalid. Check file permissions.  
S0000027.LOG: could not be opened or was invalid. Check file permissions.
```

Warning messages when an LSN could not be found, but it cannot be in an earlier log file:

```
db2flsn 00000000000243D7  
Input LSN 00000000000243D7 is within or after log file S0000023.LOG:
```

```
S0000023.LOG: Log file starts with LSN 00000000000243BA.  
S0000024.LOG: Log file could not be opened or was invalid/unused.
```

Log paths used:
(./LOGSTREAM0000) and
().

If this is not the end of the log stream, retrieve more log files into a temporary directory (to avoid overwriting active log files) and re-run db2flsn tool with -logpath2 option to use the log files from that temporary directory as well. Check access permissions on log files to make sure db2flsn can open necessary log files.

To see the first LSN of a log file, use the -lsnrange option:
db2flsn -lsnrange <log file number> -logpath2 <temp log dir>

To see the first LSN of a set of log files, use:
db2flsn -lsnrange -logpath2 <temp log dir> \
-startlog <first log> -endlog <end log>

```
db2flsn -q 00000000000243D7  
S0000023.LOG  
=> Return code is: 100 (Warning, the LSN could be in a later log file,  
returning the last file that db2flsn could open).
```

```
db2flsn 00000000000243D7 -endlog 23  
Input LSN 00000000000243D7 is after log file S0000023.LOG.  
This log file has LSN range 00000000000243BA - 00000000000243D6.  
To find the exact log file, try a larger value for the -endlog parameter.
```

```

Log paths used:
(./LOGSTREAM0000) and
().

To see the first LSN of a log file, use the -lsnrange option:
db2f1sn -lsnrange <log file number> -logpath2 <temp log dir>

To see the first LSN of a set of log files, use:
db2f1sn -lsnrange -logpath2 <temp log dir> \
-startlog <first log> -endlog <end log>

db2f1sn -q 00000000000243D7 -endlog 23
S0000023.LOG
=> Return code is: 101 (Warning, LSN could be in a later log file, returning
the file specified by -endlog parameter. To find the exact file, use a larger
value for the -endlog parameter.)

db2f1sn -lsnrange 23
S0000023.LOG: has LSN range 00000000000243BA to 00000000000243D6
=> This shows that LSN 00000000000243D7 has not been produced yet on this log
stream. However, when it is generated, this LSN is guaranteed that it cannot be
in a log file before S0000023.LOG.

Error messages, when an LSN could not be found. In this example, S0000000.LOG
has already been archived and not found in history file either:

db2f1sn 0000000000000001
Input LSN 0000000000000001 could not be found. Input LSN is before the earliest
LSN found 0000000000021E6B:

S0000001.LOG: Log file starts with LSN 0000000000021E6B.
S0000000.LOG: Log file could not be opened or was invalid/unused.

Log paths used:
(./LOGSTREAM0000) and
().

Retrieve log files before S0000001.LOG into a temporary directory (to avoid
overwriting active log files) and re-run db2f1sn tool with -logpath2 option to
include the log files from that temporary directory:

db2f1sn <LSN> -db <db> -logpath2 <temp log dir> -startlog <first log>
-endlog <last log>

To see the first LSN of a log file, use the -lsnrange option:
db2f1sn -lsnrange <log file number> -logpath2 <temp log dir>

To see the first LSN of a set of log files, use:
db2f1sn -lsnrange -logpath2 <temp log dir> \
-startlog <first log> -endlog <eng log>

db2f1sn -q 0000000000000001

=> with "-q" option, no output is produced as the log file could not be found.
Error code returned is -108 (The LSN is before the earliest log file db2f1sn
could open).

db2f1sn 0000000000000001 -startlog 1
Input LSN(0000000000000001) is before log file S0000001.LOG. This log file starts
with LSN 0000000000021E6B.

Log paths used:
(./LOGSTREAM0000) and
().

To see the first LSN of a log file, use the -lsnrange option:

```

```

db2f1sn -lsnrang <log file number> -logpath2 <temp log dir>

To see the first LSN of a set of log files, use:
db2f1sn -lsnrang -logpath2 <temp log dir> \
-startlog <first log> -endlog <end log>

db2f1sn -q 0000000000000001 -startlog 1

=> with "-q" option, no output is produced as the log file could not be found.
Error code returned is -109 (The LSN is before the log specified by -startlog
parameter.)

Using -lrirange option:

db2f1sn -lrirange 0
S000000.LOG: has LRI range 00000000000000010000000000002D65000000000003F1D0 to
00000000000000010000000000002D7400000000003F26A

db2f1sn -lrirange -startlog 0 -endlog 3
S000000.LOG: has LRI range 00000000000000010000000000002D65000000000003F1D0 to
00000000000000010000000000002D7400000000003F26A
S000001.LOG: has LRI range 00000000000000010000000000002D75000000000003F26B to
00000000000000010000000000002D8300000000003F304
S000002.LOG: has LRI range 00000000000000010000000000002D84000000000003F305 to
00000000000000010000000000002D9700000000003F39E
S000003.LOG: is unused/blank.

db2f1sn 010000000000002D75000000000003F1C0
Input LSN(000000000003F1C0) is before log file S000000.LOG. This log file
starts with LSN 000000000003F1D0.

db2f1sn 010000000000002D75000000000003F26F
Given LSN is in log file S000001.LOG

```

Usage notes

- If **-db** and **-path** are not specified, **db2f1sn** takes the current directory as database path where the LFH files (SQLGCTL.LFH.1 and SQLGCTL.LFH.2) are located. **db2f1sn** also requires access to the GLFH files (SQLGCTL.GLFH.1 and SQLGCTL.GLFH.2), which are opened either from the path specified by the **-path** parameter, or from their default location for the given database.
- The **db2f1sn** tool tries to open the history file from either the directory provided by **-path** parameter or the default path where a history file is located for the given database. The history file contains the starting LSN for log files for databases using log archiving. In such cases, **db2f1sn** looks in the history file when it cannot open an already archived log file. A database is using log archiving if it is configured with the **logarchmeth1** or **logarchmeth2** configuration parameters set to a value other than OFF or LOGRETAIN.
- This tool works with both recoverable and non-recoverable (circular logging) databases. A database is recoverable if it is configured with the **logarchmeth1** or **logarchmeth2** configuration parameters set to a value other than OFF.

db2fm - Db2 fault monitor

Controls the Db2 fault monitor daemon. You can use **db2fm** to configure the fault monitor.

This command is available on UNIX and Linux operating systems.

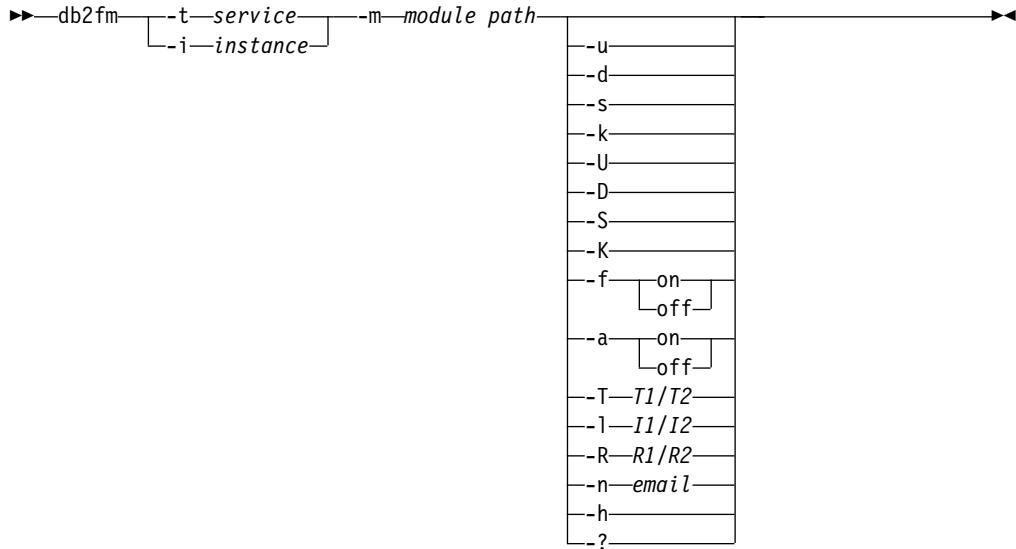
Authorization

Authorization over the instance against which you are running the command.

Required connection

None

Command syntax



Command parameters

-m module-path

Defines the full path of the fault monitor shared library for the product being monitored. The default is \$INSTANCEHOME/sql1ib/lib/libdb2gcf.

-t service

Gives the unique text descriptor for a service.

-i instance

Defines the instance of the service.

-u

Brings the service up.

-U

Brings the fault monitor daemon up.

-d

Brings the instance down.

-D

Brings the fault monitor daemon down.

-k

Kills the service.

-K

Kills the fault monitor daemon.

-s

Returns the status of the service.

-S

Returns the status of the fault monitor daemon. The status of the service or fault monitor can be one of the following

- Not properly installed,
- INSTALLED PROPERLY but NOT ALIVE,

- ALIVE but NOT AVAILABLE (maintenance),
- AVAILABLE, or
- UNKNOWN
- OPERABLE
- NOT OPERABLE

-f on | off

Turns fault monitor ON or OFF. If this option is set off, the fault monitor daemon will not be started, or the daemon will exit if it was running.

-a on | off

Activates or deactivates fault monitoring. If this option is set to OFF, the fault monitor will not be actively monitoring, which means if the service goes down it will not try to bring it back.

-T T1/T2

Overwrites the start and stop time-out.

For example:

- -T 15/10 updates the two time-outs
- -T 15 updates the start time-out to 15 secs
- -T /10 updates the stop time-out to 10 secs

-I I1/I2

Sets the status interval and time-out.

-R R1/R2

Sets the number of retries for the status method and action before giving up.

-n e-mail

Sets the email address for notification of events.

-h | -?

Displays command usage help.

Usage notes

- If you want to set up email notifications to be sent by the fault monitor daemon, you must have SMTP running on the local host. The Db2 fault monitor does not have a setting for specifying the SMTP server. In order for the fault monitor to send email notifications, you have to bind the hostname to the SMTP server, or, as a workaround, make the hostname an alias of the localhost in the /etc/hosts file.

db2fmcu - Db2 fault monitor controller

Db2 Fault Monitor is the Db2 database facility that automatically starts an instance after a crash.

It can also auto restart an instance on machine reboot. You can configure the Db2 fault monitor on Linux and UNIX operating systems using the Db2 fault monitor controller command. The command must be run as root because it accesses the system's `inittab` file.

Authorization

Root user authority

Required connection

None

Command syntax

```
►►db2fmcu [ -u -p db2fmcd_path ] [ -f inittab ]
```

Command parameters

-u -p *db2fmcd_path*

This option re-configures the *inittab* file to include the fault monitor controller (FMC) at system startup, where *db2fmcd_path* is the complete path to the FMC daemon (**db2fmcd**) object, for example /opt/IBM/db2/bin/db2fmcd.

As of Red Hat Enterprise Linux (RHEL) 6, the /etc/inittab file has been deprecated. Specifying this option creates or replaces the db2fmcd.conf file under the /etc/init directory.

As of Solaris 10, the /etc/inittab file has been deprecated. Specifying this option creates and enables the db2fm SMF service.

-d

This option changes the *inittab* file configuration to prevent the FMC from being run at system startup.

As of RHEL 6, the /etc/inittab file has been deprecated. Specifying this option removes the db2fmcd.conf file.

As of Solaris 10, the /etc/inittab file has been deprecated. Specifying this option disables the db2fm SMF service.

-f *inittab*

This option specifies a path to the *inittab* file.

Example

To start the fault monitor controller at system startup by re-configuring the *inittab* file, run the following command:

```
db2fmcu -u -p /opt/IBM/db2/bin/db2fmcd
```

To prevent the fault monitor controller from being launched at system startup, run the following command:

```
db2fmcu -d
```

Usage notes

- If you changed /etc/inittab manually, you need to send SIGHUP to process 1 to ask it to re-scan /etc/inittab right away. Otherwise, it can take some time before the next re-scan happens. If you updated /etc/inittab via **db2fmcu**, you do not need to send the signal as it is already done by the **db2fmcu** command.
- In the Solaris Operating System, the processes listed in the /etc/inittab file inherit the default system project settings. Ensure that the kernel parameters for the project are set high enough to accommodate the Db2 processes or start the **db2fmcd** process under a different project that has the appropriate kernel settings. To start the **db2fmcd** process under a different project, edit the fmc entry in the

/etc/inittab file to use newtask. For example, add /usr/bin/newtask -p in front of the **db2fmcd** path. For more information about setting kernel parameters, see the **db2osconf** command.

db2fodc - Db2 first occurrence data collection

The **db2fodc** utility captures symptom-based data about the Db2 instance to help in problem determination situations. It is intended to collect information about potential hangs, severe performance issues, and various types of errors.

Purpose

The **db2fodc** command is used to collect performance data on issues that do not trigger automatic FODC (first occurrence data collection).

The command is used in two main ways. The first method collects data immediately by running the **db2fodc** command as the issue occurs. The second method, available in Version 9.7 Fix Pack 5 and later fix packs, triggers data collection when the environment reaches the state you described with threshold parameters.

You build the command with three basic components: one main data collection parameter, secondary data collection parameters, and threshold parameters.

Begin by choosing the main data collection parameter and its data collection mode: either basic or full. You can run the command in this state to immediately collect data.

Or you can add secondary data collection parameters to choose what part or parts of the system you want to scan. In addition, you can specify where the output goes and set a timeout value. Data is collected immediately, if you run the command this way.

Or you can add threshold parameters, available in Version 9.7 Fix Pack 5 and later fix packs. Specify the **-detect** parameter, along with one or more threshold rules, to set a conditional threshold. The system is monitored and data is collected when the thresholds are met.

If you choose to add threshold parameters, the command continues to run until the user ID the command is running against is logged off or the environment reaches the state that is described by the threshold parameters. To keep the command active in the background regardless of user's subsequent logout, add nohup to the start of the command and & to the end. For example, nohup db2fodc -memory basic -detect "avm>=5242880" &.

Regardless of the collection method, the captured data is placed inside an FODC package directory. This directory is created either in the default diagnostic path or in an FODC directory path you specify with the **-fodcpath** parameter.

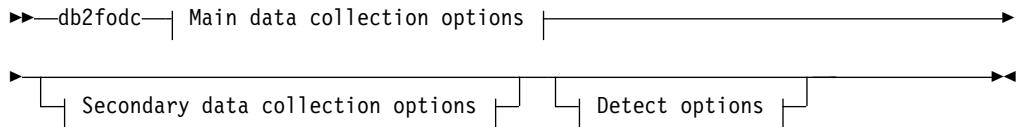
You can review the output or you can send the directory, with the collected diagnostic data, to IBM support for analysis.

Authorization

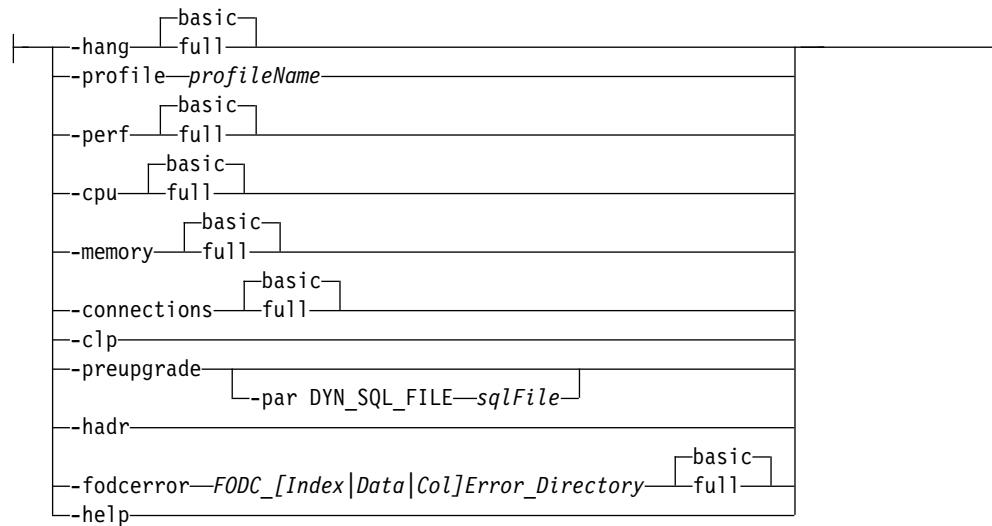
One of the following authority levels is required:

- On Linux and UNIX systems, the SYSADM authority level. You must also be the instance owner.
- On Windows operating systems, the SYSADM authority level.

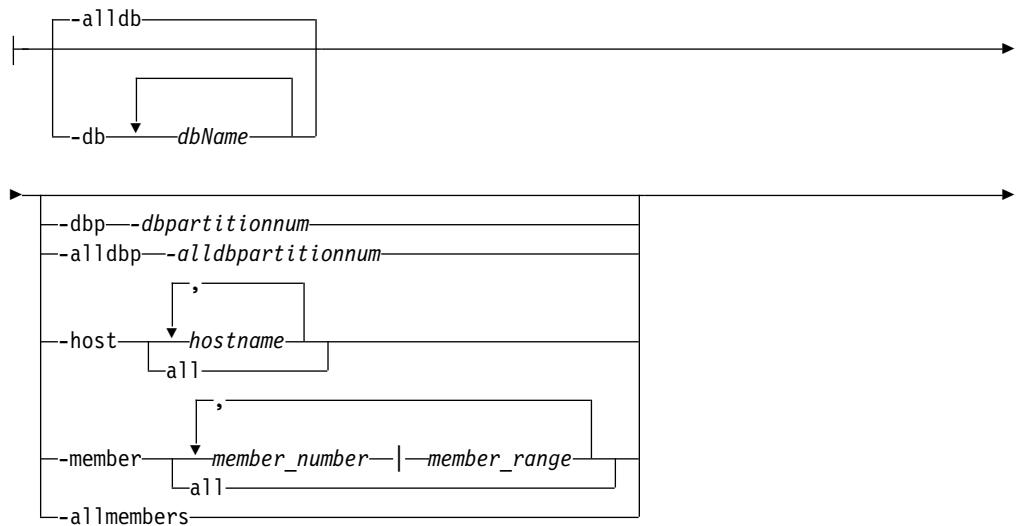
Command syntax

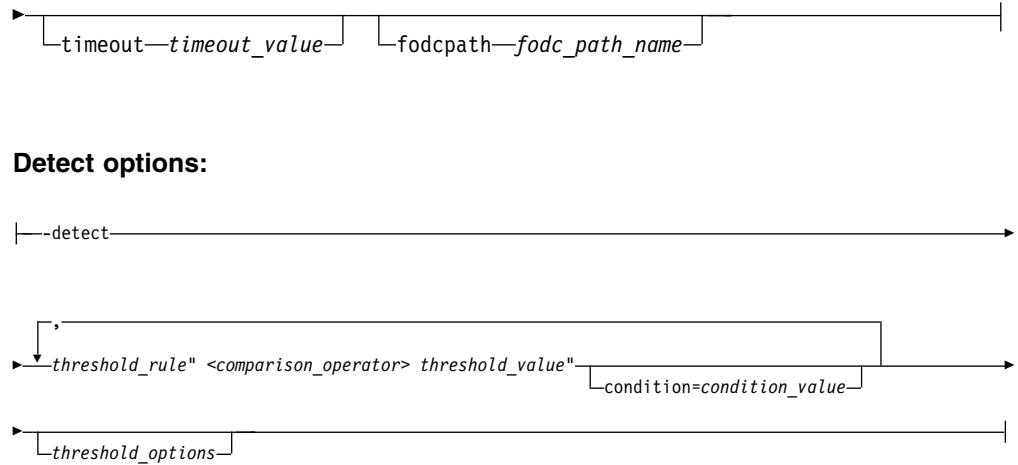


Main data collection options:



Secondary data collection options:





Main data collection parameters

Choose only one main data collection parameter per command.

-hang

Collects FODC data that is related to a potential hang situation or a serious performance issue. The **-hang** parameter is intended for use when the instance is considered unusable and needs restarting. Data is collected as quickly as possible, although, the process might not complete if the instance or database is already hanging. The full or basic collection mode can be used without user interaction.

A new directory that is prefixed with **FODC_Hang_** is created under the current diagnostic path. The script, **db2cos_hang**, is executed to collect FODC data into one or more files and deposited into the directory.

For example, `db2fodc -hang`

-perf

Collects data that is related to a performance issue. The **-perf** parameter is similar to the **-hang** parameter, but uses less resources. Therefore, this option is employed when the instance is still usable and restarting is not needed. The full or the basic collection mode can be run without user interaction.

A new directory that is prefixed with **FODC_Perf_** is created under the current diagnostic path. The script, **db2cos_perf**, is executed to collect FODC data into one or more files and deposited into the directory.

For example, `db2fodc -perf`

-profile profileName

Collects FODC data on a potential hang situation. Data is collected based on the parameters that you specify in the **db2fodc.profile** file in the `~/sql1lib/cfg` directory. You can modify one of the existing profiles or add a new one. The full list of parameters that can be specified is in the **sql1lib/bin/db2cos_hang** script. It is recommended that you use the **-profile** parameter only under the guidance of IBM support.

A new directory that is prefixed with **FODC_Hang_** is created under the current diagnostic path. The customized profile is executed to collect FODC data into one or more files and deposited into the directory.

This parameter is not supported on Windows NT operating system.

For example, db2fodc -profile sample_profile.

-cpu

In Version 9.7 Fix Pack 5 and later fix packs, collects processor-related performance and diagnostic data. The data can be used to diagnose problems that are related to high processor use, a high number of running processes, or high processor wait times. The full or the basic collection mode can be run without user interaction.

A new directory that is prefixed with FODC_Cpu_ is created under the current diagnostic path. The script, **db2cos_threshold**, is executed to collect FODC data into one or more files and deposited into the directory.

For example, db2fodc -cpu

-memory

In Version 9.7 Fix Pack 5 and later fix packs, collects memory-related diagnostic data. Problems such as no free memory available, swap space that is used at a high rate, excessive paging or a suspected a memory leak can be diagnosed. The full or the basic collection mode can be run without user interaction.

A new directory that is prefixed with FODC_Memory_ is created under the current diagnostic path. The script, **db2cos_threshold**, is executed to collect FODC data into one or more files and deposited into the directory.

For example, db2fodc -memory

-connections

In Version 9.7 Fix Pack 5 and later fix packs, collects connection-related diagnostic data. The data can be used to diagnose problems such as spikes in the number of applications in the executing or compiling state and new database connections that were denied.

A new directory that is prefixed with FODC_Connections_ is created under the current diagnostic path. The script, **db2cos_threshold**, is executed to collect FODC data into one or more files and deposited into the directory.

For example, db2fodc -connections

-clp

In Version 9.7 Fix Pack 5 and later fix packs, collects operating system and configuration information that is related to instance creation. The command does not support the **-member** parameter, but does support the **-host** parameter. The **-clp** parameter is supported only on Linux and UNIX operating systems. If you issue this command on a Windows operating system, no data is collected.

A new directory that is prefixed with FODC_ClP_ is created under the current diagnostic path. The script, **db2cos_clp**, is executed to collect FODC data into one or more files and deposited into the directory.

For example, db2fodc -clp

-preupgrade

In Version 9.7 Fix Pack 5 and later fix packs, collects performance-related information before a critical upgrade or update. The use of the **-preupgrade** parameter is precautionary. After the upgrade or update, any problems that might occur can be potentially diagnosed with the assistance of the collected data and IBM support. To obtain sufficient performance data to troubleshoot

any future problems issue the command several times, both at peak and idle usage times. This parameter must be specified with a database and can take a long time to complete.

A new directory that is prefixed with FODC_Prepupgrade_ is created under the current diagnostic path. The script, **db2cos_prepupgrade**, is executed to collect FODC data into one or more files and deposited into the directory.

For example, db2fodc -prepupgrade -dbdbname

-par DYN_SQL_FILE=sqlFile

In Version 9.7 Fix Pack 5 and later fix packs, collects FODC data that is related to an SQL file that you specify. Make sure the SQL file contains the SQL statements that are most representative of the workload your system performs. Run the command before an upgrade or update. After the upgrade, run the command again. Compare the outputs to determine the impact of the upgrade.

This option is only available with the **-prepupgrade** parameter. If you do not specify the **-par DYN_SQL_FILE=sqlFile** option with the **-upgrade** parameter, 20 dynamic queries are retrieved from the dynamic SQL cache.

For example, db2fodc -prepupgrade -db dbname -par DYN_SQL_FILE=sqlFile

-hadr

In Version 9.7 Fix Pack 7 and later fix packs, collects diagnostic data that is related to HADR problems. You can use this parameter with the **-detect** option to detect HADR congestion and automatically collect the related diagnostic information. If the **-hadr** and **-detect** options are both specified, you cannot use any threshold rules. Threshold options for the **-hadr** option have different defaults and only the following are available:

Table 51. . Default values for **-HADR** parameter threshold options

| Available threshold options | Default value |
|-----------------------------|---------------|
| iteration= | 1 |
| interval= | 30 |
| sleeptime= | 0 |
| triggercount= | 10 |
| -nocollect | n/a |
| off | n/a |

The collected information is stored in a new directory named **FODC_Hadr_timestamp_hostname_Primary|Standby|Standard** in the **DIAGPATH** directory, where *timestamp* is the time when the command was run, *hostname* is the host that the collection was performed upon, and *Primary*, *Standby*, and *Standard* denote the HADR role of the database at the time of the collection.

The script, **db2cos_HADR**, is executed to collect FODC data into one or more files and deposited into the directory.

For example, db2fodc -hadr -dbdbname -detect

-fodcerror FODC_[Index|Data|Col]Error_directory

FODC_[Index|Data|Col]Error_directory collects data that is related to:

- an index error (**FODC_IndexError_directory**),
- a database manager error (**FODC_DataError_directory**), or
- a column-organized table error (**FODC_ColError_directory**).

(*FODC_DataError_directory* and *FODC_ColError_directory* were added in Db2 Cancun Release 10.5.0.4.)

The *FODC_[Index|Data|Col]Error_directory* folder is required and must contain the **db2cos_[index|data|col]error_short(.bat)** script or the **db2cos_[index|data|col]error_long(.bat)** script. For example, the **db2cos_[index|data|col]error_short(.bat)** script or the **db2cos_[index|data|col]error_long(.bat)**.

The BASIC mode invokes **db2cos_[index|data|col]error_short** script. The FULL mode invokes **db2cos_[index|data|col]error_short** and **db2cos_[index|data|col]error_long** scripts. If the mode is not specified, the BASIC mode is the default.

Do not rename or move the *FODC_[Index|Data|Col]Error_directory* directory. The **db2dart** commands in the scripts need this directory path to correctly generate reports.

If you must run this command parameter manually, check the directory for any existing **db2dart** reports. Reports have the extension .rpt and .rpthex. If there are reports in the directory, before you start the command manually, rename the reports or move them to a subdirectory under the *FODC_[Index|Data|Col]Error_directory* directory. The full or the basic collection mode can be run without user interaction. The output and log files are in the **db2diag** log file.

-help

Displays help information. When this option is specified, all other options are ignored, and only the help information is displayed.

Main data collection parameter modes

You can specify the collection mode as a suboption for some of the main data collection parameters.

basic

The basic collection mode is run, without user interaction. Less data is collected than in the full mode, but with less resources used.

full

The full collection mode is run, without user interaction. This option requires more resources and time to run than basic collection mode, but gathers more data.

Secondary data collection parameters

One or more of the following secondary data collection parameters can be specified with one of the main data collection parameters.

-db dbname

Collects FODC data that is related to the specified database or databases. Multiple databases can be specified in a comma-separated list.

For example, db2fodc -hang -db sample,dbsample

-alldbs

Collects FODC data that is related to all active databases. This option is active by default.

-member member_number|member_range

In Version 9.7 Fix Pack 5 and later fix packs, specifies the member or members

on which the command is issued. If this option is not specified, the command is issued on the current member. Multiple members can be specified as a comma-separated list, as a range of members, or any combination thereof.

For example, db2fodc -hang -member 1-3,5-7

a11

Specifies that the command is issued on all members that are defined in **db2nodes.cfg** file. This option cannot be combined with the **-host** option.

-a11members

Specifies that this command is to run on all members of the local host. To illustrate the difference between the **-a11member** parameter and the **-a11** suboption for the **-member** parameter, consider the following example:

- Members 1 and 2 are on host A
- Members 3 and 4 are on host B
- Members 1, 2, 3, and 4 are all defined in the **db2nodes.cfg** file
- If you run the command with the **-a11member** parameter specified on host A, data is collected on members 1 and 2
- If you run the command with the **-a11** suboption for the **-member** parameter, data is collected on all four members

The **-a11member** parameter is equal to the **-a11dbp** parameter, except that the **-a11member** parameter is suitable for use in pureScale environments.

-dbp-dbpartitionnum

Collects FODC data that is related to all the specified database partition numbers. The **-dbp** parameter is equal to the **-member** parameter, except that the **-dbp** parameter is suitable for use in non-pureScale environments.

-a11dbp-a11dbpartitionnums

Specifies that the command is to run on all active database partition servers in the instance. Data is collected from the database partition servers on the same physical computer that the **db2fodc** command is being run. The **-a11dbp** parameter is equal to the **-a11member** parameter, except that the **-a11dbp** parameter is suitable for use in non-pureScale environments.

If you use the **-a11dbp** parameter, data is collected from only local members.

-timeout timeout_value

Specifies a timeout period for the callout script that is started by the **db2fodc** command. If the timeout is reached before the callout script completes diagnostic data collection, the script process is stopped. There is no default timeout. Therefore, if no timeout value is specified, the command runs in perpetuity. The timeout is specified as *nh ym xs*, where *n* represents hours, *y* represents minutes, and *x* represents seconds. If no h, m, or n suffix is specified, the timeout is in seconds.

For example, **-timeout 2h 30m 45s** and **-timeout 600**.

-fodcpath fodc_path_name

In Version 9.7 Fix Pack 4 and later fix packs, specifies the full path to the directory where the FODC data package is created. The path that you specify must be writable by the members on the database and by the fmp processes running on the member or partition. If you do not specify the **-fodcpath** parameter and do not specify a list of partitions or members in your command, the **-fodcpath** parameter setting for the current partition or member is used. If this value is not set, the instance level setting is used. If this value is not set, FODC data is sent to the current diagnostic directory path (diagpath or alt_diagpath).

-host *hostname*

In Version 9.7 Fix Pack 4 and later fix packs, specifies the host or hosts on which the command is issued. The command is issued for all members that are on the specified host. If a host name is not specified, the command is issued on the local host for the default member. Multiple host can be specified as a comma-separated list of hosts. If you run the command on a remote host, the collection mode (basic or full) must be specified. Also, ensure that \$HOME/.rhosts is set up between hosts. The **-host** option cannot be combined with the **-member** option.

For example, db2fodc -hang basic -host hostA,hostB

a11

Specifies that the command is issued on all hosts that are defined in **db2nodes.cfg**.

For example, db2fodc -hang basic -host a11

Threshold parameters

To collect data when the environment reaches certain thresholds, use the **-detect** parameter and one or more threshold parameters.

**-detect *threshold_rule* "<*comparison_operator*> *threshold_value*"
*threshold_options***

In Version 9.7 Fix Pack 5 and later fix packs, specifies a set of conditions that must exist before data collection is triggered. The **-detect** parameter can be combined with one or more variables of a threshold rule that is combined with a threshold value and separated by a comparison operator. Data collection is further specified with the addition of threshold options. For example of threshold options is the number of times a threshold must be detected or the length of time for which a threshold must be detected before data collection is triggered. At least one valid threshold rule must be specified, except for **-hadr** data collection. Detection is logged in the **db2diag** log files.

The **-detect** parameter is compatible with the following main data collection parameters:

- **-cpu**
- **-memory**
- **-connections**
- **-hadr**
- **-hang**
- **-perf**
- **-cpl**
- **-preupgrade**

threshold_rule

The condition of the system that the threshold is to detect. You can specify multiple threshold rules. The following are supported threshold rules:

swapused

On AIX operating systems, percentage value that is located under the Percent Used column from the output of "**lspvs -s**" command.

On Linux operating systems, used swap space that is divided by the total swap space, which is multiplied by 100%.

On HP-UX operating systems, total percentage value that is located under the PCT USED column of the **swapinfo -tam** command output.

On Solaris operating systems, used swap space that is divided by the total swap space (available swap space plus used swap space), multiplied by 100%.

Not available on Windows operating systems.

rqueue

The number of processes that are currently in the run queue.

bqueue

The number of processes that are currently in the block queue. This option is not available on the Windows operating systems.

avm

On AIX and HP-UX operating systems, the number of active virtual pages.

On Linux and Windows operating systems, the amount of active memory.

Not available on Solaris operating system.

free

On AIX operating systems, the amount of idle memory. A large portion of real memory is used as a cache for file system data. It is not unusual for the size of the free list to remain small. A page is 4096 bytes.

On Linux operating system, the amount of idle memory. All Linux blocks are 10247 bytes.

On HP-UX, Solaris, and Windows operating systems, the amount of idle memory.

- pi** On AIX and Windows operating systems, the number of pages that are paged in from the paging space.

Not available on Linux operating systems.

On HP-UX operating systems, the number of pages that are paged in.

On Solaris operating systems, the amount of kb paged in.

- po** On AIX and Windows operating systems, the number of pages that are paged out to the paging space.

Not available on Linux operating systems.

On HP-UX operating systems, the number of pages that are paged out.

On Solaris operating systems, the amount of kb paged out.

- si** Not available on AIX and Windows operating systems.

On Linux operating systems, the amount of memory that is swapped in from the disk per second.

On HP-UX operating systems, the number of processes that are swapped in.

On Solaris operating systems, process swap ins that are measured in kbps.

- so** Not available on AIX and Windows operating systems.

On Linux operating systems, the amount of memory that is swapped to the disk per second.

On HP-UX operating systems, the number of processes that are swapped out.

On Solaris operating systems, process swap outs that are measured in kbps.

sr On AIX operating systems, pages that are scanned by page replacement algorithm.

Not available on Linux and Windows operating systems.

On HP-UX operating systems, the number of pages that are scanned by clock algorithm per second.

On Solaris operating systems, the number of pages that are scanned by clock algorithm.

us Time spent running user (non-kernel) code, expressed in processor ticks

sy Time spent running kernel code, expressed in processor ticks

us_sy

Time spent running kernel and user (non-kernel) code, expressed in processor ticks

id Processor idle time, expressed in processor ticks.

CS Number of context switches.

connections

Number of connected applications in a status that is specified by the connstatus option. The **db2pd -application** command is invoked to determine the number of database connections.

comparison_operator

One of the supported comparison operators, either **>=** (greater than or equal to) or **<=** (less than or equal to).

threshold_value

A numerical value for the specified threshold rule. Only non-negative integers can be specified.

The current value for a *threshold_rule* parameter can help you decide where to set the *threshold_value*. For example,

- To determine the current number of **connections** (connected applications), run the **db2pd -application** command.
- To determine the current value for **swappeds**, refer to Table 2.

For all other *threshold_rule* values, refer to the command in the second row of the table 1, based on your operating system. The first column refers to the threshold rule that you are including in the **db2fodc** command. The proceeding columns display the code to look for in the output of the command. For example, if you believe that the amount of active memory is affecting the performance of your AIX system, run the **vmstat** command. The current amount of active memory is in the output of the command, represented by **avm**. You can use this number to determine what is an appropriate threshold to detect.

condition=condition_value

If you specify more than one threshold rule, you can use a logical operator to join them into one threshold. The default is to **AND** threshold rules. The following are valid condition values:

AND

Data collection is triggered if all the threshold rules are true. For example, `db2fodc -memory -detect free"<=10" connections">=1000" condition="AND"`. In this example, free memory must be equal to or less than 10 and the number of connections must be greater than or equal to 1000. Both conditions must be true for data collection to be triggered. Because **AND** is the default, it is not needed in the example.

OR Data collection is triggered if just one of the threshold rules is true. For example, `db2fodc -memory -detect free"<=10" connections">=1000" condition="OR"`. In this example, free memory must be equal to or less than 10 or the number of connections must be greater than or equal to 1000. Only one condition must be true for data collection to be triggered.

threshold_options***duration=duration_value***

Specifies the length of time, in hours, during which threshold detection and diagnostic data collection is enabled. In other words, the maximum amount of time that the **db2fodc** command runs. The clock starts as soon as the command is issued.

iteration=iteration_value

Specifies the maximum number of times to perform threshold detection and diagnostic data collection. The default is one iteration.

sleeptime=sleeptime_value

Specifies the time to wait, in seconds, before the next iteration is started. The default is 1 second.

triggercount=triggercount_value

Specifies the consecutive number of times the threshold condition must be detected in one iteration before diagnostic data collection is triggered. The default is five times. After each detection of the trigger condition, detection pauses for the interval value that is specified.

interval=interval_value

Specifies the time, in seconds, between each **triggercount**, within one iteration. The default value is 1 second. The **interval** multiplied by the **triggercount** equals the total length of time the condition must exist to trigger data collection.

For example, the parameters are set as `triggercount=3` and `interval=5`. For data collection to start, the condition that is specified by the threshold rule must be met three consecutive times with 5 seconds between each detection. So, the condition must exist for 15 seconds (3×5) to trigger data collection.

connstatus=status_value

Specifies the status of the connection in the **connections** threshold rule. The default is to count all connection statuses for applications that are connected to the database. Or, choose one of the following valid connection statuses:

CommitActive

The unit of work is committing its database changes.

Compiling

The database manager is compiling an SQL statement or precompiling a plan on behalf of the application.

ConnectCompleted

The application has initiated a database connection and the request has completed.

ConnectPending

The application has initiated a database connection but the request has not yet completed.

CreatingDatabase

The agent has initiated a request to create a database and that request has not yet completed.

Decoupled

There are no agents that are currently associated with the application. This is a normal state. When the Connection Concentrator is enabled, there is no dedicated coordinator agent, so an application can be decoupled on the coordinator partition. In non-concentrator environments, an application cannot be decoupled on the coordinator partition as there will always be a dedicated coordinator agent.

DisconnectPending

The application has initiated a database disconnect but the command has not yet completed running. The application may not have explicitly run the database disconnect command. The database manager disconnects from a database if the application ends without disconnecting.

FederatedRequestPending

The application is waiting for results from a federated data source.

HeuristicallyCommitted

The unit of work is part of a global transaction that has been heuristically committed.

HeuristicallyAborted

The unit of work is part of a global transaction that has been heuristically rolled-back.

Lock-wait

The unit of work is waiting for a lock. After the lock is granted, the status is restored to its previous value.

PendingRemoteRequest

The application is waiting for a response from a remote partition in a partitioned database instance.

PerformingLoad

The application is performing a load of data into the database.

PerformingBackup

The application is performing a backup of the database.

PerformingUnload

The application is performing an unload of data from the database.

QuiescingTablespace

The application is performing a quiesce table space request.

RequestInterrupted

An interrupt of a request is in progress.

Recompiling

The database manager is recompiling (that is, rebinding) a plan on behalf of the application.

RestartingDatabase

The application is restarting a database in order to perform crash recovery.

RestoringDatabase

The application is restoring a backup image to the database.

RollbackActive

The unit of work is rolling back its database changes.

RollbackToSavepoint

The application is rolling back to a savepoint.

TransactionEnded

The unit of work is part of a global transaction that has ended but has not yet entered the prepared phase of the two-phase commit protocol.

TransactionPrepared

The unit of work is part of a global transaction that has entered the prepared phase of the two-phase commit protocol.

UOW-Executing

The database manager is waiting on behalf of the unit of work in the application. This status typically means that the system is running in the application's code.

UOW-Waiting

The database manager is waiting on behalf of the unit of work in the application. This status typically means that the system is running in the application's code.

UOWQueued

The unit of work is queued waiting for another activity to complete execution. The unit of work is queued because the threshold for the number of concurrently running activities has been reached.

Unknown**Wait-Autonomous**

The application is waiting for an autonomous routine to complete.

WaitToDisableTablespace

The application has detected an I/O error and is attempting to disable a particular table space. The application must wait for all other active transactions on the table space to complete before it can disable the table space.

off

Stops all threshold detection and turns off currently active threshold rules. If other options are also specified when **off** is specified, the other options

are ignored. Turning off threshold detection requires up to 60 seconds to take full effect and shuts down all running **db2fodc -detect** commands.

-nocollect

Specifies that diagnostic data is not collected. Threshold detection is logged in the **db2diag** log files. This option is often used if you want to know whether the threshold is being met but do not want to congest the system with data collection. If you want to start collecting data, use the **off** parameter to stop the command and then reissue the command without the **-nocollect** parameter.

Table 52. Command to determine threshold value

| Operating system | AIX | Linux | HP-UX | Solaris | Windows |
|--------------------------------------|----------------|------------------|------------------|------------------|----------------------|
| Command used | vmstat | vmstst -a | vmstat -S | vmstat -S | db2pd -vmstat |
| Run queue (rqueue) | r | r | r | r | r |
| Block queue (bqueue) | b | b | b | b | Not applicable |
| Active memory (avm) | avm | active | avm | Not applicable | used |
| Free memory (free) | fre | free | free | free | free |
| Paging in (pi) | pi | Not applicable | pi | pi | pi |
| Paging out (po) | po | Not applicable | po | po | po |
| Swapping in (si) | Not applicable | si | si | si | Not applicable |
| Swapping out (so) | Not applicable | so | so | so | Not applicable |
| Page scanned (sr) | sr | Not applicable | sr | sr | Not applicable |
| User CPU (us) | us | us | us | us | usr |
| System CPU (sy) | sy | sy | sy | sy | sys |
| User and system CPU (us_sy) | us+sy | us+sy | us+sy | us+sy | us+sy |
| Idle CPU (id) | id | id | id | id | idl |
| Context switches (cs) | cs | cs | cs | cs | cs/s |

Table 53. Command to determine used swap space

| Operating system | Command used | Used swap space (swapused) |
|------------------|----------------|--|
| AIX | 1sps -s | Percentage value that is located under the Percent Used column |

Table 53. Command to determine used swap space (continued)

| Operating system | Command used | Used swap space (swapused) |
|------------------|----------------------|--|
| Linux | free | (total swap space/used swap space)*100% |
| HP-UX | swapinfo -tam | Total percentage value that is located under the PCT USED column |
| Solaris | swap -s | (used swap space/(available swap space+used swap space))*100% |
| Windows | Not applicable | Not applicable |

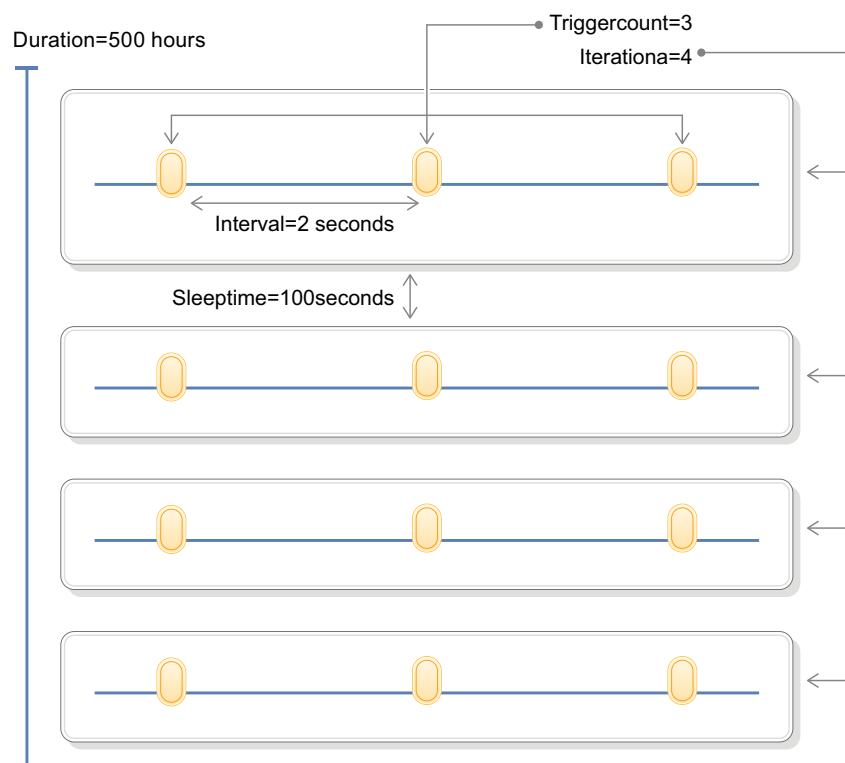


Figure 1. DB2FODC command example

Immediate collection examples

These basic examples of the **db2fodc** command illustrate how to manually collect diagnostic data, as the problems occurs.

-hang

Consider a potential hang situation. Db2 software is running stable, but when you update or select multiple records from a particular table, the application hangs. You restart Db2 software and again the system is stable. However, one week later the same situation occurs.

To troubleshoot the problem yourself or with IBM Support's help, collect diagnostic data with the **db2fodc** command. To collect data on all active databases, run the following command, while the potential hang is occurring:

```
db2fodc -hang -all dbs
```

By adding the **-hang** parameter basic operating system, configuration, and diagnostic information is collected that can assist IBM support in analyzing the potential hang.

The following examples illustrate alternative methods to collect diagnostic information about a potential hang situation.

- To collect data on a potential hang situation in a specific database, SAMPLE, with the full data collection mode, run the following command:

```
db2fodc -hang full -db SAMPLE
```

The full main data collection parameter mode is started. This option requires more resources and time to run than the basic collection mode. Data collection is restricted to the database SAMPLE.

- To collect data during a potential hang situation on all the hosts that are defined in **db2nodes.cfg** file, run the following command:

```
db2fodc -hang basic -host all
```

The basic main data collection parameter mode is started.

-profile

The **-profile** parameter is an advanced option. It allows more control on how the data is collected than using the **-hang** parameter. By customizing the profile in the **db2fodc.profile** file you can tweak various parameters that you would otherwise not be able to control. The following example is a customized profile:

```
[collectstack]
db2pdstack_iterations=9
db2pdstack_sleep=30
<end>
```

After you create your profile, specify the name of the profile in the command while the performance issue is occurring, such as in the following example:

```
db2fodc -profile collectstack
```

As a result, a stack trace is generated with 9 iterations and 30 seconds of sleep time. The full list of parameters that can be specified in the profile can be found in the **sq11ib/bin/db2cos_hang** script. It is recommended that the profile parameters be used only with the guidance of IBM support.

-perf

Consider a situation in which your application processes are progressing slowly or a resource is being heavily used on one particular database. Because the database is still usable and not hanging, the **-perf** main data collection parameter can be used to collect diagnostic information before you contact support. While the performance issue is occurring, run the following command:

```
db2fodc -db SAMPLE -perf full
```

Snapshots, stacktraces, virtual memory, input and output information, and traces are some of the data that is collected when you include the **-perf** parameter. In

this example, the full data collection mode is started and is restricted to the database *SAMPLE*. The full mode requires more resources and can take longer to run.

The following command is an example of how to limit the data collection to specific members:

```
db2fodc -perf -member 10-13,15
```

in this example, the **db2fodc -perf** command is started in the default basic collection mode on members 10, 12, 13, and 15.

-cpu

Consider a situation, in Version 9.7 Fix Pack 5 and later fix packs, in which you suspect the processor has an unusual number of running processes. To collect diagnostic data for problems that are related to processor usage, issue the following command:

```
db2fodc -cpu full
```

You run the command several more times during peak use and during idle time to generate an accurate conclusion about whether the symptoms are persisting over time. The full data collection mode is started and the default **DB2FODC** registry variables and parameters are used.

-memory

If you suspect, in Version 9.7 Fix Pack 5 and later fix packs, that there is no free memory available, that swap space is being used at a high rate, that excessive paging is occurring or that a memory leak is occurring, use the **-memory** parameter to collect memory-related diagnostic data. The following command is an example:

```
db2fodc -memory full -member 3
```

In this example, the full data collection mode is started and is restricted to the third member.

-connections

In Version 9.7 Fix Pack 5 and later fix packs, for performance problems related to database connections, you might observe sudden spikes in the number of applications in the executing or compiling state or new database connections are being denied. If these symptoms are observed, you can run the following command:

```
db2fodc -connections
```

-clp

You might encounter an error after you upgrade or create an instance. This error might be, for instance, DBI1281E. This error code does not provide a root cause of the problem and further diagnostic information is needed. To further troubleshoot the problem, in Version 9.7 Fix Pack 5 and later fix packs, run the following command:

```
db2fodc -clp full
```

This command collects environment and configuration-related information that is targeted to diagnosing an instance creation problem. After collection is completed

the information is stored in a newly created directory named `FODC_C1p_timestamp_member`, which can be sent to IBM support for analysis.

-preupgrade

In Version 9.7 Fix Pack 5 and later fix packs, before you create or upgrade an instance and before you update to the next fix pack, gather diagnostic information to help troubleshoot any problem, including any impact to your SQL statements, that might arise after the upgrade. To collect performance-related information before an update or upgrade, run the following command:

```
db2fodc -preupgrade -db SAMPLE -par DYN_SQL_FILE=sqlFile
```

Where, `SAMPLE` is the name of the database from which you are collecting information from. Where `sqlFile` is a file that contains the SQL statements that are most representative of your workload. If you do not include `-par DYN_SQL_FILE=sqlFile` option with the `-upgrade` parameter, 20 dynamic queries are retrieved from the dynamic SQL cache. To gather optimal performance information, you can issue the `db2fodc -preupgrade` command multiple times, at high usage times and at idle times. After the upgrade, run the same command again. If there is a performance issue after you upgrade, compare the output of the command before and after the upgrade. For more assistance, contact IBM Support.

-hadr

In Version 9.7 Fix Pack 7 and later fix packs, you can use the `db2fodc` command to collect data on HADR congestion. If you suspect that there is HADR congestion, issue one or more of following `db2fodc` commands with the `-hadr` parameter, as the HADR congestion is happening. Assume that the system consists of a primary host `hostA` and a standby host `hostB`.

- To manually collect HADR-related data, run the following command:

```
db2fodc -hadr -db sample
```

This command starts the `db2cos_hadr` (`db2cos_hadr.bat` on Windows) script and places the collected data in the `FODC_Hadr_timestamp_hostname_Primary|Standby|Standard` directory, which is created in the `DIAGPATH` directory.

- To collect HADR diagnostic data on all hosts, run the following command:

```
db2fodc -hadr -db sample -host all
```

This command collects data on all hosts and places the collected data in the `DIAGPATH` directory on each host.

- To collect HADR diagnostic data on specifically the primary and standby hosts, run the following command:

```
db2fodc -hadr -db sample -host hostA,hostB
```

- To collect HADR diagnostic data on `hostB` and places the `FODC_Hadr` package into `DIAGPATH` directory on `hostB`, run the following command on `hostA`:

```
db2fodc -hadr -db sample -host hostB
```

- To place the `FODC_Hadr` package into another directory, the `/TMP/hadrrdata/` directory for example, run the following command:

```
db2fodc -hadr -db sample -host all -fodcpth /TMP/hadrrdata/
```

-fodcerror F0DC_IndexError_directory

Consider a situation in which you receive an index error. The error informs you that an index used all the free space. To collect data on the index error, without stopping the database manager, issue the following command:

```
db2fodc -fodcerror F0CE_IndexError_directory
```

The basic data collection mode is started, as it is the default. Data is collected into one or more files that are deposited into the F0DC_IndexError_directory directory. Review the output for possible factors that can lead to an index error or send the directory to IBM support for analysis.

Threshold collection examples

By specifying the **-detect** parameter, along with one or more threshold rules, you can set a value against cpu performance, memory, and connections. The system is monitored and data is collected when the threshold rules are met.

The following examples illustrate the use of the **-detect** parameter to collect diagnostic information:

-cpu

In Version 9.7 Fix Pack 5 and later fix packs, the **-cpu** main data collection parameter collects processor-related performance and diagnostic data.

- To detect an intermittent issue with the processor that might be tied to the number of processes in the run queue, run the following command:

```
db2fodc -cpu basic -detect us">=90" rqueue">=1000" condition="AND"  
triggercount="3" interval="2" iteration="4" sleeptime="100"  
duration="500" -member all
```

You can specify your own rules for the **-detect** parameter to determine when to start diagnostic data collection. In this example, both (condition="AND" is the default) trigger conditions (us">=90" rqueue">=1000"rqueue">=1000") must exist for 6 seconds (triggercount="3" X interval="2" = 6 seconds) to trigger diagnostic data collection on all members. If the trigger conditions occur, then diagnostic data is collected. If the trigger conditions do not occur, trigger condition detection continues within the iteration. The iteration option is set to four to specify that trigger condition detection followed by diagnostic data collection is performed four times, with a sleep time of 100 seconds in between. The command exits after all four iterations are successfully completed or after 500 hours. (duration="500")

- If you suspect that your processor is not performing well because of an issue with processor time spent running kernel and user code, run the following command:

```
db2fodc -cpu full -detect us">=20" sy">=10" condition="OR"
```

The **-detect** parameter, which is combined with the threshold rules, delays the collection of processor-related information until the trigger conditions specified by the threshold rule are detected. The operator *OR* is chosen, which means only one of the thresholds must be tripped to trigger data collection. Because the trigger count value and interval value are not specified, the default values (triggercount=5 and interval=1) are used. Therefore, if one of the threshold rules is met five consecutive times in 5 seconds (triggercount=5 X interval=1),

CPU-related data collection is triggered. If the threshold rules are never met, the command runs indefinitely. To stop the process, run the following command:

```
db2fodc -detect off
```

The **db2fodc -detect off** command stops all threshold detection and turns off any currently active threshold rules. This process can take up to 60 seconds to complete and stops all **db2fodc -detect** commands that are running on the server.

-memory

In Version 9.7 Fix Pack 5 and later fix packs, the **-memory** parameter can also be useful to help debug memory spikes, paging issues, or memory over-commits.

- Consider a situation in which your system is performing poorly because the total number of virtual-memory working segment pages on your AIX operating system might be too high. You can run the following command:

```
nohup db2fodc -memory basic -detect "avm>=5242880" duration=1000 &
```

In this example, the nohup mode enables the command to ignore the HUP (hang up) signal so that the subsequent logout does not stop the command from running in the background. For that reason, the duration of 1000 hours is specified in the command. The **duration** parameter does not have a default, so, if duration is not specified, the command runs forever, if the conditions are never met.

- You can detect a threshold condition and trigger automatic diagnostic data collection when the threshold condition is exceeded multiple times. Consider the following command example:

```
db2fodc -memory basic -detect free"<=10" connections">=1000" interval=10  
triggercount=4 duration=5 sleepetime=30 iteration=10 -member 3
```

This example monitors the number of free memory blocks (free" $<=10$ ") AND the number of application connections to the database (connections" $>=1000$ "). The operator is *AND* by default. Only member 3 is monitored for the conditions (-member 3). There are 10 iterations with 30 seconds of rest between each iteration. Data collection is tripped if both conditions are met four consecutive times over 40 seconds (triggercount=4 X interval=10).

- To trigger data collection when the amount of free memory drops to a specified amount, run the following example command:

```
db2fodc -memory basic -detect free"<=386236" so">=0" sleepetime=30 iteration=10  
interval=10 triggercount=4 duration=5
```

If the number of free memory pages drops to or below 386236, and the amount of memory that is swapped out is greater than zero, the following output is an example of the data collection:

```
> db2fodc -memory basic -detect free"<=386236" so">=0" sleepetime=30 iteration=10  
interval=10 triggercount=4 duration=5  
"db2fodc": List of active databases: "SAMPLE"  
"db2fodc": Starting detection ...  
"db2fodc": "4" consecutive threshold hits are detected.  
"db2fodc": Triggering collection "1".  
Script is running with following parameters  
COLLECTION_MODE : LIGHT  
COLLECTION_TYPE : MEMORY  
COLLECTION_DURATION : 5  
COLLECTION_ITERATION : 5  
DATABASE/MEMBER : -all dbs  
FODC_PATH : /home/inst1/sql1lib/db2dump/
```

```
FODC_Memory_2013-04-02-15.47.56.969013_0000
db2pd_options : -agent -apinfo -active -tran -locks -bufferpools
-dbptnmem -memset -mempool -sort -fcm hwm -dyn
SNAPSHOT : 2
STACKTRACE : 2
TRACELIMIT : 20
SNAPSHOT_TYPE : ALL
...
```

In db2diag.log:

```
2013-04-02-15.47.55.154348-240 I200475E548 LEVEL: Event
PID : 8944 TID : 46912890796352 KTID : 8944
PROC : db2fodc
INSTANCE: inst1 NODE : 000
HOSTNAME: coralxib11
FUNCTION: DB2 UDB, RAS/PD component, pdFodcDetectAndRunCollection, probe:100
CHANGE :
Hostname: coralxib11 Member(s): 0 Iteration: 1
Thresholds hit 0: so(0)>=0 free(159972)<=386236
Thresholds hit 1: so(0)>=0 free(157872)<=386236
Thresholds hit 2: so(0)>=0 free(129572)<=386236
Thresholds hit 3: so(0)>=0 free(142952)<=386236
.....
2013-04-02-15.47.56.969683-240 E201708E703 LEVEL: Warning
PID : 9519 TID : 46912890796352 KTID : 9519
PROC : db2fodc
INSTANCE: inst1 NODE : 000
HOSTNAME: coralxib11
FUNCTION: DB2 UDB, RAS/PD component, pdDb2FODCMain, probe:30
MESSAGE : ADM14003W FODC has been invoked by the user from db2fodc tool for
symptom "memory" and diagnostic information has been recorded in
directory
"/home/inst1/sql1lib/db2dump/FODC_Memory_2013-04-02-15.47.56.969013_0
000". Please look in this directory for detailed evidence about what
happened and contact IBM support if necessary to diagnose the
problem.
```

-hadr

To monitor HADR congestion and start automatic diagnostic data collection, specify the **-hadr** parameter with the **-detect** option for the **db2fodc** command. In the following examples, assume that the system consists of a primary host *hostA* and a standby host *hostB*.

- To automatically start diagnostic data collection if HADR congestion is detected, run the following command:

```
db2fodc -hadr -db sample -detect
```

The command starts a process that monitors the HADR database to see whether there is enough HADR congestion to start data collection. If there is enough HADR congestion, the **db2cos_hadr** (**db2doc_hadr.bat** on Windows operating systems) script is started and diagnostic data collection occurs. The process ends after diagnostic data collection completes. If not enough HADR congestion is ever detected, the monitor runs until the detection duration exceeds the duration parameter value, or the user ends it by issuing the following command:

```
db2fodc -detect off
```

- To automatically start diagnostic data collection on all hosts if a certain amount of HADR congestion is detected on the local host, run the following command:

```
db2fodc -hadr -db sample -detect -host all
```

- If congestion is detected, HADR diagnostic data is collected on all hosts.
- Consider that you might want to know whether HADR congestion is occurring, however, you do not want to slow down your system by collecting diagnostic data. Run the following command example:

```
db2fodc -hadr -db sample -detect -nocollect
```

Diagnostic data is not collected. However, if HADR congestion is detected, the event is logged in the db2diag log files.

- To check for HADR congestion over a specific amount of time, run the following command:

```
db2fodc -hadr -db sample -detect duration=24
```

HADR congestion is monitored for 24 hours (duration=24). Because the default for **iteration** is 1, for **triggercount** is 10, and for **interval** is 30, if HADR congestion is detected 10 consecutive times over 300 seconds, data is collected and the command exits.

- Threshold options can be applied to the **-hadr** parameter. For example, run the following command:

```
db2fodc -hadr -db sample -detect iteration=2 sleeptime=3600 triggercount=8
interval=15 duration=24
```

The effect of this threshold rule is as follows:

- HADR congestion is monitored for at most two iterations, with sleep time for 1 hour between each iteration.
- If the threshold rules are met eight consecutive times, every 15 seconds, then data is collected and the iteration exits. If it is the first iteration, then the monitoring process sleeps for 1 hour before next iteration. If it is the second iteration, then the monitoring process exits.
- The detection monitoring process runs for 24 hours maximum.
- If HADR congestion is not detected after 24 hours, the detection process stops and exits the monitoring process.
- If no HADR congestion is detected, the first iteration runs for 24 hours and then exits. If that happens, the 1 hour sleeptime and the second iteration never run.

-connections

In Version 9.7 Fix Pack 5 and later fix packs, to trigger data collection when certain types of connections reach a threshold, issue the **db2pdfodc -connections** command with the **-detect** parameter, as in the following example:

```
db2fodc -connections -db sample -detect connections">=10" connstatus=Compiling
```

If the number of applications that are connected to the SAMPLE database in a compiling state is equal to or greater than 10, then connection-related diagnostic data is collected.

Multi-partitioned environments

The **db2fodc -hang** and **db2fodc -perf** commands can be run in a multi-partitioned environment with multiple physical nodes. In this environment, the following example runs successfully:

```
db2fodc -perf full -member all other_options
```

Or

```
db2fodc -perf -alldbpartitionnums other_options
```

During a potential hang or severe performance issue, in a partitioned database environment, these parameters can be used to start the **db2fodc** command at all nodes in a single invocation. Options **-alldbpartitionnums** and **-dbpartitionnum** are suitable for only logical partition numbers. If the **-dbp** or **-member** options are not specified, by default, only information from the current partition number is collected.

The **db2fodc -fodcerror** *FODC_IndexError_directory* can also be run in a multi-partitioned environment with multiple physical or logical nodes. To collect information for an index error at a specific partition number in a partitioned database environment, the following example runs successfully:

```
db2_a11 "<<+node#< db2fodc -fodcerror FODC_IndexError_directory [basic | full]
```

Where the node# is the number of the specific node. This number is the last number in the directory *FODC_IndexError_timestamp_PID_EDUID_Node#*. An absolute path must be used, if you ran the **db2fodc -fodcerror** *FODC_IndexError_directory* command with the **db2_a11** command. The output and log files are in the *db2diag* log file. The *FODC_IndexError_directory* folder is required and must contain the *db2cos_indexerror_short(.bat)* script or the *db2cos_indexerror_long(.bat)* script. Do not rename or move the *FODC_IndexError_directory* directory. The **db2dart** commands in the scripts need this directory path to correctly generate reports. If you must run **db2fodc -fodcerror** *FODC_IndexError_directory* manually, check the *FODC_IndexError_directory* directory for any existing **db2dart** reports. Reports have the extension *.rpt* and *.rpthex*. If there are reports in the directory, rename them or move them to a subdirectory under the *FODC_IndexError_directory* directory before you start **db2fodc -fodcerror** *FODC_IndexError_directory* manually.

db2fopt - Specify query optimizer parameters

The **db2fopt** command specifies parameters for use by the query optimizer. This command can be used when setting up a test system which has less physical resources than the production system.

For example, if the production system is running with **sortheap=20000** and the test system can only run with **sortheap=5000**, you can use **db2fopt** on the test system to set the **opt_sortheap** optimizer parameter to 20000. This will direct the optimizer to use 20000 as the sort heap value when evaluating access plans while the **sortheap** database configuration parameter is set to 5000.

Scope This command only affects the database partition on which it is executed.

Authorization

To query parameters using the **get** option: none

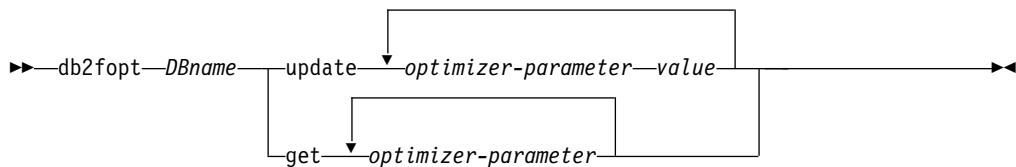
To update parameters, one of the following authorities is required:

- SYSADM
- SYSCTRL
- SYSMAINT

Required connection

None

Command syntax



Command parameters

DBname

Alias name of the database.

update *optimizer-parameter value*

Use this command to update optimizer parameters.

- opt_buffpage
- opt_sortheap
- opt_locklist
- opt_maxlocks

get *optimizer-parameter*

Use this command to query optimizer parameter values.

- opt_buffpage
- opt_sortheap
- opt_locklist
- opt_maxlocks

Usage notes

This tool is sometimes used in partitioned database environments that consist of heterogeneous database partition configurations. In this case, statement compilation occurs on a coordinator database partition which can have different database configuration settings from that of the database partitions in the instance on which query processing takes place.

If an optimizer parameter has a value of 0, then no optimizer value has been specified. Statement compilation will use the value from the database configuration.

Updating an optimizer parameter to a value of 0 will reset a previously updated value.

Specifying a non-numeric or a negative value on an update action will set the value to 0.

For an update to take effect, all connections must be terminated on the database partition, and the database partition must be deactivated if previously activated.

The optimizer parameters are only used for statement compilation. In partitioned database environments, they must be set on coordinator database partitions.

To determine the actual values to specify on the test system, you can obtain an explain output from the production system by using the **db2exfmt** tool, and review the *Database context* section.

Examples

Example 1

Query the values of **opt_sortheap**, **opt_locklist**, and **opt_maxlocks**.

```
db2fopt testdb get opt_sortheap opt_locklist opt_maxlocks
```

Example 2

Set the value for multiple parameters.

For example, the following database context section is returned from the production system.

Database Context:

```
-----  
Parallelism: None  
CPU Speed: 1.456395e-07  
Comm Speed: 0  
Buffer Pool size: 89000  
Sort Heap size: 10000  
Database Heap size: 1200  
Lock List size: 8000  
Maximum Lock List: 10  
Average Applications: 1  
Locks Available: 93030
```

On the test system, you can use the **db2fopt** command to set **opt_buffpage** to 89000, **opt_sortheap** to 10000, **opt_locklist** to 8000, and **opt_maxlocks** to 10.

```
db2fopt testdb update opt_buffpage 89000  
          opt_sortheap 10000  
          opt_locklist 8000  
          opt_maxlocks 10
```

db2fs - First Steps

Launches the First Steps interface, which contains links to the functions that you need to begin learning about and using the Db2 products.

On UNIX operating systems, **db2fs** is located in the `sql1ib/bin` directory. On Windows operating systems, `db2fs.exe` is located in the `DB2PATH\bin` directory.

One of the following browsers must be installed in order to issue the **db2fs** command:

- Internet Explorer 6.0 and up
- Mozilla 1.7 and up
- Firefox 2.0 and up

Authorization

SYSADM

Command syntax

For UNIX operating systems

```
►►db2fs [ -h ] [ -b browser ]
```

For Windows operating systems

```
>>>db2fs----->
```

Command parameters

For UNIX operating systems

-h Displays command usage information.

-b browser

Specifies the browser to be used. If it is not specified, **db2fs** searches for a browser in the directories specified in **PATH**.

For Windows operating systems

None

db2gateways - Managing Db2 gateways

Allows user to manage the pingable gateway IP of the routing table.

Authorization

Root user authority is required on Linux operating system.

Required connection

None

Command syntax

```
>>>db2gateways----->
   |-----g-----|
   |-----get-----|
   |-----u-----|
   |-----update-----|
   |-----gateway_ip-----IP address-----|
   |-----dev-----device name-----|
   |-----h-----|
   |-----help-----|
```

Command parameters

-g|-get

Gets the valid pingable gateway IP from the system routing table.

-u|-update

Updates the specified gateway IP for the device name in the system routing table.

-gateway_ip IP address

Input parameter specified with **-u|-update** option. Specifies the valid pingable input gateway IP *IP address* to be updated in the system routing table.

-dev device name

Input parameter specified with **-u|-update** option. Specifies the valid device *device name* for which the pingable gateway IP needs to be updated in the system routing table.

-h|-help

Displays the command usage information.

Examples

1. The **db2gateways** utility is available on the Db2 image at the following path.

```
media_path/db2/platform/install/db2gateways
```

where **media path** refers to the path where the copy of the Db2 image is located and **platform** represents the operating system used.

2. To get the pingable gateway IP from the routing table, enter the following command.

```
media_path/db2/platform/install/db2gateways -get
```

3. To update the pingable gateway IP to the routing table, enter the following command.

```
media_path/db2/platform/install/db2gateways -update -gateway_ip <IP_address>  
-dev <device_name>
```

where **media_path** refers to the path where the copy of the Db2 image is located, **platform** represents the operating system used, **IP_address** is the pingable IP of gateway, and **device_name** is the adapter name.

db2gcf - Control Db2 instance

Starts, stops, or monitors a Db2 instance, usually from an automated script, such as in an HA (high availability) cluster.

On UNIX operating systems, this command is located in *INSTHOME/sql1lib/bin*, where *INSTHOME* is the home directory of the instance owner. On Windows operating systems, this command is located in the *sql1lib\bin* subdirectory.

Authorization

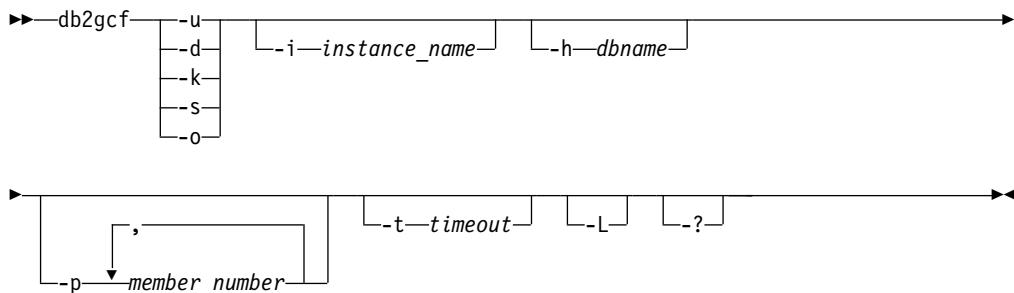
One of the following authorities:

- Instance owner
- Root user authority on Linux and UNIX operating systems or Local Administrator authority on Windows operating systems

Required connection

None

Command syntax



Command parameters

- u Starts specified member for specified instance.
- d Stops specified member for specified instance.

- k** Removes all processes associated with the specified instance. On a Db2 Enterprise Server Edition system, this parameter requires that the remote shell utility rsh or ssh is setup on either a single-partition database instance or a multi-partition database instance.
- s** Returns status of the specified member and the specified instance. The possible states are:
 - Available: The specified member for the specified instance is available for processing.
 - Operable: The instance is installed but not currently available.
 - Not operable: The instance will be unable to be brought to available state.
- o** Returns the default timeouts for each of the possible actions; you can override all these defaults by specifying a value for the **-t** parameter.
- i *instance_name***
 Instance name to perform action against. If no instance name is specified, the value of **DB2INSTANCE** is used. If no instance name is specified and **DB2INSTANCE** is not set, the following error is returned:
`db2gcf Error: Neither DB2INSTANCE is set nor instance passed.`
- h *dbname***
 Specifies the database name to start, monitor or stop. This option can only be used by the integrated solution with IBM Tivoli System Automation for Multiplatforms (SA MP).
- p *member_number***
 In a partitioned database environment, specifies member numbers to perform action against on local node only (remote members are not monitored with this command). Specify the member numbers without any spaces, but separate with commas. If no value is specified, the default is 0. This value is ignored in a single-partition database environment.
- t *timeout***
 Timeout in seconds. The **db2gcf** command will return unsuccessfully if processing does not complete within the specified period of time. There are default timeouts for each of the possible actions; you can override all these defaults by specifying a value for the **-t** parameter.
- L** Enables error logging. Instance-specific information will be logged to **db2diag** log file in the instance log directory. Non-instance specific information will be logged to system log files.
- ?** Displays help information. When this option is specified, all other options are ignored, and only the help information is displayed.

Example

1. The following example starts the instance **stevera** on member 0:

```
db2gcf -u -p 0 -i stevera
```

The following output is returned:

```
Instance : stevera
Db2 Start : Success
Member 0 : Success
```

2. The following example returns the status of the instance **stevera** on member 0:

```
db2gcf -s -p 0 -i stevera
```

The following output is returned:

```
Instance : stevera
Db2 State
Member 0 : Available
```

3. The following example stops the instance stevera on member 0:

```
db2gcf -d -p 0 -i stevera
```

The following output is returned:

```
Instance : stevera
Db2 Stop : Success
Member 0 : Success
```

Usage notes

When used together, the **-k** and **-p** parameters do not allow all processes to be removed from the specified member. Rather, all processes on the instance (all members) will be removed.

Return codes

The following is a list of all the return codes for this command.

```
db2gcf Return Values :
0 : db2 service(start,stop,kill) success or db2gcf -s status Available
1 : db2 service(start,stop) failed or db2gcf -s status Not Available
2 : db2gcf has been called with wrong number of parameters
3 : gcfmodule failed to execute the requested service
```

db2gov - Db2 governor

Monitors and changes the behavior of applications that run against a database. By default, a daemon is started on every database partition, but the front-end utility can be used to start a single daemon at a specific database partition.

Important: With the workload management features introduced in Db2 Version 9.5, the Db2 governor utility was deprecated in Version 9.7 and might be removed in a future release. It is not supported in Db2 pureScale environments. For more information, see “Db2 Governor and Query Patroller have been deprecated” at http://www.ibm.com/support/knowledgecenter/SSEPGG_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0054901.html.

Note: Starting with the Db2 Version 10.1 release, the AIX 5.3 operating system is not supported. Db2 Version 9.7 is the last release to support the AIX 5.3 operating system. The AIX 6.1 operating system is the minimum supported level.

Authorization

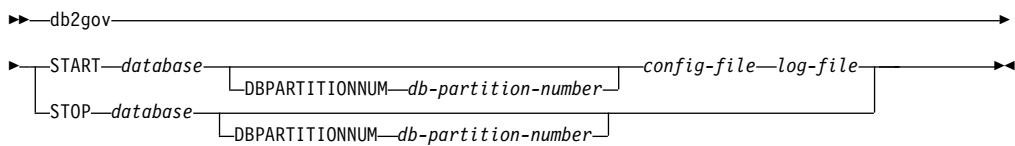
One of the following authorities:

- SYSADM
- SYSCTRL

In an environment with an instance that has a db2nodes.cfg file defined, you might also require the authorization to invoke the **db2_a11** command.

Environments with a db2nodes.cfg file defined include partitioned database environments as well as single-partition database environments that have a database partition defined in db2nodes.cfg.

Command syntax



Command parameters

START *database*

Starts the governor daemon to monitor the specified database. Either the database name or the database alias can be specified. The name specified must be the same as the one specified in the governor configuration file. One daemon runs for each database that is being monitored. In a partitioned database environment, one daemon runs for each database partition. If the governor is running for more than one database, there will be more than one daemon running at that database server.

DBPARTITIONNUM *db-partition-number*

Specifies the database partition on which to start or stop the governor daemon. The number specified must be the same as the one specified in the database partition configuration file.

config-file

Specifies the configuration file to use when monitoring the database. The default location for the configuration file is the `sql1ib` directory. If the specified file is not there, the front-end assumes that the specified name is the full name of the file.

log-file

Specifies the base name of the file to which the governor writes log records. The log file is stored in the `log` subdirectory of the `sql1ib` directory. The number of database partitions on which the governor is running is automatically appended to the log file name. For example, `mylog.0`, `mylog.1`, `mylog.2`.

STOP *database*

Stops the governor daemon that is monitoring the specified database. In a partitioned database environment, the front-end utility stops the governor on all database partitions by reading the database partition configuration file `db2nodes.cfg`.

Usage notes

In the [action] clause of the governor configuration file, the `nice nnn` parameter can be set to raise or lower the relative priority of agents working for an application. For additional information, see “Governor rule elements” in the guide called *Tuning Database Performance*.

Note: On AIX 6.1 or higher, the instance owner must have the `CAP_NUMA_ATTACH` capability to be able to raise the relative priority of agents working for the application. To grant this capability, logon as root and run the following command:

```
chuser capabilities=CAP_NUMA_ATTACH,CAP_PROPAGATE
```

On Solaris 10 or higher, the instance owner must have the proc_priocntl privilege to be able to raise the relative priority of agents working for the application. To grant this privilege, logon as root and run the following command:

```
usermod -K defaultpriv=basic,proc_priocntl db2user
```

In this example, proc_priocntl is added to the default privilege set of user db2user.

Moreover, when Db2 is running in a non-global zone of Solaris, the proc_priocntl privilege must be added to the zone's limit privilege set. To grant this privilege to the zone, logon as root and run the following command:

```
global# zonecfg -z db2zone
zonecfg:db2zone> set limitpriv="default,proc_priocntl"
```

In this example, proc_priocntl is added to the limit privilege set of zone db2zone.

On Solaris 9, there is no facility for Db2 to raise the relative priority of agents. Upgrade to Solaris 10 or higher to use the ACTION NICE clause of Db2 governor.

db2govlg - Db2 governor log query

Extracts records of specified type from the governor log files. The Db2 governor monitors and changes the behavior of applications that run against a database.

Important: With the workload management features introduced in Db2 Version 9.5, the Db2 governor utility was deprecated in Version 9.7 and might be removed in a future release. It is not supported in Db2 pureScale environments. For more information, see "Db2 Governor and Query Patroller have been deprecated" at http://www.ibm.com/support/knowledgecenter/SSEPGG_9.7.0/com.ibm.db2.luw.wn.doc/doc/i0054901.html.

Authorization

None

Command syntax

```
►—db2govlg—log-file—►
          |—————dbpartitionnum—db-partition-number—————|
          |
          |—————rectype—record-type—————|—————►
```

Command parameters

log-file

The base name of one or more log files that are to be queried.

dbpartitionnum db-partition-number

Number of the database partition on which the governor is running.

rectype record-type

The type of record that is to be queried. Valid record types are:

- START
- FORCE
- NICE
- ERROR

- WARNING
- READCFG
- STOP
- ACCOUNT

db2gpmap - Get distribution map

If a database is already set up and database partition groups defined for it, **db2gpmap** gets the distribution map for the database table or the database partition group from the catalog partitioned database server.

Authorization

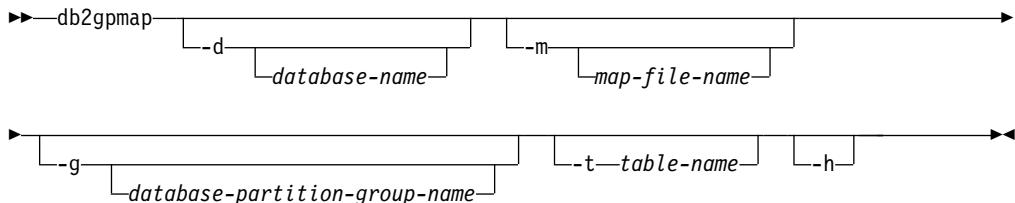
Both of the following authorities:

- Read access to the system catalog tables
- BIND and EXECUTE package privileges on db2gpmap.bnd

Required connection

Before using **db2gpmap** the database manager must be started and db2gpmap.bnd must be bound to the database. If not already bound **db2gpmap** will attempt to bind the file.

Command syntax



Command parameters

-d database-name

Specifies the name of the database for which to generate a distribution map. If no database name is specified, the value of the **DB2DBDFT** environment variable is used. If **DB2DBDFT** is not set, the default is the SAMPLE database.

-m map-file-name

Specifies the fully qualified file name where the distribution map will be saved. The default is db2split.map.

-g database-partition-group-name

Specifies the name of the database partition group for which to generate a distribution map. The default is IBMDEFAULTGROUP.

-t table-name

Specifies the table name.

-h

Displays usage information.

Examples

The following example extracts the distribution map for a table ZURBIE.SALES in database SAMPLE into a file called C:\pmaps\zurbie_sales.map:

```
db2gpm -d SAMPLE -m C:\pmaps\zurbie_sales.map -t ZURBIE.SALES
```

db2iauto - Autostart instance

Enables or disables the autostart of an instance after each system restart. This command is available on Linux and UNIX operating systems only. This command is not supported for Db2 pureScale instances.

Authorization

One of the following authorities:

- Root user authority
- SYSADM

Required connection

None

Command syntax

```
►—db2iauto—[on|off]—instance-name—►
```

Command parameters

- on** Enables autostart for the specified instance.
-off Disables autostart for the specified instance.

instance-name

The login name of the instance.

db2iclus - Microsoft Cluster Server

Allows users to add, drop, migrate and unmigrate instances and Db2 administration servers (DAS) in a Microsoft Cluster Server (MSCS) environment. This command is only available on Windows operating systems.

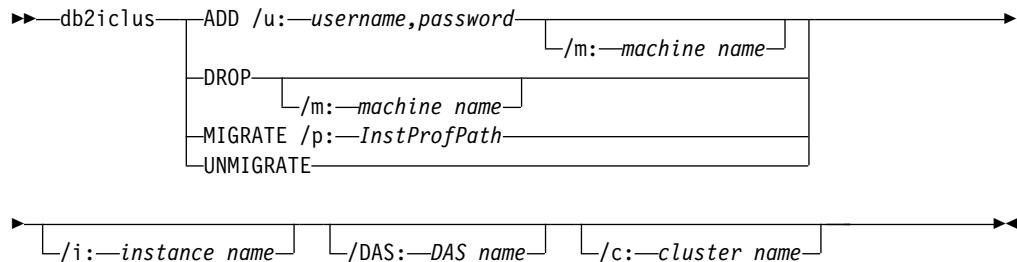
Authorization

Local administrator authority is required on the machine where the task will be performed. If adding a remote machine to an instance or removing a remote machine from an instance, local administrator authority is required on the target machine.

Required connection

None

Command syntax



Command parameters

ADD Adds an MSCS node to a Db2 MSCS instance.

DROP Removes an MSCS node from a Db2 MSCS instance.

MIGRATE

Migrates a non-MSCS instance to an MSCS instance.

UNMIGRATE

Undoes the MSCS migration.

/DAS:DAS name

Specifies the DAS name. This option is required when performing the cluster operation against the Db2 administration server.

/c:cluster name

Specifies the MSCS cluster name if different from the default or current cluster.

/p:instance profile path

Specifies the instance profile path. This path must reside on a cluster disk so it is accessible when Db2 is active on any machine in the MSCS cluster. This option is required when migrating a non-MSCS instance to an MSCS instance.

/u:username,password

Specifies the account name and password for the Db2 service. This option is required when adding another MSCS node to the Db2 MSCS partitioned database instance.

/m:machine name

Specifies the remote computer name for adding or removing an MSCS node.

/i:instance name

Specifies the instance name if different from the default/current instance.

Examples

This example shows the use of the **db2iclus** command to manually configure the Db2 instance to run in a hot standby configuration that consists of two machines, WA26 and WA27.

1. To start, MSCS and Db2 Enterprise Server Edition must be installed on both machines.
2. Create a new instance called *DB2* on machine WA26:
`db2icrt DB2`
3. From the Windows Services dialog box, ensure that the instance is configured to start manually.

4. If the Db2 instance is running, stop it with the **DB2STOP** command.
5. Install the Db2 resource type from WA26:

```
c:>db2wolfi i
ok
```

If the **db2wolfi** command returns "Error : 183", then it is already installed. To confirm, the resource type can be dropped and added again. Also, the resource type will not show up in Cluster Administrator if it does not exist.

```
c:>db2wolfi u
ok
c:>db2wolfi i
ok
```

6. From WA26, use the **db2iclus** command to transform the Db2 instance into a clustered instance.

```
c:>db2iclus migrate /i:db2 /c:mycluster /m:wa26 /p:p:\db2profs
```

```
DBI1912I The Db2 Cluster command was successful.
Explanation: The user request was successfully processed.
User Response: No action required.
```

The directory p:\db2profs should be on a clustered drive and must already exist. This drive should also be currently owned by machine WA26.

7. From WA26, use the **db2iclus** command to add other machines to the Db2 cluster list:

```
c:>db2iclus add /i:db2 /c:mycluster /m:wa27
```

```
DBI1912I The Db2 Cluster command was successful.
Explanation: The user request was successfully processed.
User Response: No action required.
```

This command should be executed for each subsequent machine in the cluster.

8. From Cluster Administrator, create a new group called "Db2 Group".
9. From Cluster Administrator, move the Physical Disk resources Disk O and Disk P into Db2 Group.
10. From Cluster Administrator, create a new resource type of type "IP Address" called "mscs5" that resides on the Public Network. This resource should also belong to Db2 Group. This will be a highly available IP address, and this address should not correspond to any machine on the network. Bring the IP Address resource type online and ensure that the address can be pinged from a remote machine.
11. From Cluster Administrator, create a new resource of type "Db2" that will belong to Db2 Group. The name of this resource must be exactly identical to the instance name, so it is called Db2 for this case. When Cluster Administrator prompts for dependencies associated with the Db2 resource, ensure it is dependent on Disk O, Disk P and mscs5.
12. Configure Db2 Group for fallback, if required, via Cluster Administrator and using the **DB2_FALLBACK** profile variable.
13. Create or restore all databases putting all data on Disk O and Disk P.
14. Test the failover configuration.

Usage notes

To migrate an instance to run in an MSCS failover environment, you need to migrate the instance on the current machine first, then add other MSCS nodes to the instance using the **db2iclus** with the **ADD** option.

To revert an MSCS instance back to a regular instance, you first need to remove all other MSCS nodes from the instance by using the **db2iclus** with the **DROP** option. Next, you should undo the migration for the instance on the current machine.

db2icrt - Create instance

Create a Db2 instance, including a Db2 pureScale instance. This command can also be used to create up to 8 Db2 member and 2 cluster caching facility as part of the creation of the Db2 pureScale instance.

On Linux and UNIX operating systems, **db2icrt** is located in *DB2DIR/instance*, where *DB2DIR* represents the installation directory in which the Db2 database system is installed. On Windows operating systems, **db2icrt** is located in *DB2PATH\bin*, where *DB2PATH* is the directory where the Db2 copy is installed.

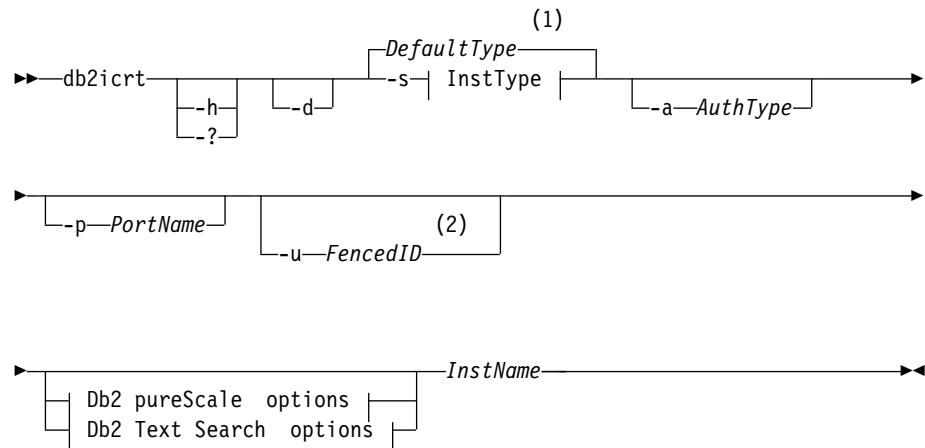
The **db2icrt** command creates a Db2 instance in the home directory of the instance owner. You can create only one Db2 pureScale instance per Db2 pureScale environment.

Authorization

Root user or non-root user authority is required on Linux and UNIX operating systems. Local Administrator authority is required on Windows operating systems.

Command syntax

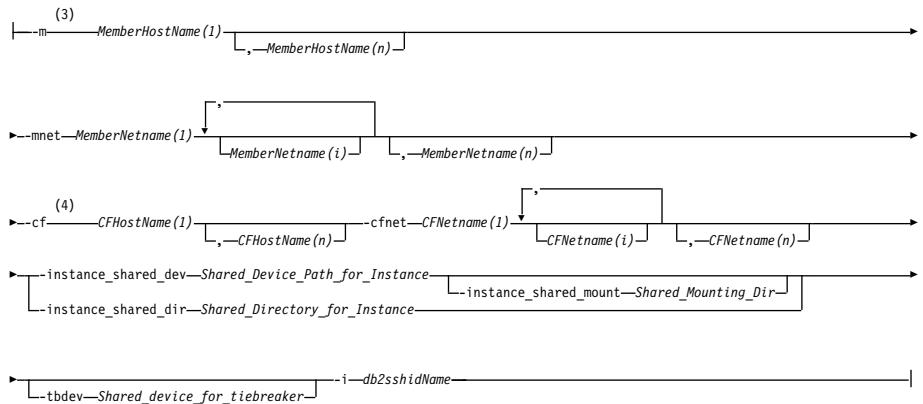
For root installation on Linux and UNIX operating systems



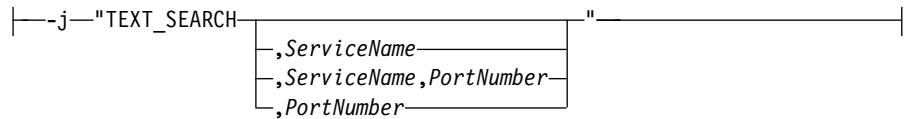
InstType:



Db2 pureScale options:



Db2 Text Search options:



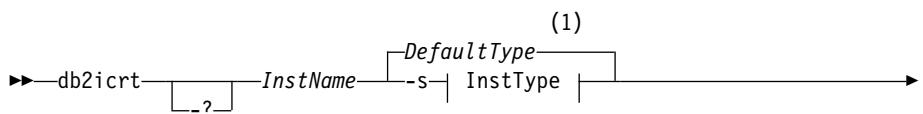
Notes:

- 1 If the instance type is not specified with -s, the default instance type that is created for the server image is the Db2 Enterprise Server Edition (ese) instance type. The default instance type for the other images and Db2 Connect are the Db2 Workgroup Server Edition (wse) instance type.
- 2 When you create client instances, -u FencedID is not a valid option.
- 3 The *MemberHostName:MemberNetname* format was deprecated for the -m option, and might be discontinued in the future. The new format, with both -m and -mnet options, is required for IPv6 support with Db2 pureScale Feature.
- 4 The *CFHostName:CFNetnames* format was deprecated for the -cf option, and might be discontinued in the future. The new format, with both -cf and -cfnet options, is required for IPv6 support with Db2 pureScale Feature.

For a non-root thin server instance on Linux and AIX operating systems



For root installation on Windows operating systems



```
▶ [ -u -UserName , Password ] [ -p -InstProfPath ] [ -h -HostName ] ▶
```

```
▶ [ Db2 Text Search options ] [ -r -FirstPort , LastPort ] ▶
```

InstType:



Db2 Text Search options:

```
[ -j "TEXT_SEARCH" [ ,ServiceName ] [ ,ServiceName,PortNumber ] [ ,PortNumber ] ]
```

Notes:

- 1 If the instance type is not specified with **-s**, the default instance type is the Db2 Workgroup Server Edition (**wse**) instance type regardless of the product editions.

Command parameters

For root installation on Linux and UNIX operating systems

- ?** Displays the usage information.
- h** Displays the usage information.
- d** Turns on debug mode. Saves the trace file with default name in /tmp as db2icrt.trc.*ProcessID*. Use this option only when instructed by Db2 database support
- a *AuthType***
Specifies the authentication type (SERVER, CLIENT, or SERVER_ENCRYPT) for the instance. The default is SERVER.
- j "TEXT_SEARCH"**
Configures the Db2 Text Search server with generated default values for service name and TCP/IP port number. This parameter cannot be used if the instance type is **client**.
- j "TEXT_SEARCH,*servicename*"**
Configures the Db2 Text Search server with the provided service name and an automatically generated port number. If the service name has a port number that is assigned in the services file, it uses the assigned port number.
- j "TEXT_SEARCH,*servicename, portnumber*"**

Configures the Db2 Text Search server with the provided service name and port number.

-j "TEXT_SEARCH, portnumber"

Configures the Db2 Text Search server with a default service name and the provided port number. Valid port numbers must be within the 1024 - 65535 range.

-p <TCP/IP PortName>

Specifies the TCP/IP port name or number that is used by the instance. This option also configures the database manager configuration parameter **SVCENAME** for the Db2 instance.

-m MemberHostName:NetName1

Specifies the host to set up as a Db2 member during instance creation. This parameter is mandatory in a Db2 pureScale environment.

Up to 8 Db2 member can be set up by the **db2icrt** command. Additional Db2 members can be added with the **db2iupd -add** command. The *NetName1* syntax is deprecated and might be discontinued in a future release. Use the **-mnet** parameter instead. The *MemberHostName* must be the canonical host name (for example, the output of 'host name' command run on a local host). The *NetName1* value that is specified here must belong to the same subnet as specified in the **-cf** parameter.

-mnet MemberNetName

This parameter replaces the deprecated *:NetName1* syntax of the **-m MemberHostName:NetName1** parameter. Specifies the cluster interconnect netname, which is the host name of the interconnect that is used for high-speed communication between members and cluster caching facilities (also referred to as CF) in a Db2 pureScale instance.

The *MemberNetName* must belong to one of the same subnets that are specified in the **-cf** parameter, and must correspond to a cluster interconnect netname (for example, *db2_<hostname_ib0>*).

-cf CFHostName:NetName2

Specifies the host to set up as a cluster caching facility (also referred to as CF) during instance creation. This parameter is mandatory in a Db2 pureScale environment.

Two CF can be set up by the **db2icrt** command. CFs can also be added by using the **db2iupd -add** command. The *NetName2* syntax is deprecated and might be discontinued in a future release. Use the **-cfnet** parameter instead.

-cfnet CFNetName

This parameter replaces the deprecated *:NetName2* syntax of the **-cf CFHostName:NetName2** parameter. Specifies the cluster interconnect netname, which is the host name of the interconnect that is used for high-speed communication between members and CFs in a Db2 pureScale instance.

The *CFNetName* must belong to the same subnet as specified in the **-m** parameter, and must correspond to a cluster interconnect netname (for example, *db2_<hostname_ib0>*).

-instance_shared_dev *Shared_Device_Path_for_Instance*

Specifies a shared disk device path that is required to set up a Db2 pureScale instance to hold instance shared files and default database path. For example, /dev/hdisk1. The shared directory must be accessible on all the hosts for the Db2 pureScale instance. The value of this option cannot have the same value as the **-tbdev** option.

When the **-instance_shared_dev** parameter is specified, the Db2 installer creates a Db2 cluster file system.

The **-instance_shared_dev** parameter and the **-instance_shared_dir** parameter are mutually exclusive.

-instance_shared_mount *Shared_Mounting_Dir*

Specifies the mount point for a new IBM Spectrum Scale file system. The specified path must be a new and empty path that is not nested inside an existing IBM Spectrum Scale file system.

-instance_shared_dir *Shared_Directory_for_Instance*

Specifies a directory in a shared file system (IBM Spectrum Scale) required to set up a Db2 pureScale instance to hold instance shared files and default database path. For example, /shareddfs. The disk must be accessible on all the hosts for the Db2 pureScale instance. The value of this option cannot have the same value as the **-tbdev** option or the installation path.

When the **-instance_shared_dir** parameter is specified, the Db2 installer uses a user-managed file system. The user-managed file system must be available on all hosts, and must be a IBM Spectrum Scale file system.

The **-instance_shared_dir** parameter and the **-instance_shared_dev** parameter are mutually exclusive.

-tbdev *Shared_device_for_tiebreaker*

Specifies a shared device path for a device that acts as a tiebreaker in the Db2 pureScale environment to ensure that the integrity of the data is maintained. The value of this option cannot have the same value as either the **-instance_shared_dev** option or the **-instance_shared_dir** option. This option is required when the Db2 cluster services tiebreaker is created for the first time. The disk device must not associate with any file system. This option is invalid if a Db2 cluster services Peer Domain exists.

Note: When you are creating a Db2 pureScale instance in a virtual machine (VM), you do not need to specify a tiebreaker disk. If you do not want to specify a tiebreaker disk, you must use `inputsas` the tiebreaker disk option value.

-i *db2sshidName*

Specifies the non-root user ID required to use a Secure Shell (SSH) network protocol between hosts. The user ID specified must be a user without special privileges. Valid only for a Db2 managed GPFS file system.

-s *InstType*

Specifies the type of instance to create. Use the **-s** option only

when you are creating an instance other than the default associated with the installed product from which you are running **db2icrt**. Valid values are:

dsf Used to create a Db2 pureScale instance for a Db2 database server with local and remote clients. This option is the default instance type for the IBM Db2 pureScale Feature.

ese Used to create an instance for a database server with local and remote clients. This option is the default instance type for Db2 Advanced Enterprise Server Edition, Db2 Advanced Workgroup Server Edition, Db2 Enterprise Server Edition, or Db2 Workgroup Server Edition.

wse Used to create an instance for a database server with local and remote clients. This option is the default instance type for Db2 Express-C, and Db2 Connect Enterprise Edition.

standalone

Used to create an instance for a database server with local clients.

client Used to create an instance for a client. This option is the default instance type for IBM Data Server Client, and IBM Data Server Runtime Client.

Db2 database products support their default instance types and the instance types lower than their default ones. For instance, Db2 Enterprise Server Edition supports the instance types of **ese**, **wse**, **standalone**, and **client**.

-u Fenced ID

Specifies the name of the user ID under which fenced user-defined functions and fenced stored procedures run. The **-u** option is required if you are not creating a client instance.

InstName

Specifies the name of the instance that is also the name of an existing user in the operating system. The instance name must be the last argument of the **db2icrt** command.

For a non-root thin server instance on Linux and AIX operating systems

-d Enters debug mode, for use by Db2 database support.

-h | -?

Displays the usage information.

For root installation on Windows operating systems

InstName

Specifies the name of the instance.

-s InstType

Specifies the type of instance to create. Currently, there are four kinds of Db2 instance types. Valid values are:

client Used to create an instance for a client. This option is the default instance type for IBM Data Server Client, and IBM Data Server Runtime Client.

standalone

Used to create an instance for a database server with local clients.

ese Used to create an instance for a database server with local and remote clients with partitioned database environment support. The

-s ese -u Username, Password

options must be used with **db2icrt** to create the ESE instance type and a partitioned database environment instance.

wse Used to create an instance for a database server with local and remote clients. This option is the default instance type for all Db2 Editions for Windows platform.

Db2 Advanced Enterprise Server Edition, Db2 Advanced Workgroup Server Edition, Db2 Enterprise Server Edition, Db2 Workgroup Server Edition support ese instance types, and the instance types lower than ese.

For instance, Db2 Enterprise Server Edition supports the instance types of ese, wse, standalone, and client.

The other editions support wse instance type and the instance types lower than wse.

-u Username, Password

Specifies the account name and password for the Db2 service. This option is required when you create a partitioned database instance.

-p InstProfPath

Specifies the instance profile path.

-h HostName

Overrides the default TCP/IP host name if there is more than one for the current machine. The TCP/IP host name is used when you create the default database partition (database partition 0). This option is only valid for partitioned database instances.

-r PortRange

Specifies a range of TCP/IP ports to be used by the partitioned database instance when running in MPP mode. For example, -r 50000,50007. The services file of the local machine is updated with the following entries if this option is specified:

DB2_InstName baseport/tcp
DB2_InstName_END endport/tcp

/j "TEXT_SEARCH"

Configures the Db2 Text Search server with generated default values for service name and TCP/IP port number. This parameter cannot be used if the instance type is client.

/j "TEXT_SEARCH,servicename"

Configures the Db2 Text Search server with the provided service name and an automatically generated port number. If the service name has a port number that is assigned in the services file, it uses the assigned port number.

/j "TEXT_SEARCH,servicename,portnumber"

Configures the Db2 Text Search server with the provided service name and port number.

/j "TEXT_SEARCH,portnumber"

Configures the Db2 Text Search server with a default service name and the provided port number. Valid port numbers must be within the 1024 - 65535 range.

-? Displays usage information.

Examples

1. To create a Db2 pureScale instance for the instance owner db2sdin1 and fenced user db2sdfe1, run the following command:

```
DB2DIR/instance/db2icrt  
-cf host1.domain.com -cfnet host1.domain.com-ib0  
-m host2.domain.com -mnet host2.domain.com-ib0  
-instance_shared_dev /dev/hdisk1  
-tbdev /dev/hdisk2  
-u db2sdfe1  
db2sdin1
```

where *DB2DIR* represents the installation location of your Db2 copy. The Db2 pureScale instance db2sdin1 has a CF on host1, and a member on host2. This command also uses /dev/hdisk1 to create a shared file system to store instance shared files and sets up /dev/hdisk2 as the shared device path for the tiebreaker.

2. To create a Db2 Enterprise Server Edition instance for the user ID db2inst1, run the following command:

```
DB2DIR/instance/db2icrt -s ese -u db2fenc1 db2inst1
```

where *DB2DIR* represents the installation location of your Db2 copy.

3. To create a Db2 pureScale instance that uses an existing file system (IBM Spectrum Scale) managed by the Db2 product for the instance owner db2sdin1 and the fenced user db2sdfe1, run the following command:

```
DB2DIR/instance/db2icrt  
-cf host1.domain.com -cfnet host1.domain.com-ib0  
-m host2.domain.com -mnet host2.domain.com-ib0  
-tbdev /dev/hdisk2  
-u db2sdfe1  
db2sdin1
```

where *DB2DIR* represents the installation location of your Db2 copy.

4. To create a Db2 pureScale instance with an existing user-managed IBM Spectrum Scale file system (*/gpfs_shared_dir*) for the instance owner db2sdin1 and the fenced user db2sdfe1, run the following command:

```
DB2DIR/instance/db2icrt  
-cf host1.domain.com -cfnet host1.domain.com-ib0  
-m host2.domain.com -mnet host2.domain.com-ib0  
-instance_shared_dir /gpfs_shared_dir  
-tbdev /dev/hdisk2  
-u db2sdfe1  
db2sdin1
```

where *DB2DIR* represents the installation location of your Db2 copy.

5. On an AIX machine, to create an instance for the user ID db2inst1, issue the following command:

On a client machine:

```
DB2DIR/instance/db2icrt db2inst1
```

On a server machine:

```
DB2DIR/instance/db2icrt -u db2fenc1 db2inst1
```

where db2fenc1 is the user ID under which fenced user-defined functions and fenced stored procedures run.

6. To create a Db2 pureScale instance on more than one member or CF, run the following command:

```
DB2DIR/instance/db2icrt  
-m coralmem1 -mnet coralmem1-ib0  
-m coralmem2 -mnet coralmem2-ib0  
-m coralmem3 -mnet coralmem3-ib0  
-m coralmem4 -mnet coralmem4-ib0  
-m coralmem5 -mnet coralmem5-ib0  
-m coralmem6 -mnet coralmem6-ib0  
-m coralmem7 -mnet coralmem7-ib0  
-m coralmem8 -mnet coralmem8-ib0  
-cf coralcf1 -cfnet coralcf1-ib0  
-cf coralcf2 -cfnet coralcf2-ib0  
-instance_shared_dev /dev/hdisk1  
-tbdev /dev/hdisk10 -u db2sдин1 db2sдин1
```

where *DB2DIR* represents the installation location of your Db2 copy.

Note: The **db2icrt** command supports Db2 pureScale instance creation on multiple members and CFs up to a maximum of eight members and 2 CFs only. Also, when more than one member or CF is specified, the deprecated format **-m MemberHostname:Netname** or **-cf CFHostName:NetName** is not supported.

Usage notes

- The instance user must exist on all hosts with the same UID, GID, group name, and home directory path. The same rule applies for the fenced user. After the **db2icrt** command is successfully run, the Db2 installer will set up SSH for the instance user across hosts.
- When you use the **db2icrt** command, the name of the instance must match the name of an existing user.
- You can have only one instance per Db2 pureScale environment.
- When you create Db2 instances, consider the following restrictions:
 - If existing IDs are used to create Db2 instances, make sure that the IDs are not locked and passwords are not expired.
 - You can also use the **db2isettup** command to create and update Db2 instances and add multiple hosts with a graphical interface.
 - If you are using the **su** command instead of the **login** command to become the root user, you must issue the **su** command with the **-** option to indicate that the process environment is to be set as if you logged in to the system with the **login** command.
 - You must not source the Db2 instance environment for the root user. Running **db2icrt** when you sourced the Db2 instance environment is not supported.
 - If you previously created a Db2 pureScale instance and dropped it, you cannot re-create it using the **-instance_shared_dev** parameter specification since the Db2 cluster file system might already be created. To specify the previously created shared file system:
 - If the existing IBM Spectrum Scale shared file system was created and managed by Db2 pureScale Feature, the **-instance_shared_dev** parameter and the **-instance_shared_dir** parameter must not be used.
 - If the existing IBM Spectrum Scale shared file system was not created and managed by Db2 pureScale Feature, use the **-instance_shared_dir** parameter.

- On AIX 6.1 (or higher), when running this command from a shared Db2 copy in a system workload partition (WPAR) global environment, this command must be run as the root user. WPAR is not supported in a Db2 pureScale environment.
- For the /var directory memory requirements, see topic "Disk and memory requirements".
- In a Db2 pureScale environment, the **db2icrt** command does not support a Lightweight Directory Access Protocol (LDAP) environment.

db2ida - Stop or restart the SAS embedded process

Stops or restarts the SAS embedded process (SAS EP) without recycling the Db2 instance. This command is useful when you perform maintenance operations, such as upgrading the SAS EP library or correcting an erroneous library path.

Authorization

You require one of the following authorizations:

- SYSADM
- SYSCTRL
- SYSMAINT

Required connection

None

Command syntax

```
►—db2ida—provider—provider_name—[—start—  
|—stop—  
|—stopforce—]►
```

Command parameters

-provider *provider_name*

Specifies an analytics provider. This parameter is case insensitive. Currently, the only supported value is SAS.

-start

Starts the SAS EP if it is not currently running. Db2 respawn logic applies if the process terminates abnormally.

-stop

Stops the SAS EP if it is safe to do so. If any executing queries are dependent on the SAS EP, the command fails. The database manager does not attempt to respawn the SAS EP after it has successfully stopped.

-stopforce

Forces the SAS EP to shut down, even if there are dependent queries running on the system. The database manager does not attempt to respawn the SAS EP after it has successfully stopped.

Examples

- The following command starts the SAS embedded process on the current instance:

```
db2ida -provider sas -start
```

- The following command forces the SAS embedded process to shut down even if dependent queries are running on the system:
`db2ida -provider sas -stopforce`

db2idrop - Remove instance

Removes a Db2 instance that was created by **db2icrt**.

You can only drop instances that are listed by the **db2ilist** command for the same Db2 copy where you are issuing the **db2idrop** command from. You can also use the **db2idrop** command to drop a Db2 pureScale instance.

On Linux and UNIX operating systems, this utility is located in the *DB2DIR/instance* directory, where *DB2DIR* represents the installation location where the current version of the Db2 database system is installed. On Windows operating systems, this utility is located under the *DB2PATH\bin* directory where **DB2PATH** is the location where the Db2 copy is installed.

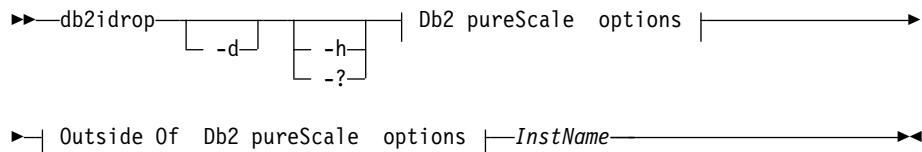
Note: A non-root-installed Db2 instance, on Linux and UNIX operating systems, cannot be dropped using this command. The only option is to uninstall the non-root Db2 copy. See the following *Usage notes* section for more details.

Authorization

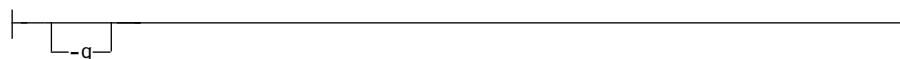
Root user or non root user authority is required on Linux and UNIX operating systems. Local Administrator authority is required on Windows operating systems.

Command syntax

For root installation on Linux and UNIX operating systems



Db2 pureScale options:



Outside Of Db2 pureScale options:



For a non-root thin server instance on Linux and AIX operating systems



For root installation on Windows operating systems

```
►►db2idrop—InstName [ -f ] [ -h ] ►►
```

Command parameters

For root installation on Linux and UNIX operating systems

- d Enters debug mode, for use by Db2 database support.
- h | -? Displays the usage information.
- g This parameter is required when **db2idrop** is used with a Db2 pureScale instance. Specifies that you want to drop the Db2 pureScale instance on all hosts.
This parameter requires all Db2 members and all cluster caching facilities are stopped on all the hosts in the Db2 pureScale instance. This option will be ignored for dropping any other instance type.
- f This parameter is deprecated.
Specifies the force applications flag. If this flag is specified all the applications using the instance will be forced to terminate. This parameter is not supported on a Db2 pureScale environment.

InstName

Specifies the name of the instance.

For a non-root thin server instance on Linux and AIX operating systems

- d Enters debug mode, for use by Db2 database support.
- h | -? Displays the usage information.

For root installation on Windows operating systems

- f Specifies the force applications flag. If this flag is specified all the applications using the instance will be forced to terminate.
- h Displays usage information.

InstName

Specifies the name of the instance.

Example

If you created db2inst1 on a Linux or UNIX operating system by issuing the following command:

```
/opt/IBM/db2/copy1/instance/db2icrt -u db2fenc1 db2inst1
```

To drop db2inst1, you must run the following command:

```
/opt/IBM/db2/copy1/instance/db2idrop db2inst1
```

Usage notes

- Before an instance is dropped, ensure that the Db2 database manager has been stopped on all hosts and that Db2 database applications accessing the instance are disconnected and terminated. Db2 databases associated with the instance can be backed up, and configuration data saved for future reference if needed.

- The **db2idrop** command does not remove any databases. Remove the databases first if they are no longer required. If the databases are not removed, they can always be catalogued under another Db2 copy of the same release and continued to be used.
 - If you want to save Db2 Text Search configurations and plan to reuse instance databases, you need to take the extra step of saving the config directory (on UNIX: *instance_home/sql1ib/db2tss/config* and on Windows: *instance_profile_path\instance_name\db2tss\config*) or config directory contents before issuing the **db2idrop** command. After the new instance is created, the config directory can be restored. However, restoring the config directory is only applicable if the new instance created is of the same release and fix pack level.
 - A non-root-installed instance cannot be dropped on Linux and UNIX operating systems. To remove this Db2 instance, the only option available to the user is to uninstall the non-root copy of Db2 by running **db2_deinstall -a**.
 - On Linux and UNIX operating systems, if you are using the **su** command instead of the **login** command to become the root user, you must issue the **su** command with the **-** option to indicate that the process environment is to be set as if you had logged in to the system using the **login** command.
 - On Linux and UNIX operating systems, you must not source the Db2 instance environment for the root user. Running **db2idrop** when you sourced the Db2 instance environment is not supported.
 - In a Db2 pureScale environment, the **-g** parameter is mandatory. In this case, the instance is dropped on all hosts. However, the IBM General Parallel File System (GPFS) on the installation-initiating host (IIH) is not deleted, nor is the GPFS file system. You must manually remove the file system and uninstall GPFS.
 - On Windows operating systems, if an instance is clustered with Microsoft Cluster Service (MSCS), then you can uncluster that instance by issuing the **db2mscs** or **db2iclus** command before dropping the instance.
 - On AIX 6.1 (or higher), when running this command from a shared Db2 copy in a system workload partition (WPAR) global environment, this command must be run as the root user. WPAR is not supported in a Db2 pureScale environment.

db2ilist - List instances

Lists all the instances that are created using the **db2icrt** command from the same Db2 copy location that you are running the **db2ilist** command.

On Linux and UNIX operating systems, this utility is located in the *DB2DIR*/instance directory, where *DB2DIR* is the instance directory where the Db2 copy is installed. On Windows operating systems, this utility is located under the **DB2PATH**\bin directory where **DB2PATH** represents the installation location where the current version of the Db2 database system is installed.

Authorization

None

Command syntax

```
►►db2ilist [ -h ]
```

Command parameters

-h Displays usage information.

Usage notes

- On Linux and UNIX operating systems, if you are using the **su** command instead of the **login** command to become the root user, you must issue the **su** command with the **-** option to indicate that the process environment is to be set as if you had logged in to the system using the **login** command.
- On Linux and UNIX operating systems, you must not source the Db2 instance environment for the root user. Running **db2ilist** when you sourced the Db2 instance environment is not supported.
- On AIX 6.1 (or higher), when running this command from a shared Db2 copy in a system workload partition (WPAR) global environment, this command must be run as the root user. WPAR is not supported in a Db2 pureScale environment.

db2inidb - Initialize a mirrored database

Initializes a mirrored database in a split-mirror environment. The mirrored database can be initialized as a clone of the primary database, placed in rollforward pending state, or used as a backup image to restore the primary database.

If the instance that a database belongs to is changing, you must do the following to ensure that changes to the instance and database support files are made. If a database is being moved to another instance, create the new instance. The new instance must be at the same release level as the instance where the database currently resides.

You must issue this command before you can use a split-mirror database.

Authorization

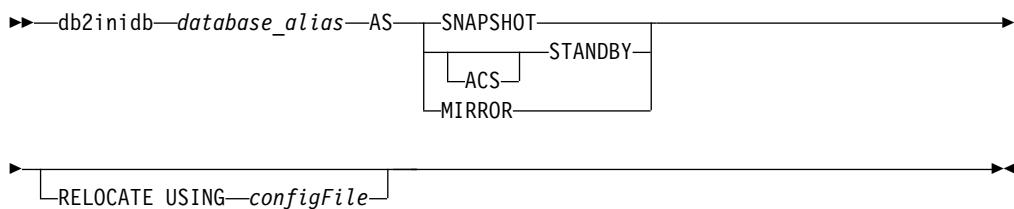
one of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT

Required connection

None

Command syntax



Command parameters

database_alias

Specifies the alias of the database to be initialized.

SNAPSHOT

Specifies that the mirrored database will be initialized as a clone of the primary database.

STANDBY

Specifies that the database will be placed in rollforward pending state. New logs from the primary database can be fetched and applied to the standby database. The standby database can then be used in place of the primary database if it goes down.

ACS

Specifies that the **db2inidb** command is to be used against an ACS snapshot copy of the database to perform the **STANDBY** action. This option is required because the **db2inidb** command can only be issued against split mirror database snapshots created with the **SET WRITE SUSPEND | RESUME** command.

Together, the use of the **ACS STANDBY** option initiates the ACS snapshot copy to be placed into a rollforward pending state so that the **Db2 BACKUP** command can be successfully issued against the snapshot image. Without this, any attempt to connect to the snapshot image results in that copy of the database being placed in the **RESTORE_PENDING** state, removing its usefulness as a backup copy for future recovery.

This feature was introduced specifically for interfacing with storage managers such as IBM Tivoli Storage FlashCopy® Manager, for the purpose of producing an offloaded Db2 backup that is based upon an ACS snapshot. Using this option for any other purpose, to mount or modify the contents of an ACS snapshot copy, even including the production of a Db2 backup, can lead to undefined behavior in the future.

MIRROR Specifies that the mirrored database is to be a backup image which you can use to restore the primary database.

RELOCATE USING configfile

Specifies that the database files are to be relocated based on the information listed in the *configFile* before the database is initialized as a snapshot, standby, or mirror. The format of *configFile* is described in “**db2relocatedb - Relocate database**” on page 1063.

Usage notes

Do not issue the **db2 connect to database-alias** operation before issuing the **db2inidb database_alias** as mirror command. Attempting to connect to a split mirror database before initializing it erases the log files needed during roll forward recovery. The connect sets your database back to the state it was in when you suspended the database. If the database is marked as consistent when it was suspended, the Db2 database system concludes there is no need for crash recovery and empties the logs for future use. If the logs have been emptied, attempting to roll forward results in the SQL4970N error message being returned.

In partitioned database environments, the **db2inidb** command must be issued on every database partition before the split mirror from any of the database partitions can be used. **db2inidb** can be run on all database partitions simultaneously using the **db2_a11** command.

If, However, if you are using the **RELOCATE USING** option, you cannot use the **db2_a11** command to run **db2inidb** on all of the partitions simultaneously. A separate configuration file must be supplied for each partition, that includes the NODENUM value of the database partition being changed. For example, if the name of a database is being changed, every database partition will be affected and the **db2relocatedb** command must be run with a separate configuration file on each database partition. If containers belonging to a single database partition are being moved, the **db2relocatedb** command only needs to be run once on that database partition.

If the **RELOCATE USING** *configFile* parameter is specified and the database is relocated successfully, the specified *configFile* will be copied into the database directory and renamed to db2path.cfg. During a subsequent crash recovery or rollforward recovery, this file will be used to rename container paths as log files are being processed.

If a clone database is being initialized, the specified *configFile* will be automatically removed from the database directory after a crash recovery is completed.

If a standby database or mirrored database is being initialized, the specified *configFile* file is automatically removed from the database directory after a rollforward recovery is completed or canceled. New container paths can be added to the db2path.cfg file after **db2inidb** has been run. This would be necessary when CREATE or ALTER TABLESPACE operations are done on the original database and different paths must be used on the standby database.

When performing an initialization of a split mirror database taken from an HADR primary or standby, use the **STANDBY** parameter if one of the following apply:

- The new database is going to act in an HADR pair and the HADR configuration settings of the new pair are not identical to the settings of the original pair.
- The database is to be initialized as a stand-alone database.

In Db2 pureScale environments, you can issue the **db2inidb** command from any member and have to issue the command only once.

db2inspf - Format inspect results

Formats the data from **INSPECT CHECK** results into ASCII format. Use this utility to see details of the inspection.

The formatting by the **db2inspf** utility can be for a table or a table space, and errors, warnings, and summary can be specified either alone or in any combination thereof.

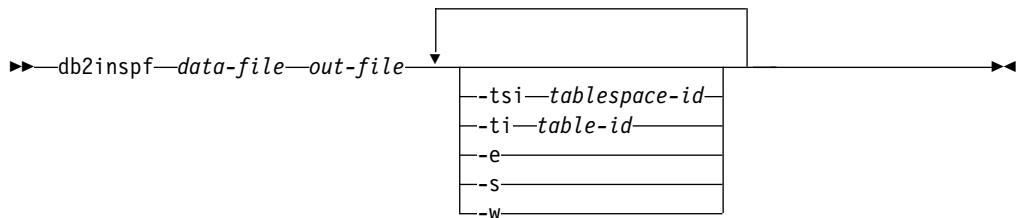
Authorization

Anyone can access the utility, but users must have read permission on the results file in order to execute this utility against them.

Required connection

None

Command syntax



Command Parameters

data-file

The unformatted inspection results file to format.

out-file

The output file for the formatted output.

-tsi *tablespace-id*

Table space ID. Format out only for tables in this table space.

-ti *table-id*

Table ID. Format out only for table with this ID, table space ID must also be provided.

-e

Format out errors only.

-s

Summary only.

-w

Warnings only.

Examples

To format all errors, warnings and summaries from the data file tbschk.log, execute the following query:

```
db2inspf tbschk.log tbschk_esw.txt -e -s -w
```

db2instance - Query state of Db2 instance

The **db2instance** command is used to query the state of a Db2 instance.

Scope

In a Db2 pureScale environment, the **db2instance** command can be run from any shell on the host on which the database server resides. In the event of database unavailability, reporting of some data is still possible if the cluster manager is still available on the host.

Authorization

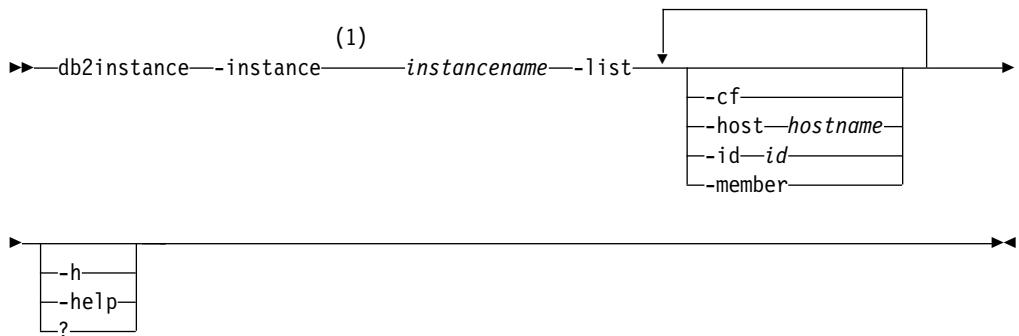
One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT

Before displaying any information, the **db2instance** command will check for SYSADM, SYSCTRL, and SYSMAINT privileges to ensure the user has a right to access the instance information.

When root runs the **db2instance** command, the command can retrieve all information for any instance. You must specify the **-instance *instancename*** parameter before the **-list** parameter.

Command syntax



Notes:

- 1 Mandatory specification if the command is run by a root user.

Command parameters

-instance *instancename*

Required specification if the **db2instance** command is run as the root user. This parameter is not valid for users who are not root.

-list

Returns the host information as well as a list of members and CFs for the specified Db2 instance.

-cf Returns a list of the CFs.

-host *hostname*

Returns a list of all the members and CFs that are associated with a specific host.

-id *id* Returns the member or CF with the same ID.

-member

Returns a list of the members.

-h | -help | ?

Returns command help information.

Examples

The output for the following examples is for a Db2 pureScale instance named db2inst1 with four members residing on hostA, hostB, hostC and hostD, and two cluster caching facilities (CF) residing on hostE and hostF:

1. To list the host information as well as a list of members and CFs, use the following **db2instance** command:

```
db2instance -list
```

The following is a sample output when you run the command:

```
ID      TYPE    STATE   HOME_HOST CURRENT_HOST ALERT ...
```

| | | | | | | |
|-----|--------|---------|-------|-------|----|-----|
| 0 | MEMBER | STARTED | hostA | hostA | NO | ... |
| 1 | MEMBER | STARTED | hostB | hostB | NO | ... |
| 2 | MEMBER | STARTED | hostC | hostC | NO | ... |
| 3 | MEMBER | STARTED | hostD | hostD | NO | ... |
| 128 | CF | PRIMARY | hostE | hostE | NO | ... |
| 129 | CF | PEER | hostF | hostF | NO | ... |

Output (continued):

```
... PARTITION_NUMBER LOGICAL_PORT NETNAME ...  
... ----- ...  
...          0      0 hostA-ib0 ...  
...          0      0 hostB-ib0 ...  
...          0      0 hostC-ib0 ...  
...          0      0 hostD-ib0 ...  
...          0      0 hostD-ib0 ...  
...          0      0 hostD-ib0 ...
```

Output (continued):

```
... HOSTNAME STATE INSTANCE_STOPPED ALERT
```

| | | | |
|-----------|--------|----|----|
| ... hostA | ACTIVE | NO | NO |
| ... hostB | ACTIVE | NO | NO |
| ... hostC | ACTIVE | NO | NO |
| ... hostD | ACTIVE | NO | NO |
| ... hostE | ACTIVE | NO | NO |
| ... hostF | ACTIVE | NO | NO |

2. To list the members associated with the specified Db2 instance, use the following **db2instance** command:

```
db2instance -list -member
```

The following is a sample output when you run the command:

```
ID      TYPE    STATE   HOME_HOST CURRENT_HOST ALERT ...
```

| | | | | | | |
|---|--------|---------|-------|-------|----|-----|
| 0 | MEMBER | STARTED | hostA | hostA | NO | ... |
| 1 | MEMBER | STARTED | hostB | hostB | NO | ... |
| 2 | MEMBER | STARTED | hostC | hostC | NO | ... |
| 3 | MEMBER | STARTED | hostD | hostD | NO | ... |

Output (continued):

```
... PARTITION_NUMBER LOGICAL_PORT NETNAME  
... ----- ...  
...          0      0 hostA-ib0  
...          0      0 hostB-ib0  
...          0      0 hostC-ib0  
...          0      0 hostD-ib0
```

3. To list the CFs associated with the specified Db2 instance, use the following **db2instance** command:

```
db2instance -list -cf
```

The following is a sample output when you run the command:

```
ID      TYPE    STATE   HOME_HOST CURRENT_HOST ALERT ...
```

| | | | | | | |
|-----|----|---------|-------|-------|----|-----|
| 128 | CF | PRIMARY | hostE | hostE | NO | ... |
| 129 | CF | PEER | hostF | hostF | NO | ... |

Output (continued):

```

... PARTITION_NUMBER LOGICAL_PORT NETNAME
... -----
...          0          0 hostD-ib0
...          0          0 hostD-ib0

```

4. To list the members and CFs that are associated with a specific host, use the following **db2instance** command:

```
db2instance -list -host hostC.yourdomain.com
```

The following is a sample output when you run the command:

| ID | TYPE | STATE | HOME_HOST | CURRENT_HOST | ALERT | ... |
|----|--------|---------|-----------|--------------|-------|-----|
| 2 | MEMBER | STARTED | hostC | hostC | NO | ... |

Output (continued):

```

... PARTITION_NUMBER LOGICAL_PORT NETNAME      ...
... -----
...          0          0 hostC-ib0      ...

```

Output (continued):

```

... HOSTNAME STATE INSTANCE_STOPPED ALERT
... -----
... hostC    ACTIVE NO           NO

```

5. To list the members or CFs with the same ID, use the following **db2instance** command:

```
db2instance -list -id 3
```

The following is a sample output when you run the command:

| ID | TYPE | STATE | HOME_HOST | CURRENT_HOST | ALERT | ... |
|----|--------|---------|-----------|--------------|-------|-----|
| 3 | MEMBER | STARTED | hostD | hostD | NO | ... |

Output (continued):

```

... PARTITION_NUMBER LOGICAL_PORT NETNAME
... -----
...          0          0 hostD-ib0

```

6. The following is an example of one of the values in the ALERT column being a YES when you run the command **db2instance -list**:

| ID | TYPE | STATE | HOME_HOST | CURRENT_HOST | ALERT | ... |
|-----|--------|---------|-----------|--------------|-------|-----|
| 0 | MEMBER | ERROR | hostA | hostA | YES | ... |
| 1 | MEMBER | STARTED | hostB | hostB | NO | ... |
| 2 | MEMBER | STARTED | hostC | hostC | NO | ... |
| 3 | MEMBER | STARTED | hostD | hostD | NO | ... |
| 128 | CF | PRIMARY | hostE | hostE | NO | ... |
| 129 | CF | PEER | hostF | hostF | NO | ... |

Output (continued):

```

... PARTITION_NUMBER LOGICAL_PORT NETNAME      ...
... -----
...          0          0 hostA-ib0      ...
...          0          0 hostB-ib0      ...
...          0          0 hostC-ib0      ...
...          0          0 hostD-ib0      ...
...          0          0 hostD-ib0      ...
...          0          0 hostD-ib0      ...

```

Output (continued):

```

... HOSTNAME STATE INSTANCE_STOPPED ALERT
... -----
... hostA    ACTIVE NO           NO

```

```

... hostB    ACTIVE NO          NO
... hostC    ACTIVE NO          NO
... hostD    ACTIVE NO          NO
... hostE    ACTIVE NO          NO
... hostF    ACTIVE NO          NO

```

Usage notes

The cm action section of the **db2cluster** command syntax diagram illustrates the options used to list and clear alerts in a Db2 instance.

To specify any of the following options, the **-list** parameter must precede the option:

- **-cf**
- **-host**
- **-id**
- **-member**

If the ALERT column has a YES entry, the **db2cluster -cm -list -alert** command can be used to find out more information about corrective action.

db2iprune - Reduce installation image size

The **db2iprune** command can reduce the size of your Db2 product installation image before installation.

This tool is useful for large-scale deployments of Db2 database products, as well as for embedding Db2 within an application. Using the input file, or .prn file, which contains a full list of removable products, components, and languages, you can specify what you would like to remove from the installation image. The **db2iprune** command calls the input file and removes the files associated with those components and languages. The result is a new, smaller Db2 installation image that can be installed by using the regular Db2 installation methods.

You cannot prune all products. At a minimum, one product must be still part of the resulting image.

Authorization

None

Note: To prune Tivoli System Automation for Multiplatforms (SA MP) from the install image, you must run the **db2iprune** command as user root.

Required connection

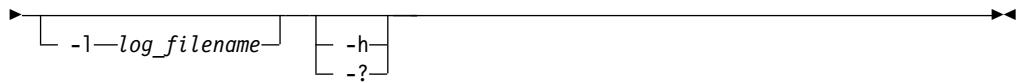
None

Command syntax

```

>>--db2iprune--r--input_file_path--p--root_directory_path----->
>>[-o--destination_directory_path] [-c] [-t--trace_file]----->

```



Command parameters

-r input_file_path

Specifies the full path to the input file that is to be used. The input file, or .prn file, contains a full list of removable components and is used to indicate which products, components, and languages you would like to remove from the installation image.

-p root_directory_path

(On Windows operating systems only.) Specifies the full path to the root directory of the source installation image. This directory contains **setup** and is the root directory of the Db2 installation DVD.

-o destination_directory_path

Specifies the full path to where the new Db2 pruned image is copied. Make sure that you have write access to this directory.

-c

Specifies that you want to prune the source installation image directly. Ensure that the source installation image directory is writable.

-l log_filename

Enables error logging. On Linux and UNIX operating systems, if the **-l** parameter is not specified, the default log file name is `tmpdir/db2iprune_username.log`. On Windows operating systems, the log file `db2iprune.log` is written to the destination directory.

-t trace_file

(On Linux and UNIX operating systems only.) Turns on the debug mode. The debug information is written to the file name specified.

-? | -h Displays the usage information.

Examples

On Windows operating systems, to prune an IBM Data Server Client image where the input file is located in `c:\db2client.prn`, the Db2 **setup.exe** file is located in `d:\`, and you want your pruned IBM Data Server Client image to be copied to the `e:\compact_client` directory, you would enter the following command at the command prompt:

```
db2iprune.exe -r c:\db2client.prn -p d:\ -o e:\compact_client
```

On Linux and UNIX operating systems, to prune an IBM Data Server Client image (where the input file is located in `/tmp/db2client.prn`) and have that pruned image copied to the `/compact_client` directory, you must enter the following command prompt:

```
db2iprune -r /tmp/db2client.prn -o /compact_client
```

Usage notes

The **db2iprune** command and sample input files are provided on the installation DVD:

On Windows operating systems

`dvd_drive:\db2\Windows\utilities\db2iprune`

db2issetup - Start instance creation interface

Starts the Db2 Instance Setup wizard, which is a graphical user interface (GUI) tool for creating, configuring, and extending instances.

Authorization

For root installations, root user authority is required on the system where the command is issued. For non-root installations, you must log on with the user ID that owns the non-root installation.

Root user authority is required on the system where the command is issued.

Required connection

None

Command syntax

```
►--db2issetup [ -i language-code ] [ -l logfile ] [ -t tracefile ]  
► [ -r response_file ] [ -? ] [ -h ]
```

Command parameters

-i language-code

Two letter code for the preferred language in which to run the install. If unspecified, this parameter will default to the locale of the current user.

-l logfile

Writes the log to the file name specified. For root installations, the path and filename default to /tmp/db2issetup.log. For non-root installations, the default log file is /tmp/db2issetup_*userID*.log, where *userID* represents the user ID that owns the non-root installation.

-t tracefile

The full path and name of trace file specified by *tracefile*.

-r response_file

Full path and file name of the response file to use. If you plan to use the GUI interface, do not specify this parameter.

-? | -h

Output usage information.

Usage notes

1. The Db2 Instance Setup wizard provides a subset of the functionality provided by the Db2 Setup wizard. The Db2 Setup wizard (which runs from the installation media) allows you to install Db2 database components, do system setup tasks such as DAS creation or configuration, and setup, configure and

- extend instances. The Db2 Instance Setup wizard provides the same functionality as the Db2 Setup wizard except it does not allow the installation of Db2 database components.
2. The Db2 Instance Setup wizard installs all the required components for the IBM Db2 pureScale Feature on any remote hosts if those components were not installed during the instance creation or extension.
 3. The executable file for this command is located in the *DB2DIR/instance* directory. It is available in a typical install, but not in a compact install.
 4. **db2isetup** runs on all supported Linux and UNIX operating systems.
 5. On AIX 6.1 (or higher), when running this command from a shared Db2 copy in a system workload partition (WPAR) global environment, this command must be run as the root user. .
 6. In a Db2 pureScale environment:
 - a. The Db2 pureScale instance must be fully stopped on all hosts before being adding or dropping a member or cluster caching facility (CF).
 - b. In silent mode, existing hosts of a Db2 pureScale instance can be used in the following cases (these do not apply to the Db2 Setup wizard):
 - To add a second CF to the Db2 pureScale instance, update one of the existing members into both a CF and member host, or add a new host as a CF.
 - To add another member to the Db2 pureScale instance, update the existing CF into both a CF and member host, or add a new host as a member.
 - You cannot use the **db2isetup** command to drop a member or CF.
 - c. There must always be at least one active CF host in the Db2 pureScale instance.
 7. When you are creating a Db2 pureScale instance in a virtual machine (VM), you do not need to specify a tiebreaker disk. If you do not want to specify a tiebreaker disk, you must use `inputsas` the tiebreaker disk option value.

db2iupd - Update instances

Updates an instance to a higher fix pack level within a release, converts an instance other than a Db2 pureScale instance to a Db2 pureScale instance, or changes the topology of a Db2 pureScale instance.

When using this command to update a Db2 pureScale instance, the operation that you specify for the member orcluster caching facility determines whether the instance can remain running or not. For details, see the parameter explanation. Otherwise, when using this command to update an instance that is not a Db2 pureScale instance, before running the **db2iupd** command, you must first stop the instance and all processes that are running for the instance.

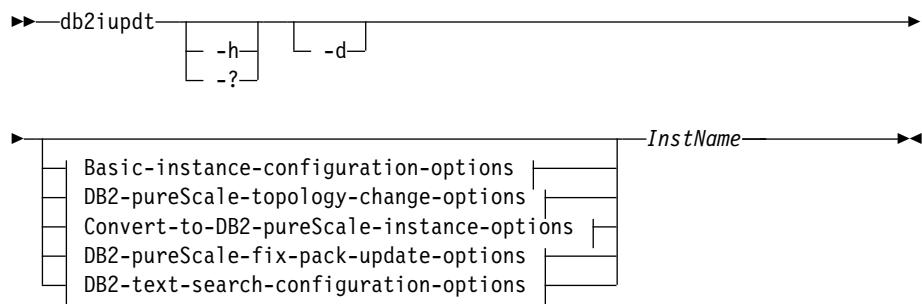
Note: In a Db2 pureScale instance, you cannot make changes to the resource model without having a *configurational quorum*, meaning that a majority of nodes are online. In a two-host setup, you cannot use the **db2iupd** command if one of the hosts is offline.

Authorization

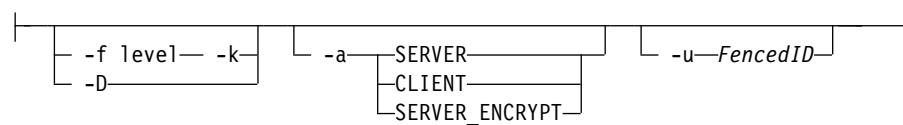
On UNIX and Linux operating systems, you can have either root user or non-root user authority. On Windows operating systems, Local Administrator authority is required.

Command syntax

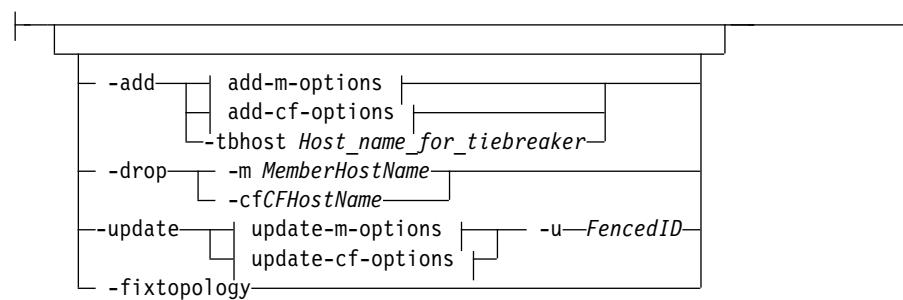
For root installation on UNIX and Linux operating systems



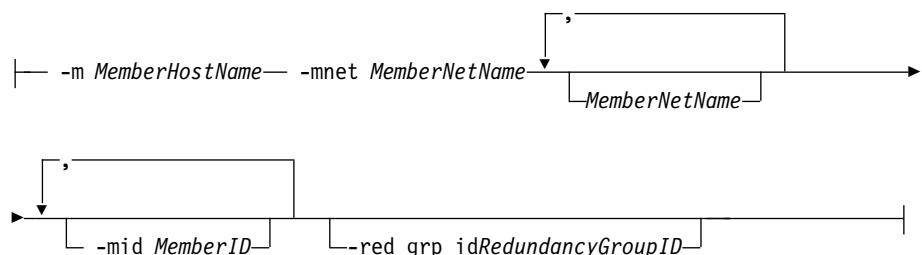
Basic-instance-configuration-options:



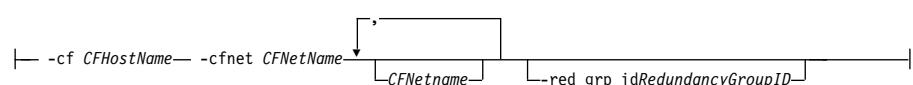
DB2-pureScale-topology-change-options:



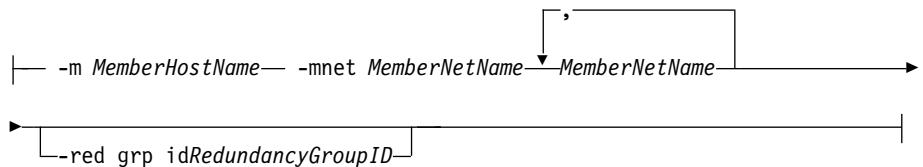
add-m-options:



add-cf-options:



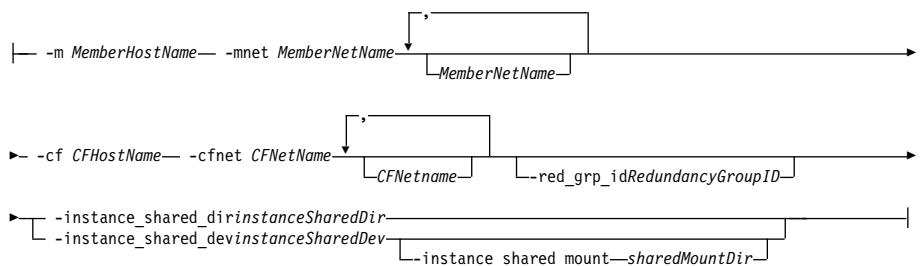
update-m-options:



update-cf-options:



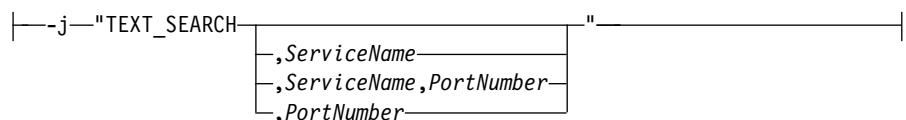
Convert-to-DB2-pureScale-instance-options:



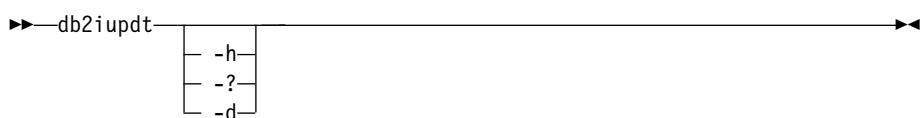
DB2-pureScale-fix-pack-update-options:



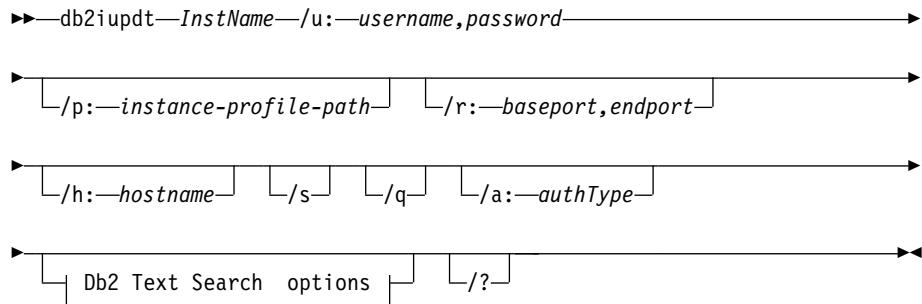
DB2-text-search-configuration-options:



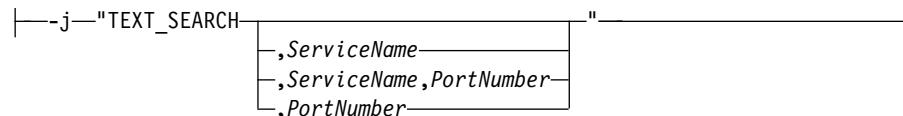
For a non-root thin server instance on Linux and AIX operating systems



For root installation on Windows operating systems



Db2 Text Search options:



Command parameters

For root installation on UNIX and Linux operating systems

-h | -?

Displays the usage information.

-a AuthType

Specifies the authentication type (SERVER, SERVER_ENCRYPT or CLIENT) for the instance. The default is SERVER.

-d Turns on debug mode.

-k Keeps the current instance type during the update.

-D Moves an instance from a higher code level on one path to a lower code level that is installed on another path. This parameter is deprecated and might be removed in a future release. This parameter is replaced by the **-f level** parameter.

-f level

Moves an instance from a higher Db2 version instance type to a lower Db2 version instance type for compatibility.

-add Specifies the host name and cluster interconnect netname or netnames of the host to be added to the Db2 pureScale Feature instance. The **db2iupd -add** command must be run from a host that is already part of the Db2 pureScale instance. When adding a member, the instance can remain running. However, before adding a CF, the instance must be stopped.

-m MemberHostName -mnet MemberNetName -mid MemberID

The host with hostname *MemberHostName* is added to the Db2 pureScale Feature instance with the cluster interconnect netname *MemberNetName*. If *MemberHostName* has multiple cluster interconnect network adapter ports, you can supply a comma delimited list for *MemberNetName* to separate each cluster interconnect netname.

The **-mid** *MemberID* parameter indicates the member identifier for a newly added member. Valid values range from 0 to 127. If not specified, a value is generated automatically.

-cf *CFHostName* **-cfnet** *CFNetName*

The host with hostname *CFHostName* is added to the Db2 pureScale Feature instance as a cluster caching facility with the cluster interconnect netname *CFNetName*. If *CFHostName* has multiple cluster interconnect network adapter ports, you can supply a comma delimited list for *CFNetName* to separate each cluster interconnect netname.

-red_grp_id *RedundancyGroupID*

Specifies the location where a member, CF or disk resides in a geographically dispersed Db2 pureScale cluster (GDPC) environment. This option is mandatory for adding a member, CF or a disk in a GDPC environment with storage replication setup. The valid values of this option are 1 and 2.

-tbhost *Host_name_for_tiebreaker*

Specifies the host that will act as a tiebreaker in IBM Spectrum Scale replicated file systems. This parameter is mandatory for setting up replicated file systems.

Note:

The tiebreaker host can be an existing member or CF only in a single-site pureScale cluster environment.

-update

This parameter is used to update the interconnect netnames used by the CF or member. To update the netname of a member or CF, the instance can be running but the specific target member or specific target CF must be stopped. The **db2iupd** -update command must be run from the target CF or target member.

This option can be used with the **-m** and **-mnet** parameters, or the **-cf** and **-cfnet** parameters.

-m *MemberHostName* **-mnet** *MemberNetName*

The host with hostname *MemberHostName* is updated to the Db2 pureScale Feature instance with the cluster interconnect netname *MemberNetName*. If *MemberHostName* has multiple cluster interconnect network adapter ports, you can supply a comma delimited list for *MemberNetName* to separate each cluster interconnect netname. If you are adding extra netnames, the comma delimited list of netnames must include the existing netnames. Up to 4 netnames can be used.

-cf *CFHostName* **-cfnet** *CFNetName*

The host with hostname *CFHostName* is updated to the Db2 pureScale Feature instance as a cluster caching facility with the cluster interconnect netname *CFNetName*. If *CFHostName* has multiple cluster interconnect network adapter ports, you can supply a comma delimited list for *CFNetName* to separate each cluster interconnect netname. If you are adding extra netnames, the comma delimited list

of netnames must include the existing netnames. Up to 4 netnames can be used. When you update a CF to add an additional cluster interconnect netname, after the netname is added, each member must be stopped and started.

-red_grp_id RedundancyGroupID

Specifies the location where a member, CF or disk resides in a geographically dispersed Db2 pureScale cluster (GDPC) environment. This option is mandatory for updating a member, CF or a disk in a GDPC environment with storage replication setup. The valid values of this option are 1 and 2.

-drop -m MemberHostName | -cf CFHostName

Specifies the host (member or cluster caching facility) to be dropped from a Db2 pureScale instance. Before dropping a member or CF, the instance must be stopped.

To specify which type of host to be dropped, use the **-m** option for a member, or **-cf** option for a cluster caching facility. This option can be used with either the **-m** or the **-cf** parameter, not both.

This parameter cannot be used to drop the last member and the last CF from a Db2 pureScale instance. This parameter should not be used with the **-add** parameter.

Starting with Db2 Version 11.1.3.3, the **-mid MemberID** parameter can be used with the **-m MemberHostName** parameter. The **-mid MemberID** indicates the member identifier for a logical member to be dropped. Valid values range 0 - 127. If not specified, all members of *MemberHostName* are dropped.

After a member is dropped, its entry is kept in the diagnostic directory.

-instance_shared_dev instanceSharedDev

Specifies a shared disk device path required to set up a Db2 pureScale instance to hold instance shared files and default database path. For example, the device path /dev/hdisk1. The shared directory must be accessible on all the hosts for the Db2 pureScale instance. The value of this parameter cannot have the same value as the **-tbdev** parameter. This parameter and **-instance_shared_dir** are mutually exclusive.

This parameter is only required if you are updating an instance other than a Db2 pureScale instance to a Db2 pureScale instance.

-instance_shared_mount sharedMountDir

Specifies the mount point for a new IBM Spectrum Scale file system. The specified path must be a new and empty path that is not nested inside an existing IBM Spectrum Scale file system.

-instance_shared_dir instanceSharedDir

Specifies the directory in a shared file system (IBM Spectrum Scale) required to set up a Db2 pureScale instance to hold instance shared files and default database path. For example, /sharedfs. The disk must be accessible on all the hosts for the Db2 pureScale instance. The value of this parameter cannot have the same value as the **-tbdev** parameter. This parameter and **-instance_shared_dev** are mutually exclusive.

This parameter is only required if you are updating an instance other than a Db2 pureScale instance to a Db2 pureScale instance.

-tbdev *Shared_device_for_tiebreaker*

Specifies a shared device path that will act as a tiebreaker in the Db2 pureScale environment to help ensure that the integrity of the data is maintained. The value of this parameter cannot have the same value as either the **-instance_shared_dev** parameter or the **-instance_shared_dir** parameter.

This parameter is required when the Db2 cluster services tiebreaker is created, or if updating an instance other than a Db2 pureScale instance to a Db2 pureScale instance. This parameter is invalid if a Db2 cluster services Peer Domain exists.

-commit_level

Commits the pureScale instance to a new level of code. This parameter is mandatory in Db2 pureScale environments.

-check_commit

Verifies whether the Db2 instance is ready for a commit.

-j "TEXT_SEARCH"

Configures the Db2 Text Search server with generated default values for service name and TCP/IP port number. This parameter cannot be used if the instance type is client or dsf.

-j "TEXT_SEARCH,servicename"

Configures the Db2 Text Search server by using the specified service name and an automatically generated port number, unless the service name has a port number that is assigned in the services file. If a port number is assigned in the file, that port number is used with the specified service name.

-j "TEXT_SEARCH,servicename,portnumber"

Configures the Db2 Text Search server with the provided service name and port number.

-j "TEXT_SEARCH,portnumber"

Configures the Db2 Text Search server with a default service name and the provided port number. Valid port numbers must be within the 1024 - 65535 range.

-u Fenced ID

Specifies the name of the user ID under which fenced user-defined functions and fenced stored procedures will run. This parameter is only needed when converting an instance from a client instance to a non-client instance type. To determine the current instance type, refer to the node type parameter in the output from a **GET DBM CFG** command. If an instance is already a non-client instance, or if an instance is a client instance and is staying as a client instance (for example, by using the **-k** parameter), the **-u** parameter is not needed. The **-u** parameter can change the fenced user for an existing instance.

-fixtopology

Used to manually correct a failed add or drop operation. For an add operation, this parameter will roll back any changes to return

to the previous topology. For a drop operation, this parameter will complete the drop operation. This parameter cannot be used in combination with any other parameters, except **-d**.

InstName

Specifies the name of the instance.

For a non-root thin server instance on Linux and AIX operating systems

-d Turns debug mode on for use by Db2 database support.

-h | -?

Displays the usage information.

For root installation on Windows operating systems

InstName

Specifies the name of the instance.

/u:username,password

Specifies the account name and password for the Db2 service.

/p:instance-profile-path

Specifies the new instance profile path for the updated instance.

/r:baseport,endport

Specifies the range of TCP/IP ports to be used by the partitioned database instance when running in MPP mode. When this option is specified, the services file on the local machine will be updated with the following entries:

```
DB2_InstName      baseport/tcp  
DB2_InstName_END  endport/tcp
```

/h:hostname

Overrides the default TCP/IP host name if there are more than one TCP/IP host names for the current machine.

/s Updates the instance to a partitioned instance.

/q Issues the **db2iupd** command in quiet mode.

/a:authType

Specifies *authType*, the authentication type (SERVER, CLIENT, or SERVER_ENCRYPT) for the instance.

/j "TEXT_SEARCH"

Configures the Db2 Text Search server with generated default values for service name and TCP/IP port number. This parameter cannot be used if the instance type is client.

/j "TEXT_SEARCH, servicename"

Configures the Db2 Text Search server with the provided service name and an automatically generated port number. If the service name has a port number assigned in the services file, it uses the assigned port number.

/j "TEXT_SEARCH, servicename, portnumber"

Configures the Db2 Text Search server with the provided service name and port number.

/j "TEXT_SEARCH, portnumber"

Configures the Db2 Text Search server with a default service name and the provided port number. Valid port numbers must be within the 1024 - 65535 range.

/? Displays usage information for the **db2iupd** command.

Example

For UNIX and Linux operating systems

A db2inst2 instance is associated with a Db2 copy of Db2 database product installed at *DB2DIR1*. You have another copy of a Db2 database product on the same computer at *DB2DIR2* for the same version of the Db2 database product that is installed in the *DB2DIR1* directory.

To update the instance to run from the Db2 copy installed at *DB2DIR1* to the Db2 copy installed at *DB2DIR2*, issue the following command:

```
DB2DIR2/instance/db2iupd db2inst2
```

If the Db2 copy installed in the *DB2DIR2* directory is at level lower than the Db2 copy installed in the *DB2DIR1* directory, issue the following command:

```
DB2DIR2/instance/db2iupd -D db2inst2
```

Update an instance to a higher level within a release

To update a Db2 instance to a higher level or from one Db2 installation path to another, enter a command such as the following:

```
DB2DIR/instance/db2iupd db2inst1
```

where *DB2DIR* represents the installation location of your Db2 copy. If this command is run from a Db2 pureScale Feature copy, the existing db2inst1 must have an instance type of dsf.

If the db2inst1 instance is a Db2 pureScale instance, this example can update it from one level to a different level of Db2 Enterprise Server Edition with the Db2 pureScale Feature. This example does not apply to updating an ese type instance to a Db2 pureScale instance. The next example outlines this procedure.

Update for an instance other than a Db2 pureScale instance to a Db2 pureScale instance

To update an instance to a Db2 pureScale instance:

```
DB2DIR/instance/db2iupd  
-cf host2  
-cfnet host2-ib0  
-m host1  
-mnet host1-ib0  
-instance_shared_dev /dev/hdisk1  
-tbdev /dev/hdisk2  
-u db2fenc1  
db2inst1
```

where *DB2DIR* represents the installation location of your Db2 copy.

This command also uses /dev/hdisk1 to create a shared file system to store instance shared files and sets up /dev/hdisk2 as the shared device path that will act as a tiebreaker. The value of the **-tbdev** parameter must be different from the value of the **-instance_shared_dev** parameter.

Scale a Db2 pureScale instance (by using **db2iupd -add** or **db2iupd -drop**)

The following examples apply to a Db2 pureScale environment:

- Update a Db2 pureScale instance to add a member.
To add a member called host1 with a netname of host1-ib0 to the Db2 pureScale instance db2sdin1 enter a command such as the following:
`DB2DIR/instance/db2iupd -d -add -m host1 -mnet host1-ib0 db2sdin1`

where *DB2DIR* represents the installation location of your Db2 copy.

- Update a Db2 pureScale instance to add a second cluster caching facility.
To add a cluster caching facility called host2 with a netname of host2-ib0 to the Db2 pureScale instance db2sdin1 enter a command such as the following:

`DB2DIR/instance/db2iupd -d -add -cf host2 -cfnet host2-ib0 db2sdin1`

where *DB2DIR* represents the installation location of your Db2 copy.

- Drop a member from a Db2 pureScale instance.
To drop a member called host1 from the Db2 pureScale instance db2sdin1 enter a command such as the following:

`DB2DIR/instance/db2iupd -d -drop -m host1 db2sdin1`

where *DB2DIR* represents the installation location of your Db2 copy. If host1 does not have a CF role in the same instance, the command must be run from a host other than host1.

Updating a CF to use an additional cluster interconnect network adapter port on an InfiniBand network

Before updating the CF, db2nodes.cfg contains:

```
0 memberhost0    0 memberhost0-ib0
128 cfhost0      0 cfhost0-ib0
```

Note: Do not modify db2nodes.cfg directly.

Run the following command:

`db2iupd -update -cf cfhost0:cfhost0-ib0,cfhost0-ib1,cfhost0-ib2,cfhost0-ib3`

The db2nodes.cfg now contains:

```
0 memberhost0    0 memberhost0-ib0
128 cfhost0      0 cfhost0-ib0,cfhost0-ib1,cfhost0-ib2,cfhost0-ib3
```

Usage notes

For all supported operating systems

- You can use the **db2iupd** command to update a Db2 instance from one Db2 copy to another Db2 copy of the same Db2 version. However, the Db2 global profile variables that are defined in the old Db2 copy installation path will not be updated over to the new installation location. The Db2 instance profile variables that are specific to the instance will be carried over after you update the instance.
- For a partitioned database environment instance, you must install the fix pack on all the nodes, but the instance update is needed only on the instance-owning node.

For UNIX and Linux operating systems

- Only Db2Db2 Enterprise Server Edition can be updated by using the **db2iupt** command.
- If you change the member topology, for example by dropping a member, you must take an offline backup before you can access the database. If

you attempt to access the database before taking an offline backup, the database is placed in a backup pending state.

You can add multiple members or drop multiple members without having to take a backup after each change. For example, if you drop three members, you have to take a backup only after you completed all of the add operations. However, if you add two members and then drop a member, you must take a backup before you can perform any additional member topology changes.

- The **db2iupd** command is located in the *DB2DIR/instance* directory, where *DB2DIR* is the location where the current version of the Db2 database product is installed.
- If you want to update a non-root instance, refer to the **db2nrupd** non-root-installed instance update command. The **db2iupd** does not support updating of non-root instances.
- If you are using the **su** command instead of the **login** command to become the root user, you must issue the **su** command with the **-** option to indicate that the process environment is to be set as if you had logged in to the system with the **login** command.
- You must not source the Db2 instance environment for the root user. Running **db2iupd** when you sourced the Db2 instance environment is not supported.
- On AIX 6.1 (or higher), when running this command from a shared Db2 copy in a system workload partition (WPAR) global environment, this command must be run as the root user. WPAR is not supported in a Db2 pureScale environment.
- When you run the **db2iupd** command to update an instance to a higher level within a release, routines and libraries are copied from each member to a shared location. If a library has the same name but different content on each host, the library content in the shared location is that of the last host that ran the **db2iupd** command.
- In a Db2 pureScale environment, to allow the addition of members to member hosts, the **db2iupd** command reserves six ports in the */etc/services* file with the prefix *DB2_instname*. You can have up to three members on the same host, with the other three ports reserved for the idle processes. A best practice is to have up to three members on the same host. However, if you want to have more than three members on a host, you can extend the number of ports in this range to be more than six. If you want to make changes to the */etc/services* file, the instance must be fully offline, and you must change the */etc/services* file on all hosts in the cluster.

For Windows operating systems

- The **db2iupd** command is located in the *DB2PATH\bin* directory, where *DB2PATH* is the location where the current version of the Db2 database product is installed.
- The instance is updated to the Db2 copy from which you issued the **db2iupd** command. To move your instance profile from its current location to another location, use the **/p** parameter, and specify the instance profile path. Otherwise, the instance profile stays in its original location after the instance update. Use the **db2upgrade** command instead to upgrade to the current release from a previous release.

db2iupgrade - Upgrade instance

Upgrades an instance to a Db2 copy of the current release from a Db2 copy of a previous release. The Db2 copy from where you are running the **db2iupgrade** command must support instance upgrade from the Db2 copy that you want to upgrade.

On Linux and UNIX operating systems, this command is in the *DB2DIR/instance* directory, where *DB2DIR* represents the installation location where the new release of the Db2 database system is installed. This command does not support instance upgrade for a non-root installation.

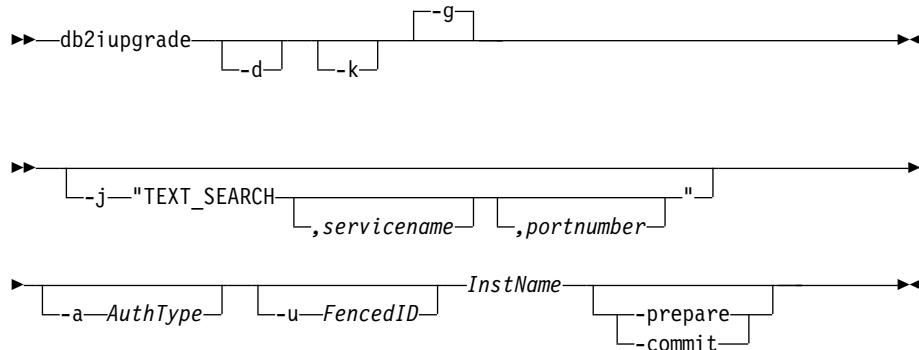
On Windows operating systems, this command is in the **DB2PATH\bin** directory, where **DB2PATH** is the location where the Db2 copy is installed. To move your instance profile from its current location to another location, use the **/p** option and specify the instance profile path. Otherwise, the instance profile will stay in its original location after the upgrade.

Authorization

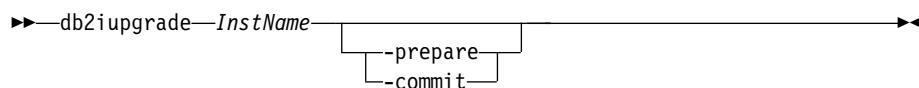
Root user or non-root user authority on Linux and UNIX operating systems. Local Administrator authority is required on Windows operating systems.

Command syntax

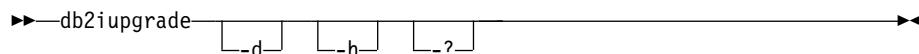
For root installation on Linux and UNIX operating systems



For an active instance upgrade on Linux operating systems

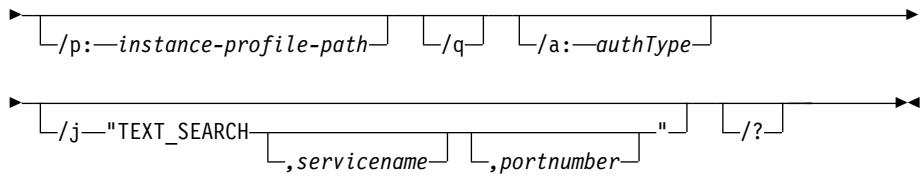


For a non-root thin server instance on Linux and AIX operating systems



For root installation on Windows operating systems





Command parameters

For root installation on Linux and UNIX operating systems

- d** Turns on debug mode. Use this option only when instructed by Db2 database support.
- k** Keeps the pre-upgrade instance type if it is supported in the Db2 copy from where you are running the **db2iupgrade** command. If this parameter is not specified, the instance type is upgraded to the default instance type supported.
- g** Upgrades all the members and cluster caching facilities (CFs) that are part of the Db2 pureScale cluster at the same time. This parameter is the default parameter and is used only for Db2 pureScale instance types.
- j "TEXT_SEARCH"**
Configures the Db2 Text Search server using generated default values for service name and TCP/IP port number. This parameter cannot be used if the instance type is client.
- j "TEXT_SEARCH,servicename"**
Configures the Db2 Text Search server using the provided service name and an automatically generated port number. If the service name has a port number that is assigned in the services file, it uses the assigned port number.
- j "TEXT_SEARCH,servicename,portnumber"**
Configures the Db2 Text Search server using the provided service name and port number.
- j "TEXT_SEARCH,portnumber"**
Configures the Db2 Text Search server using a default service name and the provided port number. Valid port numbers must be within the 1024 - 65535 range.
- a AuthType**
Specifies the authentication type (SERVER, CLIENT, or SERVER_ENCRYPT) for the instance. The default is SERVER.
- u FencedID**
Specifies the name of the user ID under which fenced user-defined functions and fenced stored procedures run. This option is required when a Db2 client instance is upgraded to a Db2 server instance.

InstName

Specifies the name of the instance.

For an active instance upgrade on Linux operating systems

-prepare

Prepares the instance for upgrade to a new version while the old

version is still running or active. This parameter is used to minimize the time for which an instance must be stopped for performing the upgrade operation. This parameter can be used for Db2 Server edition with ese instance type only.

-commit

Commits the instance upgrade to the current version of Db2 database server. This parameter is used only after stopping the instance that was prepared for upgrade using the *-prepare* option. This parameter can be used for Db2 Server edition with ese instance type only.

For a non-root thin server instance on Linux and AIX operating systems

- d** Turns on debug mode. Use this option only when instructed by Db2 database support.
- h | -?** Displays the usage information.

For root installation on Windows operating systems

InstName

Specifies the name of the instance.

/u:username,password

Specifies the account name and password for the Db2 service. This option is required when a partitioned instance is upgraded.

/p:instance-profile-path

Specifies the new instance profile path for the upgraded instance.

/q Issues the **db2iupgrade** command in quiet mode.

/a:authType

Specifies the authentication type (SERVER, CLIENT, or SERVER_ENCRYPT) for the instance.

/j "TEXT_SEARCH"

Configures the Db2 Text Search server using generated default values for service name and TCP/IP port number. This parameter cannot be used if the instance type is client.

/j "TEXT_SEARCH, servicename"

Configures the Db2 Text Search server using the provided service name and an automatically generated port number. If the service name has a port number that is assigned in the services file, it uses the assigned port number.

/j "TEXT_SEARCH, servicename, portnumber"

Configures the Db2 Text Search server using the provided service name and port number.

/j "TEXT_SEARCH, portnumber"

Configures the Db2 Text Search server using a default service name and the provided port number. Valid port numbers must be within the 1024 - 65535 range.

/? Displays usage information for the **db2iupgrade** command.

Usage notes

Only Db2 Enterprise Server Edition instances (instance type *ese*) and Db2 Advanced Enterprise Server Edition can be upgraded using the **db2iupgrade** command.

If the pre-upgrade instance type is not *dsf*, the instance type is upgraded to *ese* instance type from other types. To keep the pre-upgrade type, the **-k** parameter must be used. If the pre-upgrade instance type is *dsf*, which is the Db2 pureScale instance type, this instance type is retained in the target release.

The **db2iupgrade** command calls the **db2ckupgrade** command with the **-not1** parameter, and specifies upgrade.log as the log file for **db2ckupgrade**. The default log file that is created for **db2iupgrade** is /tmp/db2ckupgrade.log.*processID*. Verify that local databases are ready for upgrade before upgrading the instance. The **-not1** parameter disables the check for type-1 indexes. The log file is created in the instance home directory for Linux and UNIX operating systems or in the current directory for Windows operating systems. The instance upgrade does not continue if the **db2ckupgrade** command returns any errors.

For partitioned database environments, run the **db2ckupgrade** command before you issue the **db2iupgrade** command. The **db2ckupgrade** command checks all partitions and returns errors found in any partition. If you do not check whether all database partitions are ready for upgrade, subsequent database upgrades could fail even though the instance upgrade was successful. See **db2ckupgrade** for details.

For HADR databases upgrading from Db2 Version 10.5 Fix Pack 7 or later the **db2iupgrade** command calls the **db2ckupgrade** command for validating the log positions of the primary database and all standby databases that are cataloged in the instances. To ensure the success of the UPGRADE DATABASE command in the new release, it is highly recommended to ensure that the **db2ckupgrade** command is run so that this log validation is done. Otherwise the **UPGRADE DATABASE** command might fail, which results in reinitialization of HADR.

For Linux and UNIX operating systems

- If you use the **db2iupgrade** command to upgrade a Db2 instance from a previous version to the current version of a Db2 database system, the Db2 Global Profile Variables that are defined in an old database installation path are not upgraded to the new installation location. The Db2 Instance Profile Variables specific to the instance to be upgraded will be carried over after the instance is upgraded.
- If you are using the **su** command instead of the **login** command to become the root user, you must issue the **su** command with the **-** option to indicate that the process environment is to be set as if you logged in to the system using the **login** command.
- You must not source the Db2 instance environment for the root user. Running the **db2iupgrade** command when you sourced the Db2 instance environment is not supported.
- On AIX 6.1 (or higher), when running this command from a shared Db2 copy in a system workload partition (WPAR) global environment, this command must be run as the root user. WPAR is not supported in a Db2 pureScale environment.

db2jdbcbind - Db2 JDBC package binder

This utility is used to bind or rebinding the JDBC packages to a Db2 database.

JDBC and CLI share the same packages. If the CLI packages have already been bound to a database, then it is not necessary to run this utility and vice versa.

Authorization

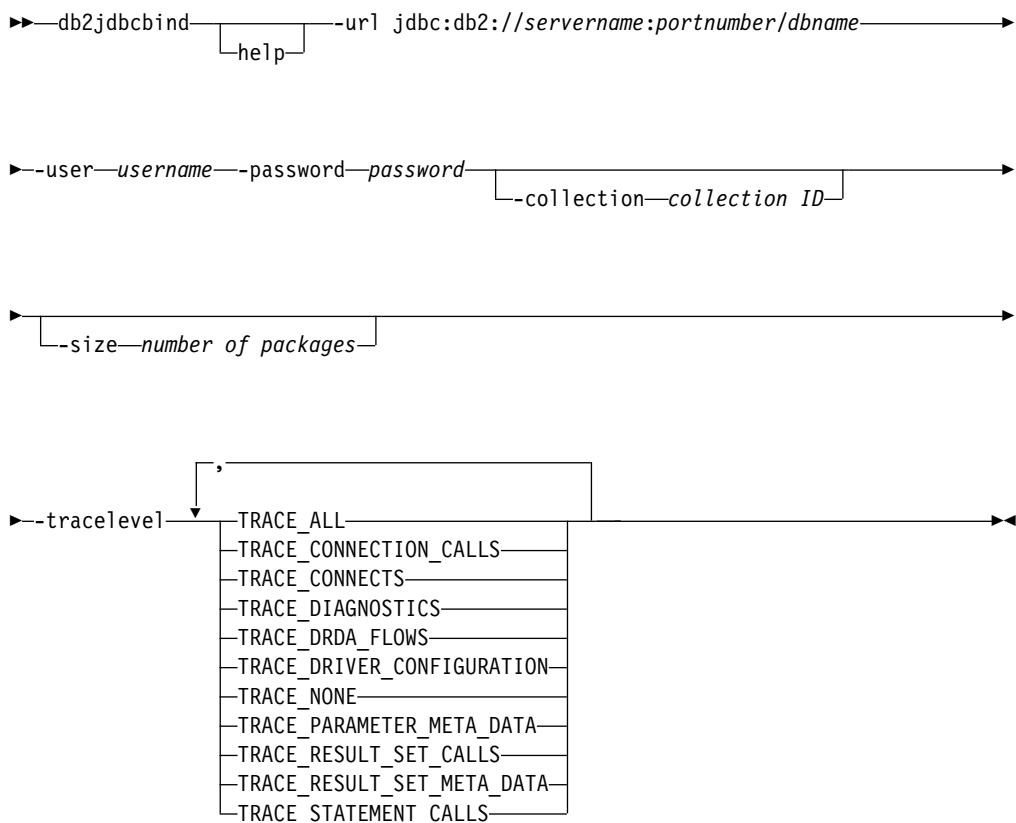
One of the following authorities:

- DBADM
- BINDADD privilege if a package does not exist, and one of:
 - IMPLICIT_SCHEMA authority on the database if the schema name of the package does not exist
 - CREATEIN privilege on the schema if the schema name of the package exists
- ALTERIN privilege on the schema if the package exists
- BIND privilege on the package if it exists

Required connection

This command establishes a database connection.

Command syntax



Command parameters

-help Displays help information, all other options are ignored.

-url jdbc:db2://servername:portnumber/dbname

Specifies a JDBC URL for establishing the database connection. The Db2 JDBC type 4 driver is used to establish the connection.

-user *username*

Specifies the name used when connecting to a database.

-password *password*

Specifies the password for the user name.

-collection *collection ID*

The collection identifier (CURRENT PACKAGESET), to use for the packages. The default is NULLID. Use this to create multiple instances of the package set. This option can only be used in conjunction with the Connection or DataSource property currentPackageSet.

-size *number of packages*

The number of internal packages to bind for each Db2 transaction isolation level and holdability setting. The default is 3, and the maximum value is 253. Since there are four Db2 isolation levels and two cursor holdability settings, there will be $4 \times 2 = 8$ times as many dynamic packages bound as are specified by this option. In addition, a single static package is always bound for internal use.

-tracelevel

Identifies the level of tracing, only required for troubleshooting.

db2p12tokmip - Migrate local keystores to centralized keystores command

Migrates master keys from a local PKCS12 keystore to a centralized keystore that is supporting KMIP.

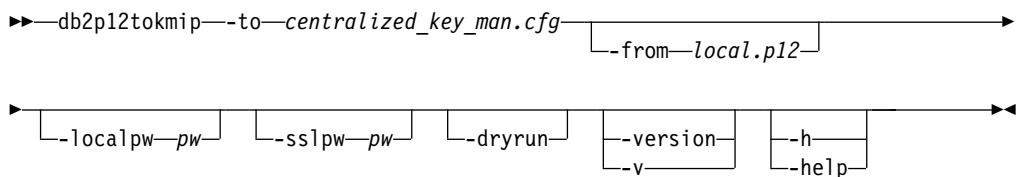
Authorization

Instance owner

Required connection

None

Command syntax

db2p12tokmip command

Command parameters

-to *centralized_key_man.cfg*

Specifies the path to the centralized keystore configuration file.

-from *local.p12*

Specifies the path to the local keystore.

-localpw *pw*

Specifies the local keystore password if it was not stashed. Users are prompted for the password if the keystore password was not stashed, or if the keystore with the stashed password failed to open.

-sslpw pw

Specifies the keystore password that is holding the SSL certificates that are used to connect to the centralized keystore.

-dryrun

Prints a list of keys that are to be migrated. However, running this parameter does not run the migration itself. Instead, it is used for testing purposes, and to ensure that the user has the correct file paths and password.

-version or -v

Prints the program's version.

-h or -help

Displays the help message for this command.

Examples

To print the db2p12tokmip description and syntax information, type either of the following commands:

```
db2p12tokmip -h
```

or

```
db2p12tokmip -help
```

To migrate keys stored in the KEYSTORE_LOCATION in dbm cfg to a centralized keystore:

```
db2p12tokmip -to ~/ekeystore.cfg
```

This example uses the centralized keystore configuration file ekeystore.cfg. Initially, the command attempts to access the keystore, since the password is assumed to be stashed. If the attempt to access the keystore fails, the user is prompted for the password.

To migrate keys stored in the KEYSTORE_LOCATION in dbm cfg to a centralized keystore:

```
db2p12tokmip -to ~/ekeystore.cfg -localpw 1234
```

Similar to the previous example, this example runs the same procedure. However, the password 1234 is used to access the local keystore.

Usage notes

- The **-to** parameter is mandatory.
- The configuration file must be passed to the tool to perform the migration.

db2p12top11 - Migrate local keystore to PKCS #11 keystore

Migrates master keys from a local PKCS12 keystore to a PKCS #11 keystore.

Authorization

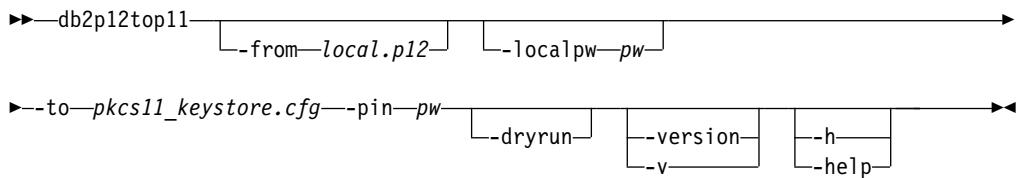
Instance owner

Required connection

None

Command syntax

db2p12top11 command



Command parameters

-from *local.p12*

Specifies the path to the local keystore.

-localpw *pw*

Specifies the local keystore password if it was not stashed. Users are prompted for the password if the keystore password was not stashed, or if the keystore with the stashed password failed to open.

-to *pkcs11_keystore.cfg*

Specifies the path to the PKCS #11 keystore configuration file.

-pin *pw*

The password to authenticate to the PKCS #11 keystore as a normal user. Users are prompted for the password if the keystore password was not stashed, or if the keystore with the stashed password failed to open.

-dryrun

Prints a list of keys that are to be migrated. However, running this parameter does not run the migration itself. Instead, it is used for testing purposes, and to ensure that the user has the correct file paths and password.

-version or -v

Prints the program's version.

-h or -help

Displays the help message for this command.

Examples

To print the db2p12top11 description and syntax information, type either of the following commands:

```
db2p12top11 -h
```

or

```
db2p12top11 -help
```

To migrate keys that are stored in the KEYSTORE_LOCATION configuration parameter to a PKCS #11 keystore:

```
db2p12top11 -to △/pkcs11_keystore.cfg -pin Str0ngPassw0rd
```

This example uses the PKCS #11 keystore configuration file `pkcs11_keystore.cfg`. Initially, the command attempts to access the local keystore, since the local keystore password is assumed to be stashed. If the attempt to access the keystore fails, the user is prompted for the password.

To migrate keys that are stored in the KEYSTORE_LOCATION configuration parameter to a PKCS #11 keystore:

```
db2p12top11 -to ~/pkcs11_keystore.cfg -pin str0ngPassw0rd -localpw 1234
```

Similar to the previous example, this example performs the same procedure. However, the password 1234 is used to access the local keystore.

Usage notes

- The `-to` parameter is mandatory.
- The configuration file must be passed to the tool to perform the migration.
- If you are migrating to a hardware security module (HSM) of the Thales nCipher family, you must assign the `unwrap_kek` parameter to the `CKNFAST_OVERRIDE_SECURITY_ASSURANCES` environment variable.

db2ldcfg - Configure LDAP environment

Configures the Lightweight Directory Access Protocol (LDAP) user distinguished name (DN) and password for the current logon user in an LDAP environment using an IBM LDAP client.

Authorization

None

Required connection

None

Command syntax

```
►►db2ldcfg [ -u userDN -w password ] ►►
```

Command parameters

`-u userDN`

Specifies the LDAP user's Distinguished Name to be used when accessing the LDAP directory. As shown in the following example, the Distinguished name has several parts: the user ID, such as `jdoe`, the domain and organization names, and the suffix, such as `com` or `org`.

`-w password`

Specifies the password.

`-r`

Removes the user's DN and password from the machine environment.

Example:

```
db2ldcfg -u "uid=jdoe,dc=mydomain,dc=myorg,dc=com" -w password
```

Usage notes

In an LDAP environment using an IBM LDAP client, the default LDAP user's DN and password can be configured for the current logon user. After the LDAP users DN and password are configured, the DN and password are saved in the user's environment and used whenever the Db2 database accesses the LDAP directory. Configuring the default LDAP user's DN and password eliminates the need to specify the LDAP user's DN and password when issuing the LDAP command or API. However, if the LDAP user's DN and password are specified when the command or API is issued, the default settings will be overridden.

You can run this command only when using an IBM LDAP client. On a Microsoft LDAP client, the current logon user's credentials are used.

Version 10 Fix Pack 1 and later fix packs, the LDAP server credential can be provided by using the **UserID** and **Password** keywords in the **ldapserver** section (<ldapserver>) of the db2dsdriver.cfg file when using a CLI application.

db2level - Show Db2 service level

Shows the current Version and Service Level of the installed Db2 product. Output from this command goes to the console by default.

Authorization

None

Required Connection

None

Command Syntax

```
►►—db2level—-localMember—►►
```

Command parameters

-localMember

Specifies the current version and service level for the member where the **db2level** command is being issued.

Examples

On Windows operating systems, the **db2level** command shows the Db2 copy name. For example:

```
DB21085I This instance or install <instance name, where applicable: "DB2">
uses "64" bits and Db2 code release "SQL11011" with level identifier "0202010F"
```

```
Informational tokens are "DB2 v11.1.1010.99", "s1610050100",
"DYN1610050100WIN64", and Fix Pack "1".
```

```
Product is installed at "c:\SQLLIB" with Db2 Copy Name "db2build".
```

On Linux and UNIX based operating systems, the **db2level** command does not show the Db2 copy name. For example:

DB21085I This instance or install (instance name, where applicable: "db2inst1") uses "64" bits and Db2 code release "SQL11011" with level identifier "0202010F".

Informational tokens are "DB2 v11.1.1.1", "s1610100100", "DYN1610100100AMD64", and Fix Pack "1".

Product is installed at "/opt/ibm/db2/v11.1fp1".

Refer to Modification Packs for further detail on the product's signature format.

Usage notes

The information output by the command includes Release, Level, and various informational tokens.

db2licm - License management tool

Performs basic license functions such as adding, removing, listing, or modifying licenses and policies installed on the local system.

Note: Under the processor Value Unit (PVU) licensing structure, each processor core will be assigned a specific number of Value Units. You must acquire the total number of processor Value Units for each processor core on which the software programs are deployed. IBM continues to define a processor to be each processor core on a chip. For example, a dual-core chip contains two processor cores.

Each software program has a unique price per Value Unit. To determine the total cost of deploying an individual software program, you multiply the program price per Value Unit by the total number of processor Value Units required.

Authorization

On Windows operating systems:

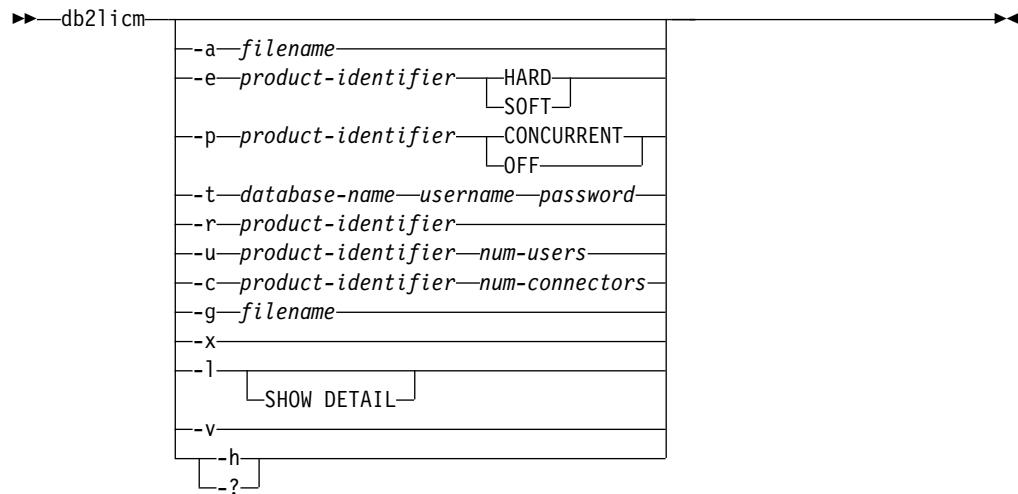
- You must belong to the local Administrators or Power Users group to use the **-a**, **-r**, or **-x** command parameters.
- SYSADM authority is required to use the **-c**, **-e**, **-p**, **-r**, or **-u** command parameters.

On UNIX and Linux operating systems, no authority is required.

Required connection

None

Command syntax



Command parameters

-a *filename*

Adds a license for a product. Specify a file name containing valid license information. This can be obtained from your licensed product CD or by contacting your IBM representative or authorized dealer.

-e *product-identifier*

Updates the enforcement policy on the system. By default, out of compliance usage is logged in the compliance report. Valid values are: HARD or SOFT.

HARD Specifies that unlicensed requests are restricted in these cases:

- Row compression: Specifies that the following operations return an error message without a valid license entitlement for row compression:
 - CREATE or ALTER TABLE statement with the **COMPRESS YES** clause.
 - CREATE or ALTER INDEX statement with the **COMPRESS YES** clause.
- Native encryption: Specifies that the following commands return an error message without a valid license entitlement for the IBM Db2 Encryption Offering:
 - CREATE or BACKUP DATABASE command with the **ENCRYPT** parameter.

Note: Changing Db2 product editions does not change the entitlement policy to SOFT.

SOFT Specifies that unlicensed requests are logged in the compliance report, but not restricted.

-p *product-identifier*

Updates the license policy type to use on the system.

CONCURRENT

Specify for concurrent user policy.

OFF Specify to turn off all policies.

- t *database-name username password***
Displays the user data that is stored in all the user tables of the specified database. Provides data consumption for Terabyte license usage scenarios. Specify the database name, user name, and password. Run the command with this option as an instance user.
- r *product-identifier***
Removes the license for a product. To get the product identifier for a specific product, invoke the command with the **-l** option.
- u *product-identifier num-users***
Updates the number of user licenses that the customer has purchased for record keeping. Specify the product identifier and the number of users. Note that there is no enforcement on the actual number of users.
- c *product-identifier num-connectors***
Updates the number of connector entitlements that the customer has purchased for record keeping. Specify the product identifier and the number of connectors. Note that there is no enforcement on the actual number of users.
- g *filename***
Generates compliance report. Specify file name where output is to be stored.

Note: You must restart the database to get the most up to date license compliance report. Processor, socket, core, memory and other system restrictions are not included in the compliance report.
- x** Resets license compliance information for the purposes of license compliance report.
- l** Lists all the products with available license information, including the product identifier.
- SHOW DETAIL**
Specify to view detailed information about licensed features (if any).
- v** Displays version information.
- h | -?** Displays help information. When this option is specified, all other options are ignored, and only the help information is displayed.

Examples

Example 1:

Basic examples:

```
db2licm -a db2ese_u.lic
db2licm -p db2consv concurrent
db2licm -r db2ese
db2licm -u db2wse 10
db2licm -e db2ese SOFT
db2licm -t testdb jmathew temp4now
```

Note: In the example above, the number of user licenses entered is only intended for record keeping and does not enforce compliance.

Example 2:

Output example listing all the products with available license information, including the product identifier:

```
C:\Program Files\IBM\SQLLIB\BIN>db2licm -l
Product name: "Db2 Enterprise Server Edition"
License type: "Trial"
Expiry date: "08/31/2009"
Product identifier: "db2ese"
Version information: "10.5"
```

Note: In Linux the **db2licm -l** command writes the following informational message to /var/log/messages:

```
kernel: Program db2licm tried to access /dev/mem between 1f0000000f0000->10100000000.
```

Example 3: A CREATE DATABASE command with the ENCRYPT parameter fails when enforcement policy is set to HARD

Set the enforcement policy to hard:

```
db2licm -e db2aese HARD
```

When the enforcement policy is set to HARD, a **CREATE DATABASE** command with the **ENCRYPT** parameter fails. For example,

```
db2licm -l
Product name: "Db2 Advanced Enterprise Server Edition"
License type: "CPU Option"
Expiry date: "Permanent"
Product identifier: "db2aese"
Version information: "10.5"
Enforcement policy: "Hard Stop"

db2 create database samptab1 ENCRYPT
SQL8029N A valid license key was not found for the requested functionality.
Reference numbers: "8".
```

db2listvolumes - Display GUIDs for all disk volumes

Displays the GUIDs for all the disk volumes defined on a Windows operating system.

This command creates two files in the directory where the tool is issued from. One file, called **volumes.xml**, contains information about each disk volume encoded in XML for easy viewing on an XML-enabled browser. The second file, called **tablespace.ddl**, contains the required syntax for specifying table space containers. This file must be updated to complete the remaining information needed for a table space definition. The **db2listvolumes** command does not require any command line arguments. It is only available on Windows operating systems.

Authorization

Administrator

Required Connection

None

Command syntax

```
►►—db2listvolumes—►►
```

Command parameters

None

db2locssh - Run commands on a remote host as user root

The **db2locssh** command is an independent tool that is used run commands on a remote host as user root.

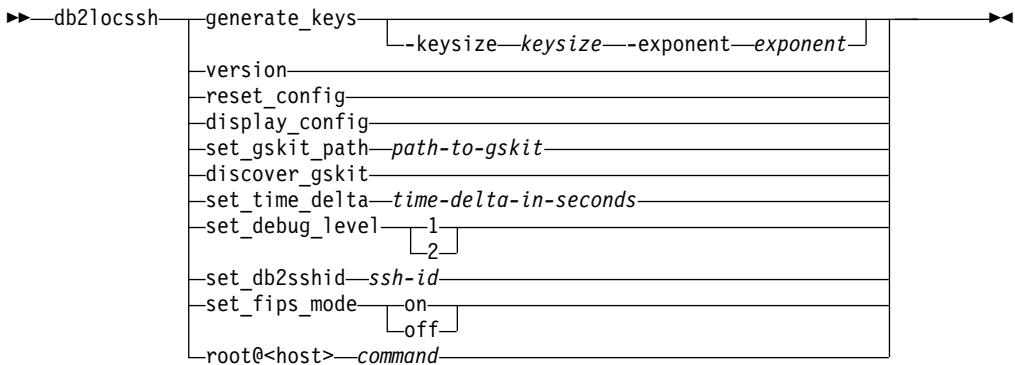
Authorization

Root

Required connection

None

Command syntax



Command parameters

generate_keys

Generates a pair of private and public keys on the host that the **db2locssh** command is executed on. The default value of *keysize* is 2048. If you want to specify a key size and exponent, you must use the **-keysize** and **-exponent** options.

version

Returns the current **db2locssh** version used on the local host.

reset_config

Reset the **db2locssh** configurations.

display_config

Display the current **db2locssh** configurations.

set_gskit_path

Specifies the file path to IBM Global Security Kit (GSKit) packages.

discover_gskit

Attempts to locate GSKit packages on an installed Db2 instance.

set_time_delta

Configure the amount of time allowed to elapse between issuing a command

on the local host and receiving the command on the remote host. The unit of the provided value must be seconds. Default is 0 which means this check is disabled.

set_debug_level

- 1 Only log errors in the system log.
- 2 Log errors and debug information in the system log.

set_db2sshid

Set the ID that the current host uses to establish an SSH connection to other hosts in the cluster.

set_fips_mode

- off Disable the Federal Information Processing Standard (FIPS) off. This is the default setting.
- on Enable FIPS.

root@<host>

Run command on <host> as user root.

db2logsForRfwd - List logs required for rollforward recovery

Parses the DB2TSCHG.HIS file. This utility allows a user to find out which log files are required for a table space rollforward operation.

This utility is located in sql1ib/bin.

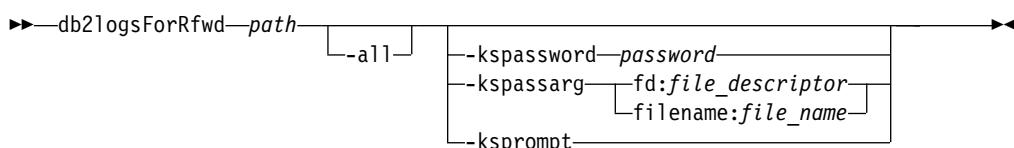
Authorization

None

Required connection

None

Command syntax



Command parameters

path

Full path and name of the DB2TSCHG.HIS file.

all

Displays more detailed information.

kspassword password

Specifies the password to use when opening the keystore.

kspassarg fd:file_descriptor | filename:file_name

Specifies the keystore password arguments. The *file_descriptor* parameter

specifies a file descriptor that identifies an open and readable file or pipe that contains the password to use. The *file_name* parameter specifies the name of the file that contains the password to use.

ksprompt

Specifies that the user is to be prompted for a password.

Examples

```
db2logsForRfwd /home/hote173/roecken/NODE0000/SQL00001/ MEMBER0000/DB2TSCHG.HIS  
db2logsForRfwd DB2TSCHG.HIS -all
```

db2look - Db2 statistics and DDL extraction tool

Extracts the Data Definition Language (DDL) statements that are required to reproduce the database objects of a production database on a test database.

The **db2look** command generates the DDL statements by object type. Note that this command ignores all objects under SYSTOOLS schema except user-defined functions and stored procedures.

It is often advantageous to have a test system that contains a subset of the data of a production system, but access plans selected for such a test system are not necessarily the same as those that would be selected for the production system. However, using the **db2look** tool, you can create a test system with access plans that are similar to those that would be used on the production system. You can use this tool to generate the UPDATE statements that are required to replicate the catalog statistics on the objects in a production database on a test database. You can also use this tool to generate **UPDATE DATABASE CONFIGURATION**, **UPDATE DATABASE MANAGER CONFIGURATION**, and **db2set** commands so that the values of query optimizer-related configuration parameters and registry variables on a test database match those of a production database.

You should check the DDL statements that are generated by the **db2look** command because they might not reproduce all characteristics of the original SQL objects. For table spaces on partitioned database environments, DDL might not be complete if some database partitions are not active. Make sure all database partitions are active using the **ACTIVATE DATABASE** command.

Authorization

SELECT privilege on the system catalog tables.

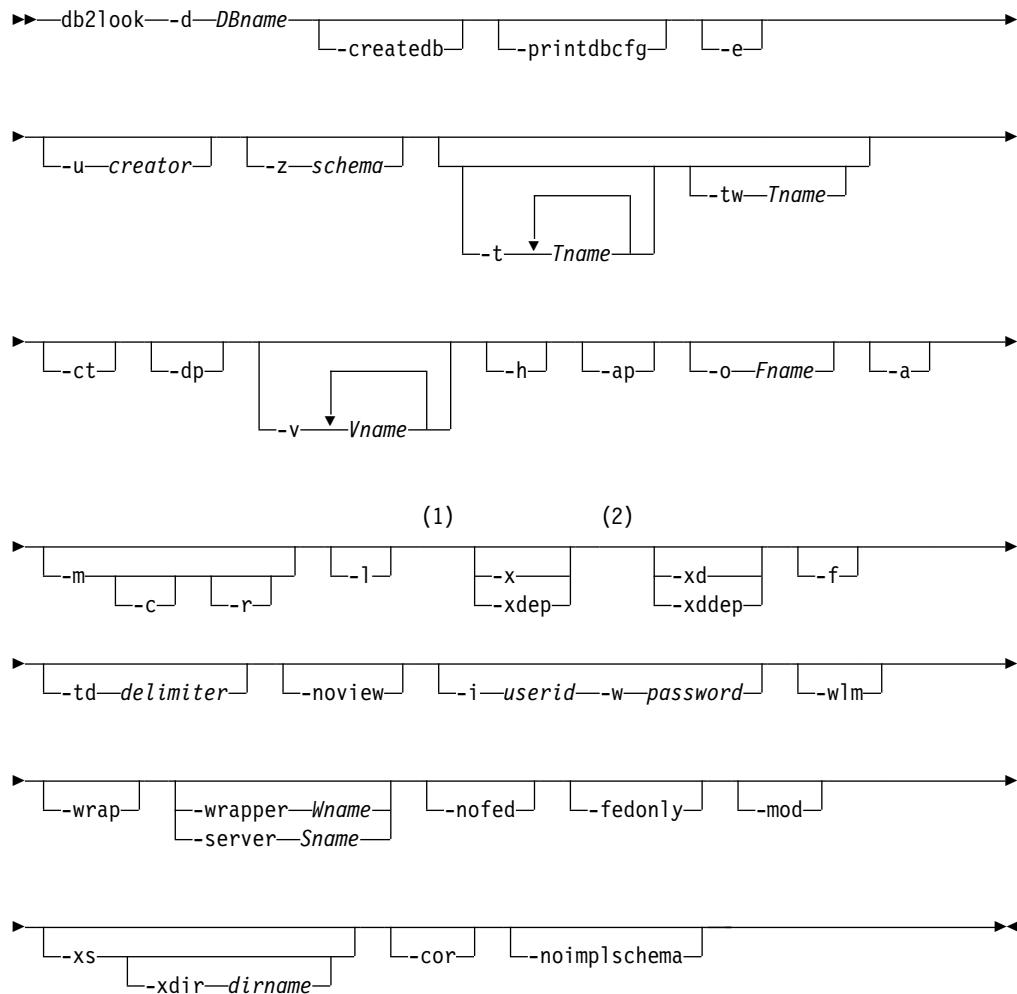
In some cases, such as generating table space container DDL, you will require one of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT
- SYSMON
- DBADM
- EXECUTE privilege on the ADMIN_GET_STORAGE_PATHS table function

Required connection

None

Command syntax



Notes:

- 1 You cannot specify both the **-x** parameter and **-xdep** parameter
- 2 You cannot specify both the **-xd** parameter and **-xddep** parameter

Command parameters

-d DBname

Alias name of the production database that is to be queried. *DBname* can be the name of a Db2 or Db2 for z/OS database. If the *DBname* is a Db2 for z/OS database, the **db2look** command generates the following statements:

- DDL statements for tables, indexes, views, and user-defined distinct types
- UPDATE statistics statements for tables, columns, column distributions, and indexes

These DDL and UPDATE statistics statements are applicable to a Db2 database and not to a Db2 for z/OS database. These statements are useful if you want to extract Db2 for z/OS objects and re-create them in a Db2 database.

-createdb

Generates the **CREATE DATABASE** command that was used to create the source database.

The generated **CREATE DATABASE** command contains the usual parameters and options found in the CREATE DATABASE syntax except the following parameters:

- ALIAS
- NUMSEGS
- RESTRICTIVE
- WITH
- AUTOCONFIGURE

-printdbcfg

Generates UPDATE DB CFG commands for the database configuration parameters. The **printdbcfg** command generates UPDATE DB CFG commands in a similar order as the results returned from the GET DB CFG command.

For the parameters that support the AUTOMATIC value, you might need to add AUTOMATIC at the end of the generated UPDATE DB CFG command.

The generated **UPDATE DB CFG** command contains the usual parameters and options found in the UPDATE DATABASE CONFIGURATION syntax except for the following parameters:

- PAGE_AGE_TRGT_MCR
- DFT_TABLE_ORG
- STRING_UNITS
- NCHAR_MAPPING
- EXTENDED_ROW_SZ
- CONNECT_PROC

-e Extracts DDL statements for the following database objects:

- Aliases
- Audit policies
- Check constraints
- Function mappings
- Function templates
- Global variables
- Indexes (including partitioned indexes on partitioned tables)
- Index specifications
- Materialized query tables (MQTs)
- Nicknames
- Primary key, referential integrity, and check constraints
- Referential integrity constraints
- Roles
- Schemas
- Security labels
- Security label components
- Security policies

- Sequences
- Servers
- Stored procedures
- Tables

Note: Values from column STATISTICS_PROFILE in the SYSIBM.SYSTABLES catalog table are not included.

- Triggers
- Trusted contexts
- Type mappings
- User mappings
- User-defined distinct types
- User-defined functions
- User-defined methods
- User-defined structured types
- User-defined transforms
- Views
- Wrappers

If you use DDL statements that are generated by the **db2look** command to re-create a user-defined function, the source code that the function references (the EXTERNAL NAME clause, for example) must be available for the function to be usable.

-u creator

Generates DDL statements for objects that were created with the specified creator ID. Limits output to objects that were created with the specified creator ID. The output does not include any inoperative objects. To display inoperative objects, use the **-a** parameter. If you specify the **-a** parameter, the **-u** parameter is ignored.

-z schema

Generates DDL statements for objects that have the specified schema name. Limits output to objects that have the specified schema name. The output does not include any inoperative objects. To display inoperative objects, use the **-a** parameter. If you do not specify the **-z** parameter, objects with all schema names are extracted. If you specify the **-a** parameter, the **-z** parameter is ignored. This parameter is also ignored for federated DDL statements.

-t Tname1 Tname2 ... TnameN

Generates DDL statements for the specified tables and their dependent objects. Limits output to the tables that are specified in the table list and generates the DDL statements for all dependent objects of all user specified tables. The maximum number of tables is 30.

The dependent objects include:

- Comments
- Indexes
- Primary keys
- Unique keys
- Aliases
- Foreign key constraints

- Check constraints
- Views
- Triggers

Specify the list as follows:

- Separate table names by a blank space.
- Enclose case-sensitive names and double-byte character set (DBCS) names with the backslash (\) and double quotation marks (" ") (for example, \" MyTabLe \").
- Enclose multiword table names with the backslash and two sets of double quotation marks (for example, \"\"My Table\"") to prevent the pairing from being evaluated word-by-word by the command line processor (CLP). If you use only one set of double quotation marks (for example, "My Table"), all words are converted into uppercase, and the **db2look** command looks for an uppercase table name (for example, MY TABLE).

If you specify the **-t** parameter with the **-l** parameter, partitioned tables are supported.

You can use two-part table names of the format *schema.table* to fully qualify a table name without using the **-z schema** parameter. Use a two-part table name when the table has dependent objects that are in a different schema than that of the table and you require DDL statements to be generated for the dependent objects. If you use the **-z schema** parameter to specify the schema, the parameter excludes dependent objects that do not have the same parent schema, thereby preventing the generation of DDL statements for the dependent objects.

-tw Tname

Generates DDL statements for tables with names that match the pattern that you specify with *Tname* and generates the DDL statements for all dependent objects of those tables. *Tname* must be a single value only. The underscore character (_) in *Tname* represents any single character. The percent sign (%) represents a string of zero or more characters. When **-tw** is specified, the **-t** option is ignored.

You can use two-part table names of the format *schema.table* to fully qualify a table name without using the **-z schema** parameter. Use a two-part table name when the table has dependent objects that are in a different schema than that of the table and you require DDL statements to be generated for the dependent objects. If you use the **-z schema** parameter to specify the schema, the parameter excludes dependent objects that do not have the same parent schema, thereby preventing the generation of DDL statements for the dependent objects.

-ct

Generates DDL statements by object creation time. The object DDL statements might not be displayed in correct dependency order. If you specify the **-ct** parameter, the **db2look** command supports only the following additional parameters: **-e**, **-a**, **-u**, **-z**, **-t**, **-tw**, **-v**, **-l**, **-noview**, and **-wlm**. If you use the **-ct** parameter with the **-z** and **-t** parameters, the **db2look** command generates the required UPDATE statements to replicate the statistics on tables, statistical views, columns, and indexes.

-dp

Generates a DROP statement before a CREATE statement. The DROP statement might not work if there is an object that depends on the dropped object. For example, you cannot drop a schema if there is a table that depends on the schema, and you cannot drop a user-defined type or

user-defined function if there is a type, function, trigger, or table that depends on that user-defined type or user-defined function. For typed tables, the DROP TABLE HIERARCHY statement is generated for the root table only. A DROP statement is not generated for indexes, primary and foreign keys, and constraints because they are always dropped when the table is dropped. You cannot drop a table that has the RESTRICT ON DROP attribute.

-v *Vname1 Vname2 ... VnameN*

Generates DDL statements for the specified views, but not for their dependent objects. The maximum number of views is 30. The rules governing case-sensitive, DBCS, and multiword table names also apply to view names. If you specify the **-t** parameter, the **-v** parameter is ignored.

You can use a two-part view name of the format *schema.view* to fully qualify a view.

-h Display help information. If you specify this parameter, all other parameters are ignored.

-ap Generates the AUDIT USING statements that are required to associate audit policies with other database objects.

-o *Fname*

Writes the output to the *Fname* file. If you do not specify an extension, the .sql extension is used. If you do not specify this parameter, output is written to standard output.

-a Generates DDL statements for objects that were created by any user, including inoperative objects. For example, if you specify this parameter with the **-e** parameter, DDL statements are extracted for all objects in the database. If you specify this parameter with the **-m** parameter, UPDATE statistics statements are extracted for all user-created tables and indexes in the database.

If you do not specify either the **-u** or the **-a** parameter, the USER environment variable is used. On UNIX operating systems, you do not have to explicitly set this variable. However, on Windows operating systems the USER environment variable does not have a default value. Therefore, you must set a user variable in the SYSTEM variables or issue the **set USER=username** command for the session.

-m Generates the UPDATE statements that are required to replicate the statistics on tables, statistical views, columns, and indexes. Using the **-m** parameter is referred to as running in mimic mode.

-c If you specify this option, the **db2look** command does not generate COMMIT, CONNECT, and CONNECT RESET statements. The default action is to generate these statements. This option is ignored unless you also specify the **-m** or **-e** parameter.

-r If you specify this option with the **-m** parameter, the **db2look** command does not generate the **RUNSTATS** command. The default action is to generate the **RUNSTATS** command.

Important: If you intend to run the command processor script that is created using the **db2look** command with the **-m** parameter against another database (for example, to make the catalog statistics of the test database match those in production), both databases must use the same codeset, territory, collation, and uniqueness determination.

- l Generates DDL statements for the following database objects:
 - User-defined table spaces
 - User-defined storage groups
 - User-defined database partition groups
 - User-defined buffer pools
- x Generates authorization DDL statements such as GRANT statements.
The supported authorizations include the following ones:
 - Columns: UPDATE, REFERENCES
 - Databases: ACCESSCTRL, BINDADD, CONNECT, CREATETAB, CREATE_EXTERNAL_ROUTINE, CREATE_NOT_FENCED_ROUTINE, DATAACCESS, DBADM, EXPLAIN, IMPLICIT_SCHEMA, LOAD, QUIESCE_CONNECT, SECADM, SQLADM, WLMADM
 - Exemptions
 - Global variables
 - Indexes: CONTROL
 - Packages: CONTROL, BIND, EXECUTE
 - Roles
 - Schemas: CREATEIN, DROPIN, ALTERIN
 - Security labels
 - Sequences: USAGE, ALTER
 - Stored procedures: EXECUTE
 - Tables: ALTER, SELECT, INSERT, DELETE, UPDATE, INDEX, REFERENCE, CONTROL
 - Views: SELECT, INSERT, DELETE, UPDATE, CONTROL
 - User-defined functions (UDFs): EXECUTE
 - User-defined methods: EXECUTE
 - Table spaces: USE
 - Workloads: USAGE
- Note:** This parameter does not generate authorization DDL statements for dependent objects when used with either the **-t** or **-tw** parameter. Use the **-xdep** parameter to generate authorization DDL statements for parent and dependent objects.
- xdep Generates authorization DDL statements, for example, GRANT statements, for parent and dependent objects. This parameter is ignored if either the **-t** or **-tw** parameter is not specified. The supported authorizations include the following ones:
 - Columns: UPDATE, REFERENCES
 - Indexes: CONTROL
 - Stored procedures: EXECUTE
 - Tables: ALTER, SELECT, INSERT, DELETE, UPDATE, INDEX, REFERENCE, CONTROL
 - Table spaces: USE
 - User-defined functions (UDFs): EXECUTE
 - User-defined methods: EXECUTE
 - Views: SELECT, INSERT, DELETE, UPDATE, CONTROL
- xd Generates authorization DDL statements, including authorization DDL

statements for objects whose authorizations were granted by SYSIBM at object creation time. It does not generate the authorization DDLs for system catalog tables and catalog views.

Note: This parameter does not generate authorization DDL statements for dependent objects when used with either the **-t** or **-tw** parameter. Use the **-xddep** parameter to generate authorization DDL statements for parent and dependent objects.

-xddep

Generates all authorization DDL statements for parent and dependent objects, including authorization DDL statements for objects whose authorizations were granted by SYSIBM at object creation time. This parameter is ignored if either the **-t** or **-tw** parameter is not specified.

-f

Extracts the configuration parameters and registry variables that affect the query optimizer.

-td *delimiter*

Specifies the statement delimiter for SQL statements that are generated by the **db2look** command. The default delimiter is the semicolon (;). Use this parameter if you specify the **-e** parameter because the extracted objects might contain triggers or SQL routines.

-noview

Specifies that CREATE VIEW DDL statements will not be extracted.

-i *userid*

Specifies the user ID that the **db2look** command uses to log on to a remote system. When you specify this parameter and the **-w** parameter, the **db2look** command can run against a database on a remote system. The local and remote database must use the same Db2 for z/OS version.

-w *password*

Specifies the password that the **db2look** command uses to log on to a remote system. When you specify this parameter and the **-i** parameter, the **db2look** command can run against a database on a remote system. The local and remote database must use the same Db2 for z/OS version.

-wlm

Generates WLM-specific DDL output, which can serve to generate CREATE and ALTER statements for the following items:

- Histograms
- Service classes
- Thresholds
- WLM event monitors
- Workloads
- Work action sets
- Work class sets

-wrap

Generates obfuscated versions of DDL statements for routines, triggers, views, and PL/SQL packages.

-wrapper *Wname*

Generates DDL statements for federated objects that apply to the specified wrapper. The federated DDL statements that might be generated include the following ones:

- CREATE FUNCTION ... AS TEMPLATE
- CREATE FUNCTION MAPPING

- CREATE INDEX SPECIFICATION
- CREATE NICKNAME
- CREATE SERVER
- CREATE TYPE MAPPING
- CREATE USER MAPPING
- CREATE WRAPPER
- GRANT (privileges to nicknames, servers, indexes)

An error is returned if you do not specify a wrapper name or specify more than one.

-server *Sname*

Generates DDL statements for federated objects that apply to the specified server. The federated DDL statements that might be generated include the following ones:

- CREATE FUNCTION ... AS TEMPLATE
- CREATE FUNCTION MAPPING
- CREATE INDEX SPECIFICATION
- CREATE NICKNAME
- CREATE SERVER
- CREATE TYPE MAPPING
- CREATE USER MAPPING
- CREATE WRAPPER
- GRANT (privileges to nicknames, servers, indexes)

An error is returned if you do not specify a server name or specify more than one.

-nofed Specifies that no federated DDL statements will be generated. If you specify this parameter, the **-wrapper** and **-server** parameters are ignored.

-fedonly

Specifies that only federated DDL statements will be generated.

-mod Generates DDL statements for each module, and for all of the objects that are defined in each module.

-xs Exports all files that are necessary to register XML schemas and DTDs at the target database and generates appropriate commands for registering them. The set of XSR objects that is exported is controlled by the **-u**, **-z**, and **-a** parameters.

-xdir *dirname*

Exports XML-related files into the specified path. If you do not specify this parameter, all XML-related files are exported into the current directory.

-cor Generates DDL statements with the CREATE OR REPLACE clause, regardless of whether or not the statements originally contained that clause.

-noimplschema

Specifies that CREATE SCHEMA DDL statements for implicitly created schemas are not generated. If you specify this parameter, you must also specify the **-e** parameter.

Examples

The following examples show how to use the **db2look** command:

- Generate the DDL statements for objects created by user `walid` in database `DEPARTMENT`. The output is sent to the `db2look.sql` file.

```
db2look -d department -u walid -e -o db2look.sql
```

- Generate the DDL statements for objects that have schema name `ianhe`, created by user `walid`, in database `DEPARTMENT`. The output is sent to the `db2look.sql` file.

```
db2look -d department -u walid -z ianhe -e -o db2look.sql
```

- Generate the UPDATE statements to replicate the statistics for the database objects created by user `walid` in database `DEPARTMENT`. The output is sent to the `db2look.sql` file.

```
db2look -d department -u walid -m -o db2look.sql
```

- Generate both the DDL statements for the objects created by user `walid` and the UPDATE statements to replicate the statistics on the database objects created by the same user. The output is sent to the `db2look.sql` file.

```
db2look -d department -u walid -e -m -o db2look.sql
```

- Generate the DDL statements for objects created by all users in the database `DEPARTMENT`. The output is sent to the `db2look.sql` file.

```
db2look -d department -a -e -o db2look.sql
```

- Generate the DDL statements for all user-defined database partition groups, buffer pools and table spaces. The output is sent to the `db2look.sql` file.

```
db2look -d department -l -o db2look.sql
```

- Generate the UPDATE statements for optimizer-related database and database manager configuration parameters and the **db2set** commands for optimizer-related registry variables in database `DEPARTMENT`. The output is sent to the `db2look.sql` file.

```
db2look -d department -f -o db2look.sql
```

- Generate the **db2set** commands for optimizer-related registry variables and the following statements for database `DEPARTMENT`:

- The DDL statements for all database objects
- The UPDATE statements to replicate the statistics on all tables and indexes
- The GRANT authorization statements
- The UPDATE statements for optimizer-related database and database manager configuration parameters
- The **db2set** commands for optimizer-related registry variables
- The DDL statements for all user-defined database partition groups, buffer pools, and table spaces

The output is sent to the `db2look.sql` file.

```
db2look -d department -a -e -m -l -x -f -o db2look.sql
```

- Generate all authorization DDL statements for all objects in database `DEPARTMENT`, including the objects that were created by the original creator. (In this case, the authorizations were granted by `SYSIBM` at object creation time.) The output is sent to the `db2look.sql` file.

```
db2look -d department -xd -o db2look.sql
```

- Generate the DDL statements for objects created by all users in the database `DEPARTMENT`. The output is sent to the `db2look.sql` file.

```
db2look -d department -a -e -td % -o db2look.sql
```

The output can then be read by the CLP:

- Generate the DDL statements for objects in database DEPARTMENT, excluding the CREATE VIEW statements. The output is sent to the db2look.sql file.

```
db2look -d department -e -noview -o db2look.sql
```
- Generate the DDL statements for objects in database DEPARTMENT related to specified tables. The output is sent to the db2look.sql file.

```
db2look -d department -e -t tab1 "\"My TABLE2\" -o db2look.sql
```
- Generate the DDL statements for all objects (federated and non-federated) in the federated database FEDDEPART. For federated DDL statements, only those that apply to the specified wrapper, FEDWRAP, are generated. The output is sent to standard output.

```
db2look -d feddepart -e -wrapper fedwrap
```
- Generate a script file that includes only non-federated DDL statements. The following system command can be run against a federated database FEDDEPART and yet only produce output like that found when run against a database which is not federated. The output is sent to the out.sql file.

```
db2look -d feddepart -e -nofed -o out
```
- Generate the DDL statements for objects that have schema name walid in the database DEPARTMENT. The files required to register any included XML schemas and DTDs are exported to the current directory. The output is sent to the db2look.sql file.

```
db2look -d department -z walid -e -xs -o db2look.sql
```
- Generate the DDL statements for objects that were created by all users in the database DEPARTMENT. The files that are required to register any included XML schemas and DTDs are exported to the /home/ofer/ofer/ directory. The output is sent to standard output.

```
db2look -d department -a -e -xs -xdir /home/ofer/ofer/
```
- Generate only WLM-specific DDL statements for database DEPARTMENT:

```
db2look -d department -wlm
```
- Generate the DDL statements for all objects in database DEPARTMENT:

```
db2look -d department -wlm -e -l
```
- Generate the DDL statements for both the parent table TAB1 in schema TABLES and the dependent view of TAB1 that is called VIEW1 in the VIEWS schema in database DB1. The output is sent to the db2look.sql file.

```
db2look -d DB1 -t TABLES.TAB1 -e -o db2look.sql
```
- Generate the DDL statements and authorization DDL statements for the parent table TAB1 in schema TABLES and the dependent view of TAB1 that is called VIEW1 in the VIEWS schema in database DB1. The output is sent to the db2look.sql file.

```
db2look -d DB1 -t TABLES.TAB1 -e -xdep -o db2look.sql
```
- Generate the RUNSTATS DDL statements on the TABLE1 table in mimic mode. The output is sent to the db2look.sql file. Not all available RUNSTATS clauses of the command are supported.

```
db2look -d DB1 -t TABLE1 -m -e -o db2look.sql
```
- Generate the **CREATE DATABASE** command that was used to create the database DEPARTMENT. The output is sent to the db2look.sql file.

```
db2look -d department -createdb -o db2look.sql
```
- Generate the UPDATE DB CFG statements from the database DEPARTMENT. The output is sent to the db2look.sql file.

```
db2look -d department -printdbcfg -o db2look.sql
```

- Generate the **CREATE DATABASE** command that was used to create the database, the UPDATE DB CFG statements, and the DDL statements for objects created in the database DEPARTMENT. The output is sent to the db2look.sql file.

```
db2look -d department -createdb -printdbcfg -e -o db2look.sql
```

Usage notes

On Windows operating systems, you must issue the **db2look** command from a Db2 command window.

By default, the instance owner has the EXECUTE privilege on **db2look** packages. For other users to run the **db2look** command, the instance owner has to grant the EXECUTE privilege on **db2look** packages. To determine the **db2look** package names, the **db2bfd** command can be used as follows:

```
cd .../sqllib/bnd  
db2bfd -b db2look.bnd  
db2bfd -b db2lkfun.bnd  
db2bfd -b db2lksp.bnd
```

To create DDL statements for federated objects, you must enable the use of federated systems in the database manager configuration. After the **db2look** command generates the script file, you must set the **federated** configuration parameter to YES before running the script. The following **db2look** command parameters are supported in a federated environment:

- ap**
Generates AUDIT USING statements.
- e**
Generates DDL statements for federated objects.
- f**
Extracts federated-related information from the database manager configuration.
- m**
Extracts statistics for nicknames.
- x**
Generates GRANT statements to grant privileges on federated objects.
- xd**
Generates DDL statements to add system-granted privileges to federated objects.
- wlm**
Generates WLM-specific DDL statements.

If the nickname column and the remote table column are of different data types, then the **db2look** command will generate an ALTER COLUMN statement for the nickname column.

You must modify the output script to add the remote passwords for the CREATE USER MAPPING statements.

You must modify the **db2look** command output script by adding AUTHORIZATION and PASSWORD to those CREATE SERVER statements that are used to define a Db2 family instance as a data source.

Usage of the **-tw** option is as follows:

- To both generate the DDL statements for objects in the DEPARTMENT database associated with tables that have names beginning with abc and send the output to the db2look.sql file:

```
db2look -d department -e -tw abc% -o db2look.sql
```

- To generate the DDL statements for objects in the DEPARTMENT database associated with tables that have a d as the second character of the name and to send the output to the db2look.sql file:

```
db2look -d department -e -tw _d% -o db2look.sql
```

- The **db2look** command uses the LIKE predicate when evaluating which table names match the pattern specified by the *Tname* argument. Because the LIKE predicate is used, if either the _ character or the % character is part of the table name, the backslash (\) escape character must be used immediately before the _ or the %. In this situation, neither the _ nor the % can be used as a wildcard character in *Tname*. For example, to generate the DDL statements for objects in the DEPARTMENT database associated with tables that have a percent sign in the neither the first nor the last position of the name:

```
db2look -d department -e -tw string\%string
```

- Case-sensitive, DBCS, and multi-word table and view names must be enclosed by both a backslash and double quotation marks. For example:

```
\\"My TabLe\"
```

If a multibyte character set (MBCS) or double-byte character set (DBCS) name is not enclosed by the backward slash and double quotation delimiter and if it contains the same byte as the lowercase character, it will be converted into uppercase and **db2look** will look for a database object with the converted name. As a result, the DDL statement will not be extracted.

- The **-tw** option can be used with the **-x** option (to generate GRANT privileges), the **-m** option (to return table and column statistics), and the **-l** option (to generate the DDL for user-defined table spaces, database partition groups, and buffer pools). If the **-t** option is specified with the **-tw** option, the **-t** option (and its associated *Tname* argument) is ignored.
- The **-tw** option cannot be used to generate the DDL for tables (and their associated objects) that reside on federated data sources, or on Db2 Universal Database on z/OS and OS/390, Db2 for i , or Db2 Server for VSE & VM.
- The **-tw** option is only supported via the CLP.

If you try to generate DDL statements on systems with a partitioned database environment, a warning message is displayed in place of the DDL statements for table spaces that are on inactive database partitions. To ensure that correct DDL statements are produced for all table spaces, you must activate all database partitions.

You can issue the **db2look** command from a Db2 client to a database that is of the same or later release as the client, but you cannot issue this command from a client to a database that is of an earlier release than the client. For example, you can issue the **db2look** command from a Version 9.8 client to a Version 10.1 database, but you cannot issue the command from a Version 10.1 client to a Version 9.8 database.

When you invoke the db2look utility, the **db2look** command generates the DDL statements for any object created using an uncommitted transaction.

When you extract a DDL statement for a security label component of type array, the extracted statement might not generate a component whose internal representation (encoding of elements in that array) matches that of the component

in the database for which you issued the **db2look** command. This mismatch can happen if you altered the security label component by adding one or more elements to it. In such cases, data that you extract from one table and moved to another table that you created from **db2look** output will not have corresponding security label values, and the protection of the new table might be compromised.

In a partitioned database environment, if the database was created with table spaces managed by Database Managed Space (DMS) or System Managed Space (SMS) with specified container paths including those defined by \$N expressions, the **db2look -createdb** generated **CREATE DATABASE** command will list all container paths on each database partition, not just the original specified path or the \$N expression. Before you run the generated statement you must adjust the container setting. There is no restriction with the automatic storage option in a partitioned database environment.

In a pureScale environment, the **db2look -printdbcfg** command generates the UPDATE DATABASE CONFIGURATION values based on the values of the database member from where the **db2look -printdbcfg** command is run.

Related information:

Nickname column and index names

Changing applications for migration

db2ls - List installed Db2 products and features

Lists the Db2 products and features installed on your Linux and UNIX systems, including the Db2 HTML documentation.

With the ability to install multiple copies of Db2 products on your system and the flexibility to install Db2 products and features in the path of your choice, you can use the **db2ls** command to list:

- where Db2 products are installed on your system and list the Db2 product level.
- all or specific Db2 products and features in a particular installation path.

The **db2ls** command can be found both in the installation media and in a Db2 install copy on the system. The **db2ls** command can be run from either location. The **db2ls** command can be run from the installation media for all products except IBM Data Server Driver Package.

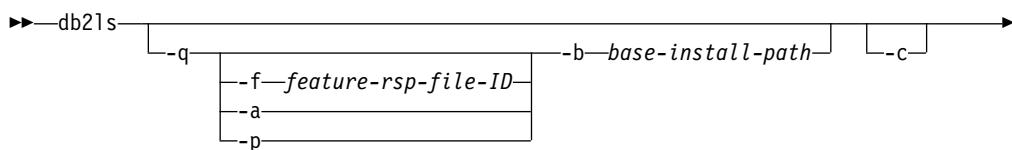
Authorization

None

Required Connection

None

Command syntax



```
▶ [-l log-file]
```

Command parameters

- q Signifies that the query is to list installed Db2 products and features. By default, only the visible components (features) are displayed unless the -a parameter is also specified.
- f *feature-rsp-file-ID* Queries for the specific feature, if it is installed. If it is not installed, the return code from the program is nonzero, otherwise the return code is zero.
- a Lists all hidden components as well as visible features. The **db2ls** command only lists visible features by default.
- p Lists products only. This will give a brief list of which products the customer has installed rather than listing the features.
- b *base-install-path* When using the global **db2ls** command in /usr/local/bin, you need to specify which directory you are querying. The global **db2ls** command will simply call the **db2ls** from that install path and pass in the rest of the parameters.
- c Prints the output as a colon-separated list of entries rather than column-based. This allows you to programmatically work with this information. The first line of output will be a colon-separated list of tokens to describe each entry. This first line will start with a hash character ("#") to make it easy to ignore programmatically.
- l *log-file* Trace log file to use for debugging purposes.

Examples

- To query what Db2 database features are installed to a particular path, issue:
`db2ls -q -b /opt/ibm/ese/V11.1`
- To see all Db2 database features installed to a particular path, issue:
`db2ls -q -a -b /opt/ibm/ese/V11.1`
- To check whether a specific Db2 database feature is installed or not, issue:
`db2ls -q -b /opt/ibm/ese/V11.1 -f feature`

Usage notes

- You cannot use the **db2ls** command on Windows operating systems.
- If the root has write permission in /usr/local/bin or is able to create /usr/local/bin, the symbolic link /usr/local/bin/db2ls will be created which points to DB2DIR/install/db2ls for the first installation of Db2 Version 9 or later version installed on the system. The root will update the link pointing to the highest version and level of Db2 installed on the system, if multiple copies of Db2 are installed.

A non-root installation will not create or change the /usr/local/bin/db2ls. In that case, to run **db2ls**, you have to do one of two things:

- Add *inst_home/sqllib/install* to the user's path. Then you can run **db2ls** as the non-root user.

- Pass in the exact path of the command, for example `inst_home/sql1ib/install/db2ls`.
- The **db2ls** command is the only method to query a Db2 product at Version 9 or later. You cannot query Db2 products using Linux or UNIX operating system native utilities such as **pkgadd**, **rpm**, **SMIT**, or **swinstall**. Any existing scripts containing a native installation utility that you use to interface and query with Db2 installations will need to change.
- Different feature listings are obtained depending upon the root versus non-root method of Db2 installation and the user running the command.

Without the **-q** option:

- For any user, other than the non-root-install instance user, the command displays all copies installed by the root user.
- For the non-root-install instance user, the command displays all Db2 copies installed by the root user plus the non-root copy owned by the non-root user.

With the **-q** option:

- If userA wants to know if userB has Db2 installed, userA can run `db2ls -q -b $userBHomeDir/sql1ib`. If userA has access permission, then the Db2 features installed by userB will be displayed, otherwise, an error message will be returned indicating that access permission was denied.
- If you run `db2ls -q` without the **-b** option, the installed features in the install path where **db2ls** belongs are displayed.
- If the directory is read-only, the **db2ls** command cannot be linked to from the `/usr/local/bin` directory. If you are running in a system workload partitions (WPARs) you can use the **db2ls** command located in the installation image root directory to query a list of installed copies.

db2move - Database movement tool

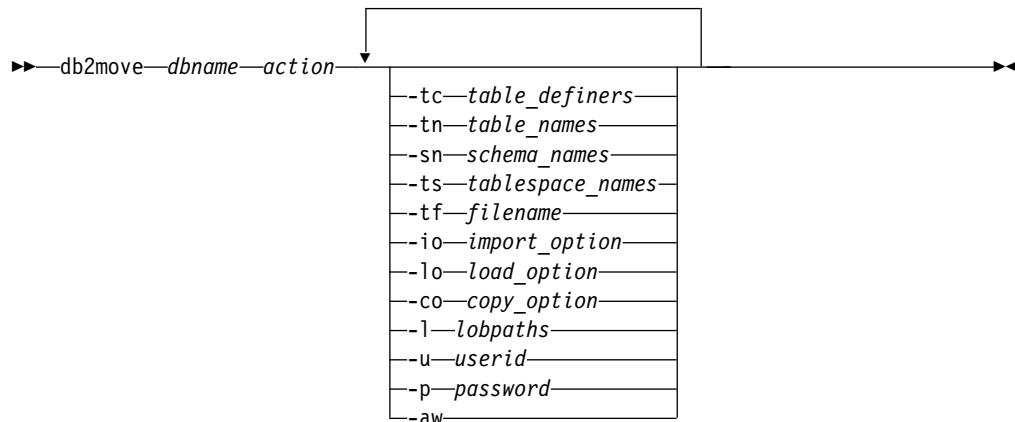
The **DB2MOVE** command, when used in the EXPORT, IMPORT, or LOAD mode, facilitates the movement of large numbers of tables between Db2 databases located on workstations. When the **DB2MOVE** command is used in the COPY mode, this tool facilitates the duplication of a schema.

The tool queries the system catalog tables for a particular database and compiles a list of all user tables. It then exports these tables in PC/IXF format. The PC/IXF files can be imported or loaded to another local Db2 database on the same system, or can be transferred to another workstation platform and imported or loaded to a Db2 database on that platform. Tables with structured type columns are not moved when this tool is used.

Authorization

This tool calls the Db2 export, import, and load APIs, depending on the action requested by the user. Therefore, the requesting user ID must have the authorization that the APIs require, or the request fails.

Command syntax



Command parameters

dbname

Specifies the name of the database.

action Specifies an action. Values are as follows:

EXPORT

Exports all tables that meet the filtering criteria according to the option specified. If you do not specify an option then all tables are exported. Internal staging information is stored in the db2move.1st file.

IMPORT

Imports all tables listed in the db2move.1st internal staging file. Use the **-io** option for IMPORT specific actions.

LOAD

Loads all tables listed in the internal staging file db2move.1st. Use the **-lo** option for LOAD specific actions.

COPY

Duplicates schemas into a target database. The target database must be a local database. Use the **-sn** option to specify one or more schemas. See the **-co** option for COPY specific options. Use the **-tn** or **-tf** option to filter tables in LOAD_ONLY mode. You must use the SYSTOOLSPACE table space if you use the ADMIN_COPY_SCHEMA() stored procedure or if you use the db2move command with the **COPY** parameter.

-tc table_definers

Specifies one or more table definers (creators).

This parameter applies only to the **EXPORT** action. If you specify the **-tc** parameter, only those tables that were created by the specified definers are exported. If you do not specify this parameter, all definers are used. If you specify multiple definers, you must separate them with commas; no blanks are allowed between definer IDs. You can use this parameter with the **-tn table_names** parameter to select the tables for export.

You can use an asterisk (*) as a wildcard character anywhere in the string.

-tn table_names

Specifies one or more table names. This parameter applies only to the **EXPORT** and **COPY** actions.

If you specify the **-tn** parameter with the **EXPORT** action, only those tables whose names match those in the specified string are exported. If you do not specify this parameter, all user tables are used. If you specify multiple table names, you must separate them with commas; no blanks are allowed between table names. Table names must be listed unqualified. To filter schemas, you should use the **-sn** parameter.

For export, you can use an asterisk (*) as a wildcard character anywhere in the string.

If you specify the **-tn** parameter with the **COPY** action, you must also specify the **-co "MODE" LOAD_ONLY** *copy_option* parameter, and only the specified tables are repopulated in the target database. The table names must be listed with their schema qualifiers in the format "*schema*".*table*".

-sn *schema_names*

Specifies one or more schema names. If you specify this parameter, only those tables whose schema names match those in the specified string are exported or copied. The default for the **EXPORT** action is all schemas. The default does not apply to the **COPY** action.

If you specify multiple schema names, you must separate them with commas; no blanks are allowed between schema names. Schema names of fewer than 8 characters are padded to 8 characters in length.

In the case of the **EXPORT** action, if you use the asterisk (*) wildcard character in the schema names, it is changed to a percent sign (%), and the table name (with the percent sign) is used in the LIKE predicate of the WHERE clause. If you use the **-sn** parameter with the **-tn** or **-tc** parameter, the **db2move** command acts on only those tables whose schemas match the specified schema names or whose definers match the specified definers. A schema name fred has to be specified as **-sn fr*d*** instead of **-sn fr*d** when using an asterisk.

Note: The **-sn** option is not supported on Db2 for z/OS.

-ts *tablespace_names*

Specifies a list of table space names. This parameter applies only to the **EXPORT** action.

If you specify the **-ts** parameter, only those tables in the specified table space are exported. If you use the asterisk (*) wildcard character in the table space name, it is changed to a percent sign (%), and the table name (with the percent sign) is used in the LIKE predicate in the WHERE clause. If you do not specify the **-ts** parameter, all table spaces are used. If you specify multiple table space names, you must separate them with commas; no blanks are allowed between table space names. Table space names with fewer than 8 characters are padded to 8 characters in length. To specify a table space name mytb, it has to be specified as **-ts my*b*** instead of **-sn my*b** when using an asterisk.

-tf *filename*

Specifies a file name. This parameter applies only to the **EXPORT** and **COPY** actions. If you specify the **-tf** parameter with the **EXPORT** action, only those tables whose names match those in the specified file are exported. In the file, you should list one table per line, and you should fully qualify each table name. Wildcard characters are not allowed in the strings. Sample file contents are as follows:

```
"SCHEMA1"."TABLE NAME1"  
"SCHEMA NAME77"."TABLE155"
```

If you do not specify the **-tf** parameter, all user tables are used.

If you specify this parameter with the **COPY** action, you must also specify the **-co "MODE" LOAD_ONLY** *copy_option* parameter, and only those tables that you specify in the file are repopulated in the target database. In the file, you should list the table names with their schema qualifier in the format "*schema*".*table*".

-io import_option

Specifies options for the **IMPORT** action. Valid options are **INSERT**, **INSERT_UPDATE**, **REPLACE**, **CREATE**, and **REPLACE_CREATE**. The default is **REPLACE_CREATE**. For limitations of the import create function, see "IMPORT command options **CREATE** and **REPLACE_CREATE** are deprecated".

-lo load_option

Specifies options for the **LOAD** action. Valid options are **INSERT** and **REPLACE**. The default is **INSERT**.

-co Specifies options for the **COPY** action.

"TARGET_DB db name [USER userid USING password]"

Specifies the name of the target database, user ID, and password. (The source database user id and password can be specified using the existing **-p** and **-u** options). The **USER USING** clause is optional. If **USER** specifies a user id, then the password must either be supplied following the **USING** clause, or if it is not specified, then **db2move** will prompt for the password information. The reason for prompting is for security reasons discussed in the following section. **TARGET_DB** is a mandatory option for the **COPY** action. The **TARGET_DB** cannot be the same as the source database and must be a local database. The **ADMIN_COPY_SCHEMA** procedure can be used for copying schemas within the same database. The **COPY** action requires inputting at least one schema (**-sn**) or one table (**-tn** or **-tf**).

Running multiple **db2move** commands to copy schemas from one database to another will result in deadlocks. Only one **db2move** command should be issued at a time. Changes to tables in the source schema during copy processing may mean that the data in the target schema is not identical following a copy.

"MODE"

This option is optional.

DDL_AND_LOAD

Creates all supported objects from the source schema, and populates the tables with the source table data. This is the default option.

DDL_ONLY

Creates all supported objects from the source schema, but does not repopulate the tables.

LOAD_ONLY

Loads all specified tables from the source database to the target database. The tables must already exist on the target. The **LOAD_ONLY** mode requires inputting at least one table using the **-tn** or **-tf** option.

This is an optional option that is only used with the COPY action.

"SCHEMA_MAP"

Renames a schema when copying to a target. This option is optional.

To use this option, provide a list of the source-target schema mappings, separated by commas, surrounded by parentheses, for example, schema_map ((s1, t1), (s2, t2)). In this case, objects from schema s1 are copied to schema t1 on the target, and objects from schema s2 are copied to schema t2 on the target. The default and recommended target schema name is the source schema name. The reason is that the **db2move** command does not attempt to modify the schema of any qualified objects within object bodies. Therefore, using a different target schema name might lead to problems if there are qualified objects within the object body.

Consider the following example, which creates a view called v1:create view FOO.v1 as 'select c1 from FOO.t1'

In this case, copy of schema FOO to BAR, v1 will be regenerated as:create view BAR.v1 as 'select c1 from FOO.t1'

This will either fail since schema FOO does not exist on the target database, or have an unexpected result due to FOO being different than BAR. Maintaining the same schema name as the source will avoid these issues. If there are cross dependencies between schemas, all inter-dependent schemas must be copied or there may be errors copying the objects with the cross dependencies.

For example:create view FOO.v1 as 'select c1 from BAR.t1'

In this case, the copy of v1 will either fail if BAR is not copied as well, or have an unexpected result if BAR on the target is different than BAR from the source. **db2move** will not attempt to detect cross schema dependencies.

This is an optional option that is only used with the COPY action.

If a target schema already exists, the utility will fail. Use the ADMIN_DROP_SCHEMA procedure to drop the schema and all objects associated with that schema.

"NONRECOVERABLE"

This option allows the user to override the default behavior of the load to be done with COPY-NO. With the default behavior, the user will be forced to take backups of each table space that was loaded into. When specifying this **NONRECOVERABLE** keyword, the user will not be forced to take backups of the table spaces immediately. It is, however, highly recommended that the backups be taken as soon as possible to ensure the newly created tables will be properly recoverable. This is an optional option available to the COPY action.

"OWNER"

Allows the user to change the owner of each new object created in the target schema after a successful COPY. The default owner of the target objects will be the connect user; if this option is specified, ownership will be transferred to the new owner. This is an optional option available to the COPY action.

"TABLESPACE_MAP"

The user may specify table space name mappings to be used instead of the table spaces from the source system during a copy. This will be an array of table space mappings surrounded by brackets. For example, `tablespace_map ((TS1, TS2), (TS3, TS4))`. This would mean that all objects from table space TS1 will be copied into table space TS2 on the target database and objects from table space TS3 will be copied into table space TS4 on the target. In the case of `((T1, T2), (T2, T3))`, all objects found in T1 on the source database will be re-created in T2 on the target database and any objects found in T2 on the source database will be re-created in T3 on the target database. The default is to use the same table space name as from the source, in which case, the input mapping for this table space is not necessary. If the specified table space does not exist, the copy of the objects using that table space will fail and be logged in the error file.

The user also has the option of using the `SYS_ANY` keyword to indicate that the target table space should be chosen using the default table space selection algorithm. In this case, `db2move` will be able to choose any available table space to be used as the target. The `SYS_ANY` keyword can be used for all table spaces, example: `tablespace_map SYS_ANY`. In addition, the user can specify specific mappings for some table spaces, and the default table space selection algorithm for the remaining. For example, `tablespace_map ((TS1, TS2), (TS3, TS4), SYS_ANY)`. This indicates that table space TS1 is mapped to TS2, TS3 is mapped to TS4, but the remaining table spaces will be using a default table space target. The `SYS_ANY` keyword is being used since it's not possible to have a table space starting with "SYS".

This is an optional option available to the COPY action.

"PARALLEL" *number_of_threads*

Specify this option to have the load operations for the tables in the schema(s) spread across a number of threads. The value range for *number_of_threads* is 0-16

- If PARALLEL is not specified, no threads are used and the load operations are performed serially.
- If PARALLEL is specified without a number of threads, the `db2move` utility will choose an appropriate value.
- If PARALLEL is specified and *number_of_threads* is provided, the specified number of threads is used. If *number_of_threads* is 0 or 1, the load operation is performed serially.
- The maximum value that can be specified for *number_of_threads* is 16.

This is an optional option available to the COPY action.

-l *lobpaths*

For IMPORT and EXPORT, if this option is specified, it will be also used for XML paths. The default is the current directory.

This option specifies the absolute path names where LOB or XML files are created (as part of EXPORT) or searched for (as part of IMPORT or LOAD). When specifying multiple paths, each must be separated by commas; no blanks are allowed between paths. If multiple paths are specified, EXPORT will use them in round-robin fashion. It will write one LOB document to

the first path, one to the second path, and so on up to the last, then back to the first path. The same is true for XML documents. If files are not found in the first path (during IMPORT or LOAD), the second path will be used, and so on.

-u *userid*

The default is the logged on user ID.

Both user ID and password are optional. However, if one is specified, the other must be specified. If the command is run on a client connecting to a remote server, user ID and password should be specified.

-p *password*

The default is the logged on password. Both user ID and password are optional. However, if one is specified, the other must be specified. When the **-p** option is specified, but the password not supplied, **db2move** will prompt for the password. This is done for security reasons. Inputting the password through command line creates security issues. For example, a **ps -ef** command would display the password. If, however, **db2move** is invoked through a script, then the passwords will have to be supplied. If the command is issued on a client connecting to a remote server, user ID and password should be specified.

-aw

Allow Warnings. When **-aw** is not specified, tables that experience warnings during export are not included in the **db2move.1st** file (although that table's .ixf file and .msg file are still generated). In some scenarios (such as data truncation) the user might want to allow such tables to be included in the **db2move.1st** file. Specifying this option allows tables which receive warnings during export to be included in the **.1st** file.

Examples

- To export all tables in the SAMPLE database (using default values for all options), issue:

```
db2move sample export
```

- To export all tables created by *userid1* or user IDs LIKE *us%rid2*, and with the name *tbname1* or table names LIKE *%tbname2*, issue:

```
db2move sample export -tc userid1,us*rid2 -tn tbname1,*tbname2
```

- To import all tables in the SAMPLE database (LOB paths D:\LOBPATH1 and C:\LOBPATH2 are to be searched for LOB files; this example is applicable to Windows operating systems only), issue:

```
db2move sample import -l D:\LOBPATH1,C:\LOBPATH2
```

- To load all tables in the SAMPLE database (/home/userid/lobpath subdirectory and the tmp subdirectory are to be searched for LOB files; this example is applicable to Linux and UNIX systems only), issue:

```
db2move sample load -l /home/userid/lobpath,/tmp
```

- To import all tables in the SAMPLE database in REPLACE mode using the specified user ID and password, issue:

```
db2move sample import -io replace -u userid -p password
```

- To duplicate schema *schema1* from source database *dbsrc* to target database *dbtgt*, issue:

```
db2move dbsrc COPY -sn schema1 -co TARGET_DB dbtgt USER myuser1 USING mypass1
```

- To duplicate schema *schema1* from source database *dbsrc* to target database *dbtgt*, rename the schema to *newschema1* on the target, and map source table space *ts1* to *ts2* on the target, issue:

```
db2move dbsrc COPY -sn schema1 -co TARGET_DB dbtgt USER myuser1 USING mypass1  
SCHEMA_MAP ((schema1,newschema1)) TABLESPACE_MAP ((ts1,ts2), SYS_ANY))
```

Usage notes

- When copying one or more schemas into a target database the schemas must be independent of each other. If not, some of the objects might not be copied successfully into the target database
- Loading data into tables containing XML columns is only supported for the **LOAD** and not for the **COPY** action. The workaround is to manually issue the **IMPORT** or **EXPORT** commands, or use the **db2move Export** and **db2move Import** behaviour. If these tables also contain GENERATED ALWAYS identity columns, data cannot be imported into the tables.
- A **db2move EXPORT**, followed by a **db2move IMPORT** or **db2move LOAD**, facilitates the movement of table data. It is necessary to manually move all other database objects associated with the tables (such as aliases, views, or triggers) as well as objects that these tables may depend on (such as user-defined types or user-defined functions).
- If the **IMPORT** action with the **CREATE** or **REPLACE_CREATE** option is used to create the tables on the target database (both options are deprecated and may be removed in a future release), then the limitations outlined in “Imported table re-creation” are imposed. If unexpected errors are encountered during the **db2move** import phase when the **REPLACE_CREATE** option is used, examine the appropriate tabnnn.msg message file and consider whether the errors might be the result of the limitations on table creation.
- Tables that contain GENERATED ALWAYS identity columns cannot be imported or loaded using **db2move**. You can, however, manually import or load these tables. For more information, see “Identity column load considerations” or “Identity column import considerations”.
- When export, import, or load APIs are called by **db2move**, the **FileTypeMod** parameter is set to **lobsinfile**. That is, LOB data is kept in files that are separate from the PC/IXF file, for every table.
- The **LOAD** command must be run locally on the machine where the database and the data file reside.
- When using **db2move LOAD** and **logarchmeth1** is enabled for the database (the database is recoverable):
 - If the **NONRECOVERABLE** option is not specified, then **db2move** will invoke the db2Load API using the default **COPY NO** option, and the table spaces where the loaded tables reside are placed in the Backup Pending state upon completion of the utility (a full database or table space backup is required to take the table spaces out of the Backup Pending state).
 - If the **NONRECOVERABLE** option is specified, the table spaces are not placed in backup-pending state, however if rollforward recovery is performed later, the table is marked inaccessible and it must be dropped. For more information aboutLoad recoverability options, see “Options for improving load performance”.
- Performance for the **db2move** command with the **IMPORT** or **LOAD** actions can be improved by altering the default buffer pool, IBMDEFAULTBP, and by updating the configuration parameters **sortheap**, **util_heap_sz**, **logfilsiz**, and **logprimary**.
- When running data movement utilities such as **export** and **db2move**, the query compiler might determine that the underlying query will run more efficiently against an MQT than the base table or tables. In this case, the query will execute

against a refresh deferred MQT, and the result of the utilities might not accurately represent the data in the underlying table.

- The **db2move** command is not available with Db2 clients. If you issue the **db2move** command from a client machine, you will receive a **db2move** is not recognized as an internal or external command, operable program or batch file error message. To avoid this issue, you can issue the **db2move** command directly on the server.
- The **db2move COPY** command and the **ADMIN_COPY_SCHEMA** procedure perform similar tasks. The **ADMIN_COPY_SCHEMA** procedure copies schemas within the same database, and the **db2copy COPY** command copies from one database to another. Many of the usage notes, behaviors, and restrictions that are covered in **ADMIN_COPY_SCHEMA** procedure - Copy a specific schema and its objects, also apply to the **db2copy COPY** command.
- Row and Column Access Control (RCAC) applies for any SQL access to tables protected with row permissions and column masks. RCAC includes SQL in applications and utilities like **IMPORT** and **EXPORT**. For example, when exporting data from a table that is protected with row permissions and column masks that use the **EXPORT** utility, only the data that you are authorized to access are exported. If your intent is to export the full content of the table, you need to make sure the SECADM grants you the proper authorization.

Files Required/Generated When Using EXPORT

- Input: None.
- Output:

EXPORT.out

The summarized result of the EXPORT action.

db2move.lst

The list of original table names, their corresponding PC/IXF file names (**tabnnn.ixf**), and message file names (**tabnnn.msg**). This list, the exported PC/IXF files, and LOB files (**tabnnnc.yyy**) are used as input to the **db2move IMPORT** or **LOAD** action.

tabnnn.ixf

The exported PC/IXF file of a specific table.

tabnnn.msg

The export message file of the corresponding table.

tabnnnc.yyy

The exported LOB files of a specific table.

nnn is the table number. *c* is a letter of the alphabet. *yyy* is a number ranging from 001 to 999.

These files are created only if the table being exported contains LOB data. If created, these LOB files are placed in the *lobpath* directories. There are a total of 26,000 possible names for the LOB files.

system.msg

The message file containing system messages for creating or deleting file or directory commands. This is only used if the action is **EXPORT**, and a LOB path is specified.

Files Required/Generated When Using IMPORT

- Input:

db2move.lst

An output file from the EXPORT action.

tabnnn.ixf

An output file from the EXPORT action.

tabnnnc.yyy

An output file from the EXPORT action.

- Output:

IMPORT.out

The summarized result of the IMPORT action.

tabnnn.msg

The import message file of the corresponding table.

Files Required/Generated When Using LOAD

- Input:

db2move.lst

An output file from the EXPORT action.

tabnnn.ixf

An output file from the EXPORT action.

tabnnnc.yyy

An output file from the EXPORT action.

- Output:

LOAD.out

The summarized result of the LOAD action.

tabnnn.msg

The LOAD message file of the corresponding table.

Files Required/Generated When Using COPY

- Input: None

- Output:

COPYSHEMA.msg

An output file containing messages generated during the COPY operation.

COPYSHEMA.err

An output file containing an error message for each error encountered during the COPY operation, including DDL statements for each object which could not be re-created on the target database.

LOADTABLE.msg

An output file containing messages generated by each invocation of the Load utility (used to repopulate data on the target database).

LOADTABLE.err

An output file containing the names of tables that either encountered a failure during Load or still need to be populated on the target database. See the “Restarting a failed copy schema operation” topic for more details.

These files are timestamped and all files that are generated from one run will have the same timestamp.

db2mq1sn - MQListener

Invokes the asynchronous MQListener to monitor a set of WebSphere MQ message queues, passing messages that arrive on them to configured Db2 stored procedures. It can also perform associated administrative and configuration tasks.

MQListener configuration information is stored in a Db2 database and consists of a set of named configurations, including a default. Each configuration is composed of a set of tasks. MQListener tasks are defined by the message queue from which to retrieve messages and the stored procedure to which they will be passed. The message queue description must include the name of the message queue and its queue manager, if it is not the default. Information about the stored procedure must include the database in which it is defined, a user name and password with which to access the database, and the procedure name and schema.

On Linux and UNIX operating systems, this utility is located in the *DB2DIR*/instance directory, where *DB2DIR* is the location where the current version of the Db2 database product is installed.

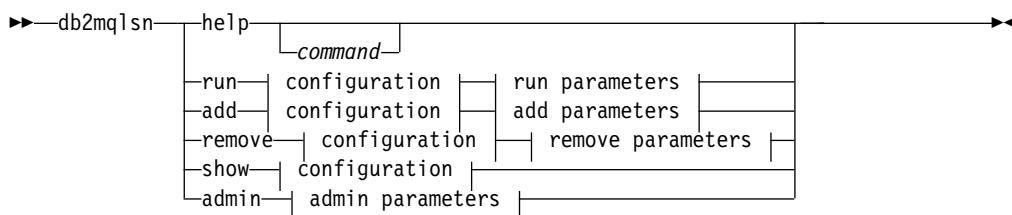
On Windows operating systems, this utility is located in the *DB2PATH*\sql1ib\bin directory, where *DB2PATH* is the location where the current version of the Db2 database product is installed.

For more information about controlling access to WebSphere MQ objects, refer to the *WebSphere MQ System Administration Guide* (SC34-6068-00).

Authorization

- All options except **db2mq1sn admin** access the MQListener configuration in the configDB database. The connection is made as configUser or, if no user is specified, an implicit connection is attempted. The user in whose name the connection is made must have EXECUTE privilege on package mqlConfig.
- To access MQ objects with the **db2mq1sn run** and **db2mq1sn admin** options, the user who executes the program must be able to open the appropriate MQ objects.
- To execute the **db2mq1sn run** option successfully, the dbUser specified in the **db2mq1sn add** option that created the task must have EXECUTE privilege on the specified stored procedure, and must have EXECUTE privilege on the package mqlRun in the dbName database.

Command syntax



configuration:

—configDB—*configuration database name*—→

```
▶ [-configUser user ID -configPwd password]
```

```
▶ [-config configuration name]
```

run parameters:

```
└─[-adminQueue admin queue name] └─[-adminQMgr admin queue manager]
```

add parameters:

```
└─[--inputQueue input queue name] └─[-queueManager queue manager name]
```

```
▶ [--procSchema stored procedure schema --procName stored procedure name]
```

```
▶ [--dbName stored procedure database] └─[-dbUser user ID -dbPwd password]
```

```
▶ └─[-mqCoordinated] └─[-numInstances number of instances to run]
```

remove parameters:

```
└─[--inputQueue input queue name] └─[-queueManager queue manager name]
```

admin parameters:

```
└─[-adminQueue admin queue name] └─[-adminQueueList namelist of admin queue names] └─[-adminQMgr admin queue manager]
```

```
▶ [-adminCommand shutdown] └─[-restart]
```

Command parameters

help command

Supplies detailed information about a particular command. If you do not give a command name, then a general help message is displayed.

-configDB configuration database

Name of the database that contains the configuration information.

-configUser user ID -configPwd password

Authorization information with which to access the configuration database.

-config configuration name

You can group individual tasks into a configuration. By doing this you can run a group of tasks together. If you do not specify a configuration name, then the utility runs the default configuration.

run

-adminQueue admin queue name -adminQMgr admin queue manager

This is the queue on which the MQListener listens for

administration commands. If you do not specify a queue manager, then the utility uses the configured default queue manager. If you do not specify an adminQueue, then the application does not receive any administration commands (such as **shutdown** or **restart**) through the message queue.

add

-inputQueue *input queue name* -queueManager *queue manager name*

This is the queue on which the MQListener listens for messages for this task. If you do not specify a queue manager, the utility uses the default queue manager configured in WebSphere MQ.

-procSchema *stored procedure schema* -procName *stored procedure name*

The stored procedure to which MQListener passes the message when it arrives.

-dbName *stored procedure database*

MQListener passes the message to a stored procedure. This is the database in which the stored procedure is defined.

-dbUser *user ID* -dbPwd *password*

The user on whose behalf the stored procedure is invoked.

-mqCoordinated

This indicates that reading and writing to the WebSphere MQ message queue should be integrated into a transaction together with the Db2 stored procedure call. The entire transaction is coordinated by the WebSphere MQ coordinator. (The queue manager must also be configured to coordinate a transaction in this way. See the WebSphere MQ documentation for more information.) By default, the message queue operations are not part of the transaction in which the stored procedure is invoked.

-numInstances *number of instances to run*

The number of duplicate instances of this task to run in this configuration. If you do not specify a value, then only one instance is run.

remove

-inputQueue *input queue name* -queueManager *queue manager name*

This is the queue and queue manager that define the task that will be removed from the configuration. The combination of input queue and queue manager is unique within a configuration.

admin

-adminQueue *admin queue name* -adminQueueList *namelist of admin queue names* -adminQMgr *admin queue manager*

The queue or namelist of queue names on which to send the admin command. If you do not specify a queue manager, the utility uses the default queue manager that is configured in WebSphere MQ.

-adminCommand *admin command*

Submits a command. The command can be either **shutdown** or **restart**. **shutdown** causes a running MQListener to exit when the listener finishes processing the current message. **restart** performs a shutdown, and then reads the configuration again and restarts.

Examples

```
db2mq1sn show -configDB sampleDB -config nightlies  
db2mq1sn add -configDB sampleDB -config nightlies -inputQueue app3  
-procSchema imauser -procName proc3 -dbName aDB -dbUser imauser -dbPwd aSecret  
db2mq1sn run -configDB -config nightlies
```

db2mscs - Set up Windows failover utility

Creates the infrastructure for Db2 failover support on Windows using Microsoft Cluster Server (MSCS). This utility can be used to enable failover in both single-partition and partitioned database environments.

Authorization

The user must be logged on to a domain user account that belongs to the Administrators group of each machine in the MSCS cluster.

Command syntax

```
>>db2mscs [-f input_file] [-l user_name] [-p password] >>
```

Command parameters

-f *input_file*

Specifies the input file to be used by the MSCS utility. If this parameter is specified, **db2mscs** utility will use filename as the input file, if this parameter is not specified, the **db2mscs** utility will try to use the DB2MSCS.CFG file that is in the current directory.

-u *instance_name*

This option allows you to undo the **db2mscs** operation and revert the instance back to the non-MSCS instance specified by *instance_name*.

-l *user_name*

Specifies the user name of the domain account for the Db2 service. If you specify this parameter and the **DB2_LOGON_USERNAME** parameter in the DB2MSCS.CFG file is already specified, the value for the **DB2_LOGON_USERNAME** parameter is ignored. If neither of the parameters are specified, the Db2 service is created under the local administrator account on the remote machine.

If you are concerned about security, use the **-l** parameter. Do not specify the **DB2_LOGON_USERNAME** parameter.

-p *password*

Specifies the password of the domain account for the Db2 service. If you specify this parameter and the **DB2_LOGON_PASSWORD** parameter in the DB2MSCS.CFG file is already specified, the value for the **DB2_LOGON_PASSWORD** parameter is ignored. If neither of the parameters are specified, you will be prompted for a password.

If you are concerned about security, use the **-p** parameter. Do not specify the **DB2_LOGON_PASSWORD** parameter.

Usage notes

The **db2mscs** utility is a stand-alone command line utility used to transform a non-MSCS instance into an MSCS instance. The utility will create all MSCS groups, resources, and resource dependencies. It will also copy all Db2 information stored in the Windows registry to the cluster portion of the registry as well as moving the instance directory to a shared cluster disk. The **db2mscs** utility takes as input a configuration file provided by the user specifying how the cluster should be set up. The DB2MSCS.CFG file is an ASCII text file that contains parameters that are read by the **db2mscs** utility. You specify each input parameter on a separate line using the following format: *PARAMETER_KEYWORD=parameter_value*. For example:

```
CLUSTER_NAME=FINANCE  
GROUP_NAME=DB2 Group  
IP_ADDRESS=9.21.22.89
```

Two example configuration files can be found in the CFG subdirectory under the Db2 database product installation directory. The first, DB2MSCS.EE, is an example for single-partition database environments. The second, DB2MSCS.EEE, is an example for partitioned database environments.

The parameters for the DB2MSCS.CFG file are as follows:

DB2_INSTANCE

The name of the Db2 instance. This parameter has a global scope and should be specified only once in the DB2MSCS.CFG file. It is required that **DB2_INSTANCE** must be stopped before running **db2mscs**. The maximum length for this parameter is 8 bytes.

DAS_INSTANCE

The name of the Db2 Admin Server instance. Specify this parameter to migrate the Db2 Admin Server to run in the MSCS environment. This parameter has a global scope and should be specified only once in the DB2MSCS.CFG file. The maximum length for this parameter is 8 bytes.

CLUSTER_NAME

The name of the MSCS cluster. All the resources specified following this line are created in this cluster until another **CLUSTER_NAME** parameter is specified. The maximum length for this parameter is 15 bytes.

DB2_LOGON_USERNAME

The user name of the domain account for the Db2 service (specified as *domain\user*). This parameter has a global scope and should be specified only once in the DB2MSCS.CFG file. If this parameter is not specified, the Db2 service will be created under the local administrator account on the remote machine. The maximum length for this parameter is 256 bytes.

DB2_LOGON_PASSWORD

The password of the domain account for the Db2 service. This parameter has a global scope and should be specified only once in the DB2MSCS.CFG file. If **DB2_LOGON_USERNAME** is specified and **DB2_LOGON_PASSWORD** is not specified, you will be prompted for a password. The maximum length for this parameter is 256 bytes.

GROUP_NAME

The name of the MSCS group. If this parameter is specified, a new MSCS group is created if it does not exist. If the group already exists, it is used as the target group. Any MSCS resource specified after this parameter is created in this group or moved into this group until another **GROUP_NAME** parameter is

specified. Specify this parameter once for each group. A MSCS group can be created within a MSCS Cluster. The maximum length for this parameter is 15 bytes.

DB2_NODE

The database partition number of the database partition server (or database partition) to be included in the current MSCS group. If multiple logical database partitions exist on the same machine, each database partition requires a separate **DB2_NODE** parameter. Specify this parameter after the **GROUP_NAME** parameter so that the Db2 resources are created in the correct MSCS group. The maximum length for this parameter is 15 bytes.

IP_NAME

The name of the IP Address resource. The value for the **IP_NAME** is arbitrary, but it must be unique in the cluster. When this parameter is specified, an MSCS resource of type IP Address is created. This parameter is required for remote TCP/IP connections. This parameter is optional in a single partition database environment. A recommended name is the hostname that corresponds to the IP address. The maximum length for this parameter is 256 bytes.

IP_ADDRESS

The TCP/IP address for the IP resource specified by the preceding **IP_NAME** parameter. This parameter is required if the **IP_NAME** parameter is specified. This is a new IP address that is not used by any machine in the network. The maximum length for this parameter is 15 bytes.

IP_SUBNET

The TCP/IP subnet mask for the IP resource specified by the preceding **IP_NAME** parameter. This parameter is required if the **IP_NAME** parameter is specified. The maximum length for this parameter is 15 bytes.

IP_NETWORK

The name of the MSCS network to which the preceding IP Address resource belongs. This parameter is optional. If it is not specified, the first MSCS network detected by the system is used. The name of the MSCS network must be entered exactly as seen under the Networks branch in Cluster Administrator. The previous four IP keywords are used to create an IP Address resource. The maximum length for this parameter is 256 bytes.

NETNAME_NAME

The name of the Network Name resource. Specify this parameter to create the Network Name resource. You must specify this parameter for the instance owning machine, on which Db2 instance directory resides. The maximum length for this parameter is 256 bytes.

NETNAME_VALUE

The value for the Network Name resource. This parameter must be specified if the **NETNAME_NAME** parameter is specified. The maximum length for this parameter is 256 bytes.

NETNAME_DEPENDENCY

The name for the IP resource that the Network Name resource depends on. Each Network Name resource must have a dependency on an IP Address resource. This parameter is optional. If it is not specified, the Network Name resource has a dependency on the first IP resource in the group. The maximum length for this parameter is 256 bytes.

SERVICE_DISPLAY_NAME

The display name of the Generic Service resource. Specify this parameter if you want to create a Generic Service resource. The maximum length for this parameter is 256 bytes.

SERVICE_NAME

The service name of the Generic Service resource. This parameter must be specified if the **SERVICE_DISPLAY_NAME** parameter is specified. The maximum length for this parameter is 256 bytes.

SERVICE_STARTUP

Optional startup parameter for the Generic Resource service. The maximum length for this parameter is 256 bytes.

DISK_NAME

The name of the physical disk resource to be moved to the current group. Specify as many disk resources as you need. The disk resources must already exist. When the **db2mscs** utility configures the Db2 instance for failover support, the instance directory is copied to the first MSCS disk in the group. To specify a different MSCS disk for the instance directory, use the **INSTPROF_DISK** parameter. The disk name used should be entered exactly as seen in Cluster Administrator. The maximum length for this parameter is 256 bytes.

INSTPROF_DISK

An optional parameter to specify an MSCS disk to contain the Db2 instance directory. If this parameter is not specified the **db2mscs** utility uses the first disk that belongs to the same group. The maximum length for this parameter is 256 bytes.

INSTPROF_PATH

An optional parameter to specify the exact path where the instance directory will be copied. This parameter *must* be specified when using IPSHAdisks, a ServerRAID Netfinity disk resource (for example, **INSTPROF_PATH=p:\db2profs**). **INSTPROF_PATH** will take precedence over **INSTPROF_DISK** if both are specified. The maximum length for this parameter is 256 bytes.

TARGET_DRVMAP_DISK

An optional parameter to specify the target MSCS disk for database drive mapping for a the multi-partitioned database environment. This parameter will specify the disk the database will be created on by mapping it from the drive the create database command specifies. If this parameter is not specified, the database drive mapping must be manually registered using the **db2drvmp** utility. The maximum length for this parameter is 256 bytes.

DB2_FALLBACK

An optional parameter to control whether or not the applications should be forced off when the Db2 resource is brought offline. If not specified, then the setting for **DB2_FALLBACK** will be YES. If you do not want the applications to be forced off, then set **DB2_FALLBACK** to NO.

db2mtrk - Memory tracker

Provides complete report of memory status, for instances, databases, agents, and applications.

This command outputs the following memory pool allocation information:

- Currentsize
- Maximum size (hard limit)

- Largest size (high water mark)
- Type (identifier indicating function for which memory will be used)
- Agent who allocated pool (only if the pool is private)
- Application

The same information is also available from the Snapshot monitor.

Scope

In a partitioned database environment, this command can be invoked from any database partition defined in the db2nodes.cfg file. Apart from when instance level information is returned, the command returns information only for that database partition. This command does not return information for remote servers.

Authorization

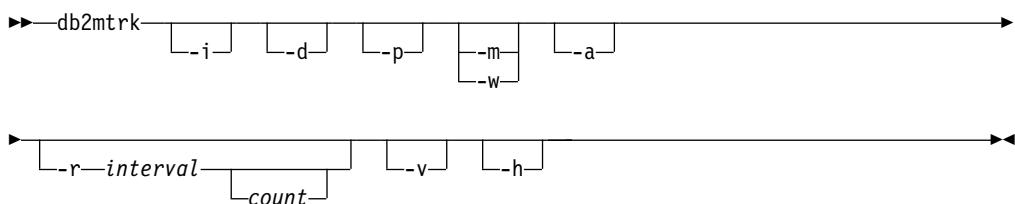
One of the following authorities:

- SYSADM
- SYSCTRL
- SYSMAINT
- SYSMON

Required Connection

Instance. The application creates a default instance attachment if one is not present.

Command Syntax



Command Parameters

- i** Show instance level memory.
- d** Show database level memory.
- a** Show application memory usage.
- p** Deprecated. Show private memory.
Replaced with **-a** parameter to show application memory usage.
- m** Show maximum values for each pool.
- w** Show high watermark values for each pool.
- r** Repeat mode
interval
Number of seconds to wait between subsequent calls to the memory tracker (in repeat mode).
- count** Number of times to repeat.

- v** Verbose output.
- h** Show help screen. If you specify **-h**, only the help screen appears. No other information is displayed.

Examples

The following call returns database and instance normal values and repeats every 10 seconds:

```
db2mtrk -i -d -v -r 10
```

Consider the following output samples:

The command db2mtrk -i -d displays the following output:

Tracking Memory on: 2006/01/17 at 15:24:38

Memory for instance

| monh | other |
|--------|-------|
| 576.0K | 8.0M |

Memory for database: AJSTORM

| utilh | pckcacheh | catcacheh | bph (1) | bph (S32K) | bph (S16K) | bph (S8K) |
|-----------|-----------|-----------|---------|------------|------------|-----------|
| 64.0K | 640.0K | 128.0K | 34.2M | 576.0K | 320.0K | 192.0K |
| bph (S4K) | shsorth | lockh | dbh | apph (13) | appshrh | |
| 128.0K | 64.0K | 9.6M | 4.8M | 64.0K | 256.0K | |

Memory for database: CMGARCIA

| utilh | pckcacheh | catcacheh | bph (1) | bph (S32K) | bph (S16K) | bph (S8K) |
|-----------|-----------|-----------|---------|------------|------------|-----------|
| 64.0K | 640.0K | 128.0K | 34.2M | 576.0K | 320.0K | 192.0K |
| bph (S4K) | shsorth | lockh | dbh | apph (26) | appshrh | |
| 128.0K | 64.0K | 9.6M | 4.8M | 64.0K | 256.0K | |

The command db2mtrk -a -i -d displays the following output:

Tracking Memory on: 2007/01/15 at 11:30:38

Memory for instance

| other | monh | fcmfp |
|-------|-------|--------|
| 11.5M | 64.0K | 640.0K |

Memory for database: SAMPLE

| utilh | pckcacheh | other | catcacheh | bph (1) | bph (S32K) | bph (S16K) |
|-----------|-----------|----------|-----------|---------|------------|------------|
| 64.0K | 1.0M | 576.0K | 448.0K | 1.3M | 832.0K | 576.0K |
| bph (S8K) | bph (S4K) | shsorth | lockh | dbh | apph (12) | apph (11) |
| 448.0K | 384.0K | 192.0K | 320.0K | 10.4M | 64.0K | 64.0K |
| apph (10) | apph (9) | apph (8) | | | | |
| 64.0K | 64.0K | 64.0K | | | | |

Application Memory for database: SAMPLE

| appshrh |
|---------|
| 256.0K |

Memory for application 11

| apph | other |
|------|-------|
|------|-------|

```
64.0K    64.0K

Memory for application 10

apph      other
64.0K    64.0K

Memory for application 9

apph      other
64.0K    64.0K

Memory for application 8

apph      other
64.0K    448.0K
```

The command db2mtrk -a -v -i -d displays the following output:
Tracking Memory on: 2007/01/15 at 11:22:56

Memory for instance

```
Other Memory is of size 12058624 bytes
Database Monitor Heap is of size 65536 bytes
FCMBP Heap is of size 655360 bytes
Total: 12779520 bytes
```

Memory for database: SAMPLE

```
Backup/Restore/Util Heap is of size 65536 bytes
Package Cache is of size 1048576 bytes
Other Memory is of size 589824 bytes
Catalog Cache Heap is of size 458752 bytes
Buffer Pool Heap (1) is of size 1376256 bytes
Buffer Pool Heap (System 32k buffer pool) is of size 851968 bytes
Buffer Pool Heap (System 16k buffer pool) is of size 589824 bytes
Buffer Pool Heap (System 8k buffer pool) is of size 458752 bytes
Buffer Pool Heap (System 4k buffer pool) is of size 393216 bytes
Shared Sort Heap is of size 196608 bytes
Lock Manager Heap is of size 327680 bytes
Database Heap is of size 10944512 bytes
Application Heap (12) is of size 65536 bytes
Application Heap (11) is of size 65536 bytes
Application Heap (10) is of size 65536 bytes
Application Heap (9) is of size 65536 bytes
Application Heap (8) is of size 65536 bytes
Applications Shared Heap is of size 524288 bytes
Total: 18153472 bytes
```

Application Memory for database: SAMPLE

```
Applications Shared Heap is of size 524288 bytes
Total: 524288 bytes
```

Memory for application 11

```
Application Heap is of size 65536 bytes
Other Memory is of size 65536 bytes
Total: 131072 bytes
```

Memory for application 10

```
Application Heap is of size 65536 bytes
Other Memory is of size 65536 bytes
Total: 131072 bytes
```

```

Memory for application 9

Application Heap is of size 65536 bytes
Other Memory is of size 65536 bytes
Total: 131072 bytes

Memory for application 8

Application Heap is of size 65536 bytes
Other Memory is of size 458752 bytes
Total: 524288 bytes

Total: 1441792 bytes

```

Usage notes

Note:

1. When no flags are specified, usage is returned.
2. One of the **-d**, **-h**, **-i**, **-p** or **-a** flag must be specified.
3. When the **-p** parameter is specified, detailed private memory usage information is returned, grouped by agent ID.
4. When the **-a** parameter is specified, detailed application memory usage information is returned, grouped by application ID.
5. The "Other Memory" reported is the memory associated with the usage of operating the database management system.
6. In some cases (such as the package cache) the maximum size displayed will be larger than the value assigned to the configuration parameter. In such cases, the value assigned to the configuration parameter is used as a 'soft limit', and the pool's actual memory usage might grow beyond the configured size.
7. For the buffer pool heaps, the number specified in the parentheses is either the buffer pool ID, or indicates that this buffer pool is one of the system buffer pools.
8. For application heaps, the number specified in parentheses is the application ID.
9. The maximum size that the memory tracker reports for some heaps is the amount of physical memory on the machine. These heaps are called unbounded heaps and are declared with an unlimited maximum size because when the heaps are declared, it is not clear how much memory they will require at peak times. Although these heaps are not strictly bounded by the physical memory on the machine, they are reported as the maximum size because it is a reasonable approximation.
10. The bufferpool heaps are always fully allocated so the memory tracker will report the same values for the current and maximum sizes of these heaps. If a bufferpool size is set to automatic then the current and maximum size of the bufferpool heap will be adjusted over time based on workload and available memory.

db2nchg - Change database partition server configuration

Modifies database partition server configuration. This includes moving the database partition server from one machine to another; changing the TCP/IP host name of the machine; and selecting a different logical port number or a different network name for the database partition server.

This command can only be used if the database partition server is stopped.

This command is available on Windows operating systems only.

Authorization

Local Administrator

Command syntax

```
►—db2nchg—/n:—dbpartitionnum—  
          └/i:—instance_name—→  
→└/u:—username,password—┘ └/p:—logical_port—┘ └/h:—host_name—→  
→└/m:—machine_name—┘ └/g:—network_name—→
```

Command parameters

/n:dbpartitionnum

Specifies the database partition number of the database partition server's configuration that is to be changed.

/i:instance_name

Specifies the instance in which this database partition server participates. If a parameter is not specified, the default is the current instance.

/u:username,password

Specifies the user name and password. If a parameter is not specified, the existing user name and password will apply.

/p:logical_port

Specifies the logical port for the database partition server. This parameter must be specified to move the database partition server to a different machine. If a parameter is not specified, the logical port number will remain unchanged.

/h:host_name

Specifies TCP/IP host name used by FCM for internal communications. If this parameter is not specified, the host name will remain the same.

/m:machine_name

Specifies the machine where the database partition server will reside. The database partition server can only be moved if there are no existing databases in the instance.

/g:network_name

Changes the network name for the database partition server. This parameter can be used to apply a specific IP address to the database partition server when there are multiple IP addresses on a machine. The network name or the IP address can be entered.

Examples

To change the logical port assigned to database partition 2, which participates in the instance TESTMPP, to logical port 3, enter the following command:

```
db2nchg /n:2 /i:TESTMPP /p:3
```

db2ncrt - Add database partition server to an instance

Adds a database partition server to an instance.

This command is available on Windows operating systems only.

Scope

If a database partition server is added to a computer where an instance already exists, a database partition server is added as a logical database partition server to the computer. If a database partition server is added to a computer where an instance does not exist, the instance is added and the computer becomes a new physical database partition server. This command should not be used if there are databases in an instance. Instead, the **START DATABASE MANAGER** command should be issued with the **ADD DBPARTITIONNUM** option. This ensures that the database is correctly added to the new database partition server. It is also possible to add a database partition server to an instance in which a database has been created. The db2nodes.cfg file should not be edited since changing the file might cause inconsistencies in the partitioned database environment.

Authorization

Local Administrator authority on the computer where the new database partition server is added.

Command syntax

```
►—db2ncrt—/n:—dbpartitionnum—/u:—username,password—————→  
►—————/i:—instance_name—————/m:—machine_name—————/p:—logical_port—————→  
►—————/h:—host_name—————/g:—network_name—————/o:—instance_owning_machine—————→
```

Command parameters

/n:dbpartitionnum

A unique database partition number which identifies the database partition server. The number entered can range from 1 to 999.

/u:username,password

Specifies the logon account name and password for Db2.

/i:instance_name

Specifies the instance name. If a parameter is not specified, the default is the current instance.

/m:machine_name

Specifies the computer name of the Windows workstation on which the database partition server resides. This parameter is required if a database partition server is added on a remote computer.

/p:logical_port

Specifies the logical port number used for the database partition server. If this parameter is not specified, the logical port number assigned will be 0.

When creating a logical database partition server, this parameter must be specified and a logical port number that is not in use must be selected. Note the following restrictions:

- Every computer must have a database partition server that has a logical port 0.
- The port number cannot exceed the port range reserved for FCM communications in the `x:\winnt\system32\drivers\etc\` directory. For example, if a range of 4 ports is reserved for the current instance, then the maximum port number is 3. Port 0 is used for the default logical database partition server.

/h:*host_name*

Specifies the TCP/IP host name that is used by FCM for internal communications. This parameter is required when the database partition server is being added on a remote computer.

/g:*network_name*

Specifies the network name for the database partition server. If a parameter is not specified, the first IP address detected on the system will be used. This parameter can be used to apply a specific IP address to the database partition server when there are multiple IP addresses on a computer. The network name or the IP address can be entered.

/o:*instance_owning_machine*

Specifies the computer name of the instance-owning computer. The default is the local computer. This parameter is required when the **db2ncrt** command is invoked on any computer that is not the instance-owning computer.

Usage notes

db2ncrt command can be executed only on a partitioned database instance.

Examples

To add a new database partition server to the instance TESTMPP on the instance-owning computer SHAYER, where the new database partition server is known as database partition 2 and uses logical port 1, enter the following command:

```
db2ncrt /n:2 /u:QBPAULZ\paulz,g1reeky /i:TESTMPP /m:TEST /p:1 /o:SHAYER /h:TEST
```

db2ndrop - Drop database partition server from an instance

Drops a database partition server from an instance that has no databases. If a database partition server is dropped, its database partition number can be reused for a new database partition server.

This command can only be used if the database partition server is stopped.

This command is available on Windows operating systems only.

Authorization

Local Administrator authority on the machine where the database partition server is being dropped.

Command syntax

```
►—db2ndrop—/n:—dbpartitionnum—  
                  |—/i:—instance_name—|————►
```

Command parameters

/n:*dbpartitionnum*

A unique database partition number which identifies the database partition server.

/i:*instance_name*

Specifies the instance name. If a parameter is not specified, the default is the current instance.

Examples

```
db2ndrop /n:2 /i=KMASCI
```

Usage notes

If the instance-owning database partition server (dbpartitionnum 0) is dropped from the instance, the instance becomes unusable. To drop the instance, use the **db2idrop** command.

This command should not be used if there are databases in this instance. Instead, the **db2stop drop dbpartitionnum** command should be used. This ensures that the database partition server is correctly removed from the partition database environment. It is also possible to drop a database partition server in an instance where a database exists. The **db2nodes.cfg** file should not be edited since changing the file might cause inconsistencies in the partitioned database environment.

To drop a database partition server that is assigned to the logical port 0 from a machine that is running multiple logical database partition servers, all other database partition servers assigned to the other logical ports must be dropped first. Each database partition server must have a database partition server assigned to logical port 0.

db2nrcfg - Non-root install configuration tool

Configuration tool used for non-root installations of Db2.

Authorization

Non-root ID who owns the non-root installation.

Required Connection

None

Command syntax

```
►—db2nrcfg—  
                  |—a:—AuthType—| —d—| —p:—PortName—| —s:—InstType—|————►
```

```

    ➤ [ -j "TEXT_SEARCH" [,portnumber] ] [ -h ] [ -? ]
  
```

Command parameters

- a *AuthType***
Sets the authentication type (SERVER, CLIENT, or SERVER_ENCRYPT) for the instance.
- d** Turns debug mode ON.
- p *PortName***
Sets the port name or port number to be used by this instance.
- s *InstType***
Sets the type of instance to be created (wse, ese, or client).
- j "TEXT_SEARCH"**
Configures the Db2 Text Search server using generated default values for service name and TCP/IP port number. This parameter cannot be used if the instance type is client.
- j "TEXT_SEARCH, *portnumber*"**
Configures the Db2 Text Search server using a default service name and the provided port number. Valid port numbers must be within the 1024 - 65535 range.
- h | -?**
Displays help information.

Usage notes

This command is automatically run by Db2 installer during non-root installation.

The **db2icrt**, **db2iupdt**, and **db2iupgrade** commands, that are available for root install, are not available in non-root install.

db2nrupdt - Non-root-installed instance update

Update tool used for instances created by non-root installations of Db2.

Authorization

Non-root ID who owns the non-root installation.

Required Connection

None

Command syntax

```

    ➤ db2nrupdt [ -a AuthType ] [ -d ] [ -k ] [ -j "TEXT_SEARCH" [,portnumber] ] [ -h ] [ -? ]
  
```

Command parameters

-a *AuthType*

Sets the authentication type (SERVER, CLIENT, or SERVER_ENCRYPT) for the instance.

-d

Turns debug mode ON.

-k

Keeps the current instance type during the update.

-j "TEXT_SEARCH"

Configures the Db2 Text Search server using generated default values for service name and TCP/IP port number. This parameter cannot be used if the instance type is client.

-j "TEXT_SEARCH, portnumber"

Configures the Db2 Text Search server using a default service name and the provided port number. Valid port numbers must be within the 1024 - 65535 range.

-h | -?

Displays help information.

Usage notes

The **db2icrt**, **db2iupd**, and **db2iupgrade** commands, that are used by root install, are not available for a non-root install in a thin server instance environment.

db2nrupgrade - Upgrade non-root instance

Upgrades a non-root instance from a previous version of the Db2 database system to the current version of the Db2 copy from where you are running the **db2nrupgrade** command.

This command is only available on Linux and UNIX operating systems.

This command is located in the *DB2DIR/instance* directory, where *DB2DIR* represents the installation location where the new release of the Db2 database system is installed. This command does not support instance upgrade for a root installation.

Authorization

Non-root ID who owns the non-root installation copy.

Command syntax

```
→ db2nrupgrade [ -d ] [ -a AuthType ] [ -b backup_dir ] [ -j "TEXT_SEARCH" [ ,portnumber ] ] [ -h | -? ] →
```

Command parameters

-d

Turns on debug mode. Use this option only when instructed by Db2 Support.

-a *AuthType*

Specifies the authentication type (SERVER, CLIENT, or SERVER_ENCRYPT) for the instance. The default is SERVER.

-b *backup_dir*

This parameter is mandatory. Specifies the directory where the configuration files from the old Db2 version are stored. The backup directory is in the **db2setup** log in the format of `sql1ib_vVR` where *V* is the version number and *R* is the release number of the old copy. For example, if you have V9.5 installed and then install V9.7 using the **db2setup** command, you can find the name of the backup directory as `sql1ib_v95` in the **db2setup** log file.

-j "TEXT_SEARCH"

Configures the Db2 Text Search server using generated default values for service name and TCP/IP port number. This parameter cannot be used if the instance type is client.

-j "TEXT_SEARCH, *portnumber*"

Configures the Db2 Text Search server using a default service name and the provided port number. Valid port numbers must be within the 1024 - 65535 range.

-h | -? Displays help information.

Usage notes

- This command is run automatically during the copy upgrade. You do not need to manually run this command unless the copy upgrade failed.

db2osconf - Utility for kernel parameter values

Makes recommendations for kernel parameter values based on the size of a system.

The recommended values are high enough for a given system that they can accommodate most reasonable workloads. This command is currently available only for Db2 databases on the Solaris operating system and for 64-bit Db2 instances on HP-UX.

Authorization

- On Db2 database for HP-UX, no authorization is required. To make the changes recommended by the **db2osconf** utility, you must have root user authority.
- On Db2 database for Solaris operating systems, you must have root user authority or be a member of the sys group.

Command syntax

To get the list of currently supported options, enter **db2osconf -h**:

```
db2osconf -h
Usage:
-c          # Client only
-f          # Compare to current
-h          # Help screen
-l          # List current
-m <mem in GB> # Specify memory in GB
-n <num CPUs> # Specify number of CPUs
-p <perf level> # Msg Q performance level (0-3)
-s <scale factor> # Scale factor (1-3)
-t <threads>   # Number of threads
```

Command parameters

- c The -c switch is for client only installations. This option is available only for Db2 database systems on Solaris operating systems.
- f Used to compare the current kernel parameters with the values that would be recommended by the **db2osconf** utility. The -f option is the default if no other options are entered with the **db2osconf** command. On Solaris operating systems, only the kernel parameters that differ will be displayed. On HP-UX, the -f option returns a list of recommended parameters and a list of recommended changes to parameter values:
***** Please Change the Following in the Given Order *****
WARNING [<parameter name>] should be set to <value>
- l Lists the current kernel parameters.
- m Overrides the amount of physical memory in GB. Normally, the **db2osconf** utility determines the amount of physical memory automatically. This option is available only for Db2 database systems on Solaris operating systems.
- n Overrides the number of CPUs on the system. Normally, the **db2osconf** utility determines the number of CPUs automatically. This option is available only for Db2 database systems on Solaris operating systems.
- p Sets the performance level for SYSV message queues. 0 (zero) is the default and 3 is the highest setting. Setting this value higher can increase the performance of the message queue facility at the expense of using more memory.
- s Sets the scale factor. The default scale factor is 1 and should be sufficient for almost any workload. If a scale factor of 1 is not enough, the system might be too small to handle the workload. The scale factor sets the kernel parameters recommendations to that of a system proportionally larger than the size of the current system. For example, a scale factor of 2.5 would recommend kernel parameters for a system that is 2.5 times the size of the current system.
- t Provides recommendations for **semsys:seminfo_semume** and **shmsys:shmseg** kernel parameter values. This option is available only for Db2 database systems on Solaris operating systems. For multithreaded programs with a fair number of connections, these kernel parameters might have to be set beyond their default values. They only need to be reset if the multithreaded program requiring them is a local application:

semsys:seminfo_semume

Limit of semaphore undo structures that can be used by any one process

shmsys:shmseg

Limit on the number of shared memory segments that any one process can create.

These parameters are set in the /etc/system file. The following section is a guide to set the values, and is what the **db2osconf** utility uses to recommend them. For each local connection Db2 will use one semaphore and one shared memory segment to communicate. If the multithreaded application is a local application and has X number of connections to Db2 databases, then that application (process) will need X number of shared memory segments and X number of the semaphore undo structures to

communicate with the Db2 database system. So the value of the two kernel parameters should be set to $X + 10$ (the plus 10 provides a safety margin).

Without the **-l** or **-f** switches, the **db2osconf** utility displays the kernel parameters using the syntax of the `/etc/system` file. To prevent human errors, the output can be cut and pasted directly into the `/etc/system` file.

The kernel parameters are recommended based on both the number of CPUs and the amount of physical memory on the system. If one is disproportionately low, the recommendations will be based on the lower of the two.

Example

Here is a sample output produced by running the **db2osconf** utility with the **-t** switch set for 500 threads. The results received are machine-specific, so the results you receive will vary depending on your environment.

```
db2osconf -t 500

set msgsys:msginfo_msgmax = 65535
set msgsys:msginfo_msgrnb = 65535
set msgsys:msginfo_msgrsz = 32
set msgsys:msginfo_msgrseg = 32767
set msgsys:msginfo_msgrmap = 2562
set msgsys:msginfo_msgrmni = 2560
set msgsys:msginfo_msgrtql = 2560
set semsys:seminfo_semmmap = 3074
set semsys:seminfo_semmnii = 3072
set semsys:seminfo_semmns = 6452
set semsys:seminfo_semmnu = 3072
set semsys:seminfo_semmume = 600
set shmsys:shminfo_shmmax = 2134020096
set shmsys:shminfo_shmmnii = 3072
set shmsys:shminfo_shmseg = 600

Total kernel space for IPC:
0.35MB (shm) + 1.77MB (sem) + 1.34MB (msg) == 3.46MB (total)
```

The recommended values for `set semsys:seminfo_semmume` and `set shmsys:shminfo_shmseg` were the additional values provided by running `db2osconf -t 500`.

Usage notes

Even though it is possible to recommend kernel parameters based on a particular Db2 database workload, this level of accuracy is not beneficial. If the kernel parameter values are too close to what are actually needed and the workload changes in the future, the Db2 database manager might encounter a problem due to a lack of interprocess communication (IPC) resources. A lack of IPC resources can lead to an unplanned outage for the Db2 database manager and a reboot would be necessary in order to increase kernel parameters. By setting the kernel parameters reasonably high, it should reduce or eliminate the need to change them in the future. The amount of memory consumed by the kernel parameter recommendations is almost trivial compared to the size of the system. For example, for a system with 4 GB of RAM and 4 CPUs, the amount of memory for the recommended kernel parameters is 4.67 MB or 0.11%. This small fraction of memory used for the kernel parameters should be acceptable given the benefits.

On Solaris operating systems, there are two versions of the **db2osconf** utility: one for 64-bit kernels and one for 32-bit kernels. The utility needs to be run as root or with the group sys since it accesses the following special devices (accesses are read-only):

```
crw-r---- 1 root      sys      13,  1 Jul 19 18:06 /dev/kmem
crw-rw-rw- 1 root      sys      72,  0 Feb 19 1999 /dev/ksyms
crw-r---- 1 root      sys      13,  0 Feb 19 1999 /dev/mem
```

db2pd - Monitor and troubleshoot Db2 database

Retrieves information from the Db2 database system memory sets.

Authorization

One of the following authority levels is required:

- The SYSADM authority level.
- The SYSCtrl authority level.
- The SYSMAINT authority level.
- The SYSMON authority level.

When the SYSMON authority level is granted, the following options are not available:

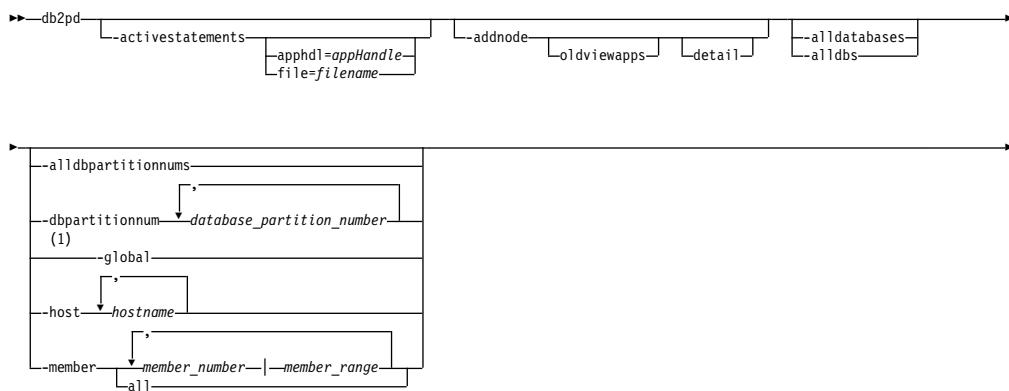
- **dump**
- **memblocks**
- **stack**

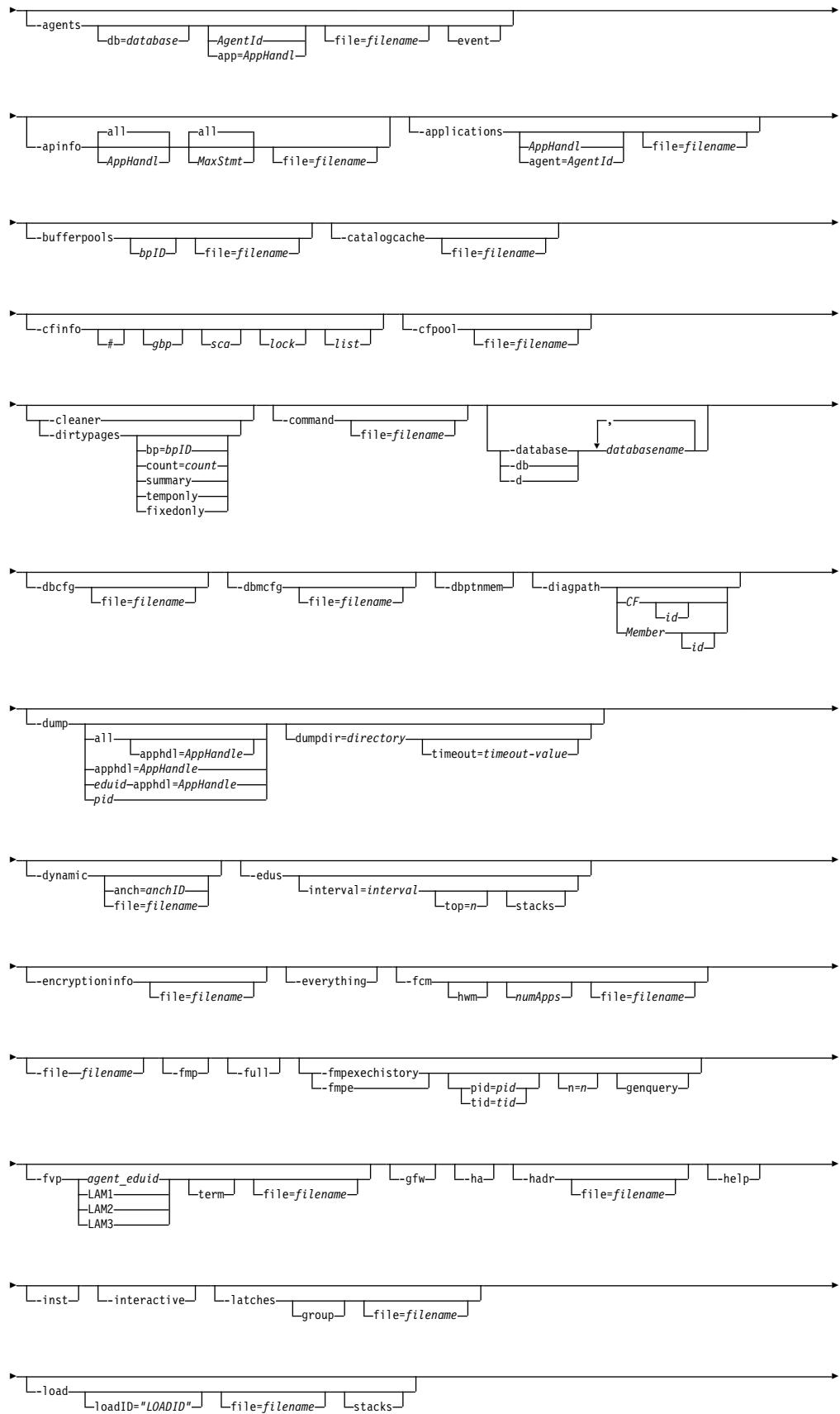
Note: On Windows, you must have administrator authority to use the **db2pd** command.

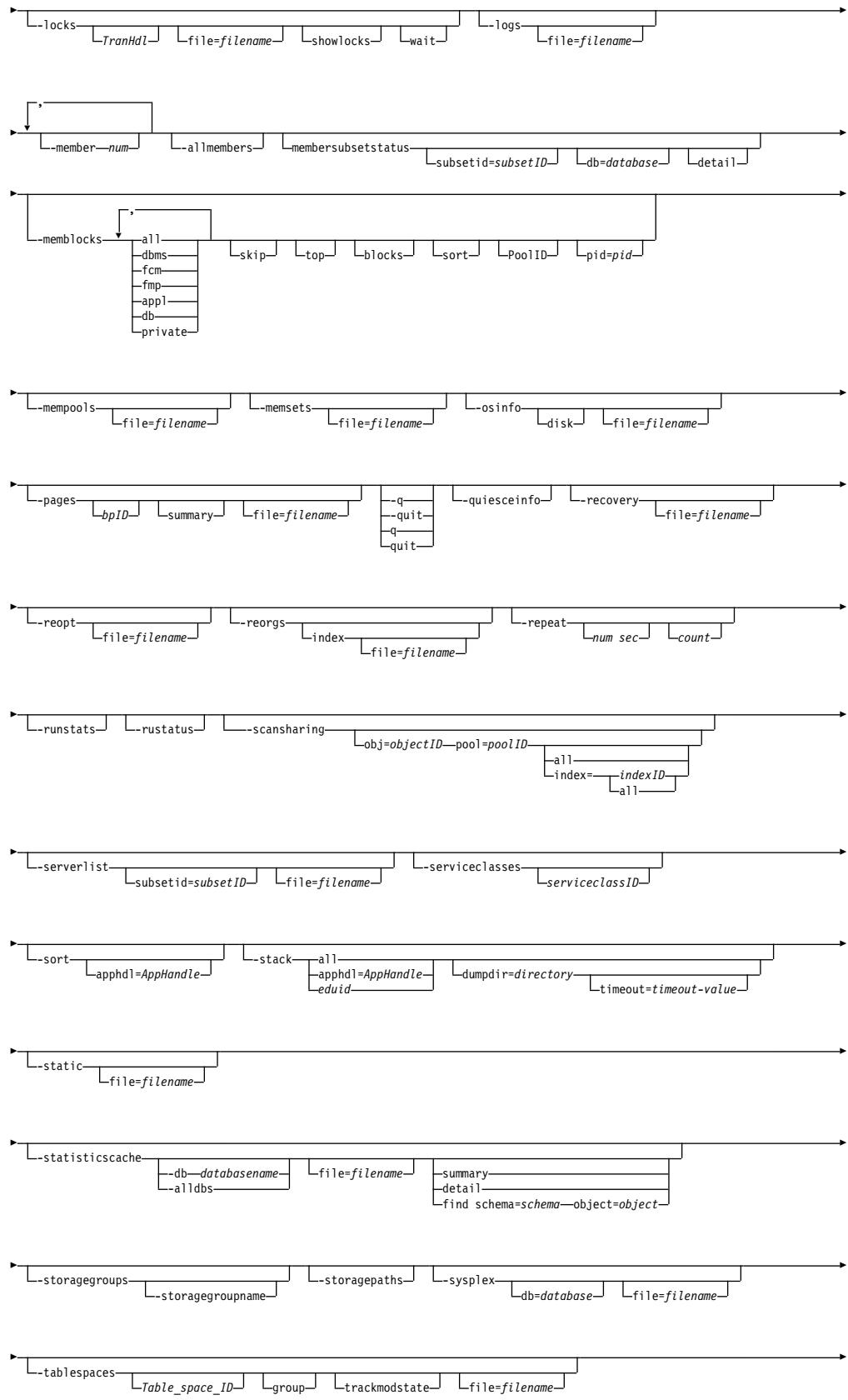
Required connection

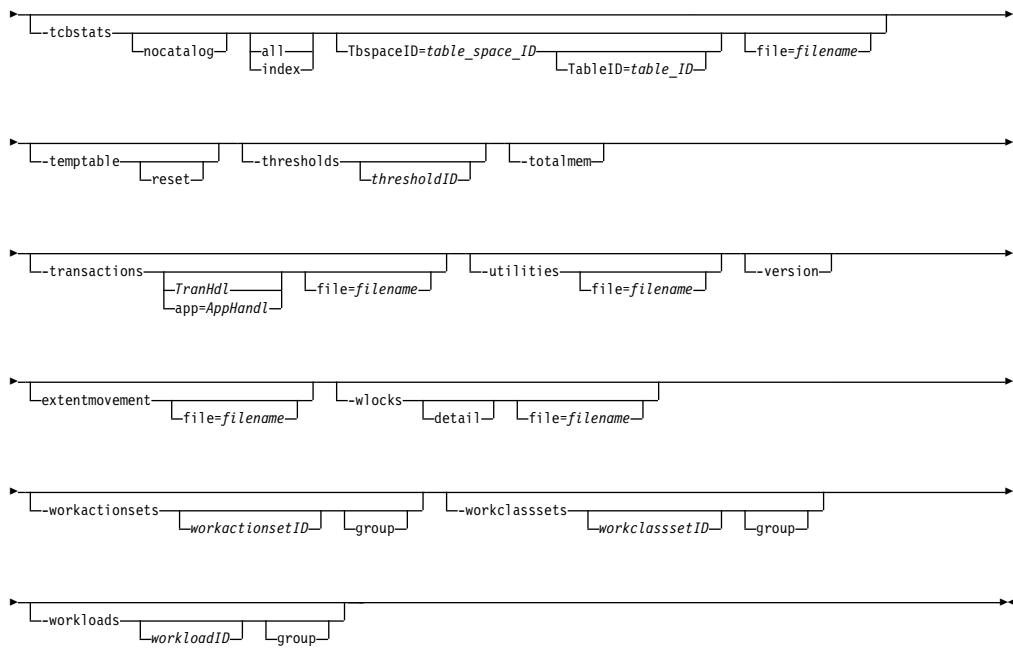
There is no minimum connection requirement. However, if a database scope option is specified, that database must be active before the command can return the requested information.

Command syntax









Notes:

- 1 The **-global** parameter has been deprecated. You can use the **-member all** parameter options to obtain information globally.

Command parameters

-activestatements

Returns information about activities that are currently being processed for connected applications. Examples of such applications include dynamic SQL statements, static SQL statements and loads.

apphdl=appHandle

If an application handle is specified, information is returned about that particular application.

file=filename

Sends the **-activestatements** output to a specified file.

See the **-activestatements** usage notes.

-addnode

Returns progress information about the add database partition server operation. This parameter only returns information when issued on the database partition server that is being added. The progress information is persistent on the new database partition server until it is restarted. If issued on an existing database partition server, this parameter returns no information.

See Sample output of the **db2pd -addnode** command.

-alldatabases | -all dbs

Specifies that the command attaches to all memory sets of all the databases.

-alldbpartitionnums

Specifies that this command is to run on all active database partition

servers on the local host. This parameter reports only information from database partition servers on the same physical machine that **db2pd** is being run on.

-allmembers

Specifies that this command is to run on all active members for a Db2 pureScale environment. **db2pd** will only report information from database members on the same physical machine that **db2pd** is being run on.

-agents

Returns information about agents.

If an agent ID is specified, information is returned about the agent. If an application ID is specified, information is returned about all the agents that are performing work for the application. Specify this command parameter with the **-inst** parameter, if you have chosen a database that you want scope output for.

event

This option returns metrics for the event being processed by the agent. The metrics returned include the last time that the event was changed, the state of the event, the type of event, the object of the event, and the event object name.

See the agents usage notes.

-apinfo

Displays the detailed information about applications including the execution of dynamic SQL statements of the current unit of work (UOW), if it is applicable.

AppHandle

If an application handle is specified, information is returned about that particular application. The default is to display information for all applications running at that partition.

MaxStmt

If a number of maximum statements is specified, the information for the most recent of SQL statements, equalling the maximum number specified, is returned. The default is to display information for all the executed SQL statements.

file=filename

Sends the **-apinfo** output to a specified file.

See Sample output of the **db2pd -apinfo** command.

Note: To capture the past history of a unit of work (UOW) including the SQL statement text for the applications, activate a deadlock event monitor using the statement history clause. For example, use one of the following statements:

```
create event monitor testit for deadlocks with details history write to file path global  
create event monitor testit for deadlocks with details history write to table
```

The CREATE EVENT MONITOR statement has additional options, such as the ability to specify the name of the table space and table into which data will be written. For details, see the CREATE EVENT MONITOR statement description. The event monitor with statement history capability affects all applications and increases the monitor heap usage by the Db2 database manager.

See the **-apinfo** usage notes.

-applications

Returns information about applications.

If an application ID is specified, information is returned about that application.

If an agent ID is specified, information is returned about the agent that is working on behalf of the application. See the **-applications** usage notes.

-bufferpools

Returns information about the buffer pools. If a bufferpool ID is specified, information is returned about the bufferpool. See the **-bufferpools** usage notes.

-catalogcache

Returns information about the catalog cache, which maintains an in-memory version of statistics.

See Sample output of the **db2pd -catalogcache** command.

The output for SYSTABLES can have multiple entries for the same table (see DEPT in the output shown previously). Multiple entries correspond to a different version of the statistics for the same table. The usage lock name will be unique among the entries for the same object and soft invalid entries will be marked with an 'S'. See the **-catalogcache** usage notes.

-cfinfo

Dumps CF information that can be useful when diagnosing performance and other issues. You can specify which specific structure you want information to be dumped for by using any of the following sub-options: **gbp**, **sca**, **lock**, or **list**. For example, running **db2pd -cfinfo 2 sca** will dump the SCA structure information from CF #2.

-cfpool

Displays a listing of each CF connection pool entry on the current member and its status, including whether it is being used or not, the Db2 Engine Dispatchable Unit (EDU) that is using it, and the function it is being used for.

The **cfpool** option can be used to monitor command connections and to display Host Channel Adapter (HCA) port mapping information. You can use this information to validate that load balancing between HCA ports is behaving as expected. You can also use this information verify that HCA failover is working as expected (for example, draining connections from an offline connection, or reestablishing connections after the port comes back online).

In addition, information about the cluster interconnect netname of the HCA port to which the XI and lock notification connections are established is included in the output from db2pd when you use the **cfpool** option.

-cleaner

Dumps page cleaner related information from a database. This option must be preceded by an active database by specifying the **-database** or **-db** option with the proper active database name.

See Sample output of the **-cleaner** option.

-command *filename*

Specifies to read and execute the **db2pd** command options that are specified in the file.

-database | -db | -d *databasename*

Specifies that the command attaches to the database memory sets of the specified database. Specify the database name, not the alias name.

-dbcfg Returns the settings of the database configuration parameters. See the **-dbcfg** usage notes.**-dbmcfg**

Returns the settings of the database manager configuration parameters.

Specify this option with the **-inst** command parameter, if you have chosen a database for which you want scope output. See the **-dbmcfg** usage notes.

-dbpartitionnum *number*

Specifies that the command is to run on the specified local or remote database partition server.

-dbptnmem

Lists database partition memory statistics.

-diagpath

Returns the fully resolved split diagnostic path. In a Db2 pureScale environment, this returns the diagnostic path for all members and CFs.

CF | member

Returns the diagnostic path for either the members or CFs. If you do not specify a *id*, then the diagnostic log paths for all members or CFs are returned.

-dirtyPages

Dumps the dirty pages from each bufferpool in the database. This option must be preceded by an active database by specifying the **-database** or **-db** option with the proper active database name.

bpID Specify this option to dump dirty pages from the specified bufferpool.

count Specify this option to dump the first *count* number of dirty pages in each bufferpool.

summary

Specify this option to dump recovery related information of each bufferpool.

temponly

Specify this option to dump temporary dirty pages from each bufferpool.

fixedonly

Specify this option to dump dirty pages that are fixed from each bufferpool.

See Sample output of the **-dirtyPages** option.

-dump Produces stack trace and binary dump files in the **diagpath** directory. Only available on UNIX operating systems.

- Specify with the **all** command parameter to produce stack trace files and binary dump files for all agents in the current database partition.
- Specify with the **all** parameter and an **appHandle=appHandle** parameter to return all EDUs associated with the specified *appHandle* application.
- Specify with an EDU ID of *eduid* and an **appHandle=appHandle** parameter to return information about the specified EDU if it is associated the *appHandle* application.

- Specify with an **apphd1=appHandle** parameter to return just the EDU of the coordinator agent for the *appHandle* application.
- Specify with the *pid* option to produce a stack trace file and binary dump file for a specific agent.

You can specify the following parameters with the parameters mentioned previously:

dumpdir=directory

Specifies a directory where the stack files of EDUs running in **db2sysc** processes are to be redirected. All other stack files are written in the **DIAGPATH** directory. An absolute path must be specified and the specified directory must exist. This option is available for UNIX and Linux operating systems only.

timeout=timeout-value

Specifies the time in seconds during which the stack files are redirected to the directory specified.

-dynamic

Returns information about the execution of dynamic SQL. See the **-dynamic** usage notes.

anch=anchID

If an anchor identifier is specified, information is returned about that particular dynamic SQL.

file=filename

Sends the **-dynamic** output to a specified file.

-edus

Lists all EDUs in the instance. In the case of a sustained trap, specifying this option outputs the EDU Name indicating that the EDU is suspended.

interval=interval

Only available on UNIX operating systems. If an interval is specified, two snapshots of the EDUs are taken, *interval* seconds apart. Two new columns are then included in the list of EDUs: USR DELTA which displays the delta of CPU user time across the *interval*, and SYS DELTA which displays the delta of CPU system time across the *interval*. If an EDU is added part way through the *interval* it is included in the list, with the delta calculated from when it was added. If an EDU is deleted part way through the *interval* it is not included in the list at all.

top=n

Specifies *n* EDUs that are to be displayed, where *n* is an integer value. The EDUs that take up the max CPU time during interval specified are displayed first.

stacks

Dumps the stacks for the EDUs that are displayed.

See the **-edus** usage notes. See also Sample output of the **db2pd -edus** command.

-encryptioninfo

Displays the database encryption information.

file=filename

Sends the encryption information output to a specified file.

See sample output of the **db2pd -encryptioninfo** command.

-extentmovement

Displays information about the extent movement status of the database.

See the **-extentmovement** usage notes. See also Sample output of the **db2pd -extentmovement** command.

-everything

Runs all options for all databases on all database partition servers that are local to the server.

-fcm

Returns information about the fast communication manager.

- Specify this parameter with the **-inst** parameter, if you have chosen a database for which you want scope output.
- Specify this parameter with the **hwm** parameter, to retrieve high-watermark consumptions of FCM buffers and channels by applications since the start of the Db2 instance. The high-watermark consumption values of applications are retained even if they have disconnected from the database already.
- Specify this parameter with the *numApps* option, to limit the maximum number of applications that the **db2pd** command reports in the current and HWM consumption statistics.

See the **-fcm** usage notes.

-file filename

Specifies to write the output to the specified file.

-fmp

Returns information about the process in which the fenced routines are executed. See the **-fmp** usage notes.

-fmpechistory | -fmpe

Displays the fenced routine history that attempted to be loaded and executed. Note that this parameter is available starting in Fix Pack 1.

pid=pid

Displays detailed thread information about a specific fenced process ID. If none is specified, detailed information for all processes is displayed. For thread-safe FMP processes, there will be one execution history list per thread, and threads are presented in three groups: Active, Pooled, Forced. For non thread-safe FMP processes, only one execution history list per process is displayed.

tid=tid

Displays historical details for a thread-safe routine using a specific thread ID. For non thread-safe routine, the thread ID value will be 1.

n=n

Use this option to specify the number of routine execution history that is to be displayed for each FMP process. The maximum value is 128. If not specified, only the last routine history is returned by default.

genquery

Generates a select query that will return the routine schema, module, name and specific name according to the routine unique ID.

See the **-fmpechistory | -fmpe** usage notes.

-full

Specifies that all output is expanded to its maximum length. If not specified, output is truncated to save space on the display.

-fvp Displays fenced vendor process information and allows the termination of a fenced vendor process in situations where it is not responding. This applies to backup, restore, prune history, load, load copy (roll forward) and Log Manager, where a vendor media device is being used.

Note: The **-database** *database* command parameter must be used in conjunction with this parameter in order to connect to the right memory set to gather the information. This has no affect on Windows operating systems.

agent_eduid

Displays the fenced vendor process information for a Db2 EDU ID of a backup, restore, prune history, load or load copy (roll forward) agent.

LAM1 Displays fenced vendor process information for **logarchmeth1**.

LAM2 Displays fenced vendor process information for **logarchmeth2**.

LAM3 Displays fenced vendor process information for the special case where the current log archive method configuration parameter is not set to VENDOR, and so a fenced vendor process needs to be created temporarily, during **ROLLFORWARD DATABASE**, to retrieve logs from a previous vendor archiving method.

term On top of displaying fenced vendor process information, this option also terminates the fenced vendor process specified.

-global

Specifies that **db2pd** will also be run on remote hosts. If the **-file** parameter is specified, a single file consisting of all the individual files from remote host will be created on the computer from where you issued the **db2pd** command.

Note: This command parameter is available in Db2 Version 9.8 Fix Pack 3 and later fix packs. This parameter is deprecated in Db2 Version 9.7 Fix Pack 4 and later fix packs.

-dbp database_partition_number

Specifies that **db2pd** will be run on the remote host of the specified database partition. If no database partition is specified with the **-global** option, **db2pd** will run only on the host where member resides.

-gfw Returns a list of event monitors that are currently active or were deactivated for some reason. It also returns statistics and information about the targets into which event monitors write data for each fast writer independent coordinator.

-ha Reports high availability statistics.

-hadr Reports high availability disaster recovery (HADR) information. .

See the **-hadr** usage notes.

-h | -help

Displays the online help information.

-host *hostname*

Specifies the host or hosts on which the command is issued. The command is issued for all members that reside on the host. If this option is not specified, the command is issued on the local host. If multiple hosts are

specified, all host names must be valid for the command to complete. This option cannot be specified together with the **-member** option.

-inst Returns all instance-scope information.

-interactive

Specifies to override the values specified for the **DB2PDOPT** environment variable when running the **db2pd** command.

-latches

Reports all latch holders and all latch waiters.

group Just prints the list of holders followed by the list of waiters.

file=filename

Sends **-latches** output to *filename*.

See the **-latches** usage notes.

-load Displays all load EDU information. This parameter can be combined with the **-host** or **-member** parameter to display host or member specific load EDU information. Requires an active database to be specified.

loadID="LOADID"

Displays all load EDUs working for the specific load operation specified by *LOADID*. If the *LOADID* specified does not exist, no information is displayed.

file=filename

Redirects the output, excluding stack files, to the specified file.

stacks Dumps the stack traces for the load EDUs displayed in the **diagpath** directory. If this option is used with the **loadID** option, the stacks are dumped for the load EDUs working for the specified load operation. This option is available for UNIX and Linux operating systems only.

See the **-load** usage notes.

-locks Returns information about the locks.

Specify a transaction handle to obtain information about the locks that are held by a specific transaction.

Specify with the **showlocks** command parameter to return detailed information about lock names. For row and block locks on partitioned tables and individual data partitions, **showlocks** displays the data partition identifier as part of the row with the lock information. . The **showlocks** parameter displays the table name and schema name of locks.

Specify the **wait** command parameter to return locks in a wait state and the owners of those locks.

See the **-locks** usage notes.

-logs Returns information about the log files. See the **-logs** usage notes. See also Sample output of the **db2pd -logs** command.

This information can also be obtained by running the MON_GET_TRANSACTION_LOG table function.

-member member_number | member_range

Specifies the member or members on which the command is issued. If this option is not specified, the command is issued on the current member. Multiple members can be specified as a comma separated list of

member_number (member1, member2), or using *member_range*, where *member_range* is a range of members (member1-member3), or using any combination of the first two methods. This option cannot be specified together with the **-host** option.

- all** Specifies that the command is issued on all members, including members on remote hosts.

-membersubsetstatus

Dumps the state of member subsets.

- detail** Displays the member subset details in the ascending order of **FAILOVER_PRIORITY**

-memblocks

Returns information about the memory sets. Certain memory sets are returned based on the scope that the **-memblocks** parameter is used in:

- If this parameter is issued with the **-inst** and **-all dbs** parameters, information about the **dbms**, **fcm**, **fmp**, **app1**, and **db** memory sets is returned. The following command returns information about the instance-scope and database-scope memory sets for all databases:
`db2pd -inst -all dbs -memblocks`
- If this parameter is issued with the **-inst** and **-db** parameters, information about the **dbms**, **fcm**, **fmp**, **app1**, and **db** memory sets is returned for the specified database. The following command returns information about the instance-scope and database-scope memory sets for the database sample:
`db2pd -inst -db sample -memblocks`
- If this parameter is issued within a database scope (**-db**), information about the **app1** and **db** memory sets is returned. The following command returns information about the database-scope memory sets for the database sample:
`db2pd -db sample -memblocks`
- If this parameter is issued on its own with the **db2pd** command, it returns information about the instance-scope memory sets, which include the **dbms**, **fcm**, and **fmp** memory sets. This is the default behavior. The following command returns the same information as `db2pd -inst -memblocks` which returns information about the instance-scope memory sets:
`db2pd -memblocks`
- If this parameter is issued with any of the following parameter options, the information returned is only that options memory set. The following command returns information only on the **fmp** memory set:
`db2pd -memblocks -fmp`

dbms

Only report memory blocks in the database manager system memory set. This memory set is a part of instance-scope memory sets.

fcm Only report memory blocks in the fast communication manager memory set. This memory set is a part of instance-scope memory sets.

fmp Only report memory blocks in the fenced mode process memory set. This memory set is a part of instance-scope memory sets.

app1 Only report memory blocks in the application memory set. This memory set is a part of database-scope memory sets.

db Only report memory blocks in the database memory set. This memory set is a part of database-scope memory sets.

a11 Report memory blocks from all memory sets. This includes memory blocks from instance-scope (**-inst**) memory sets, and, on Windows operating systems only, the private memory set.

Note: The database scope (**-db** or **-a11dbs**) must be specified to include memory blocks from database-scope memory sets (database and application memory sets).

top Report the top memory consumers for each set.

blocks Report the memory blocks for each set.

sort Report the sorted memory blocks for each pool in each set.

PoolID Report memory blocks from a specific pool.

pid=pid

Report memory blocks from a specific process id (for UNIX operating systems only).

private

Report memory blocks from the private memory set (for Windows operating systems only).

skipfreedwithpool | skip

Report memory blocks skipping those to be freed with the pool.

See the **-memblocks** usage notes.

-mempools

Returns information about the memory pools.

Specify this option with the **-inst** option to include all the instance-scope information in the returned information. See the **-mempools** usage notes.

-memsets

Returns information about the memory sets.

Specify this command parameter with the **-inst** command parameter to include all the instance-scope information in the returned information. See the **-memsets** usage notes.

-osinfo

Returns operating system information. If a disk path is specified, information about the disk will be printed. See the **-osinfo** usage notes.

-pages

Returns information about the buffer pool pages.

bpID If bufferpool ID is specified, only pages from the specified bufferpool are returned.

summary

If this option is specified, only the summary information section will be displayed.

See the **-pages** usage notes. See also Sample output of the **db2pd -pages** command.

-q | -quit | q | quit

Quit. When the **db2pd** keyword alone is issued, **db2pd** runs in interactive mode. The **quit** command causes an exit from this mode back to the standard command prompt.

-quiesceinfo

Specifies the current quiesce status of the instance and database.

-recovery

Returns information about recovery activity. See the **-recovery** usage notes.

-reopt Returns information about cached SQL statements that were re-optimized using the **REOPT ONCE** option. See the **-reopt** usage notes.**-reorgs**

Returns information about table and data partition reorganization. When the **index** parameter is added to the command, index reorganization information is returned along with the table and data partition reorganization information.

Note: Starting with Db2 Version 9.8 Fix Pack 3, the **db2pd -reorgs index** command reports the index reorg statistics for partitioned indexes in addition to the index reorg statistics for non-partitioned indexes reported since Db2 V9.8 Fix Pack 3.

Note: You cannot monitor the progress of index reorganization operations on a database if you specify the **CLEANUP ONLY** parameter of the **REORG INDEXES** command.

See the **-reorgs** usage notes. See also Sample output of the **db2pd -reorgs index** command.

-repeat num sec count

Specifies that the command is to be repeated after the specified number of seconds. If a value is not specified for the number of seconds, the command repeats every five seconds. You can also specify the number of times the output will be repeated. If you do not specify a value for *count*, the command is repeated until it is interrupted.

When the **db2pd** command with the **-repeat** parameter is issued on members that are on different hosts, the command is sent from the local host to the remote hosts. The command runs on each remote host until the *count* value specified is reached. The command runs to completion on one host before it begins on another host.

-runstats

Returns information about the status of the RUNSTATS utility on table and associated indexes. The status of table statistics collection is displayed first, followed by the status of index statistics collection. Sample output of the **-runstats** option:

db2pd -runstats

Table Runstats Information:

```
Retrieval Time: 08/13/2009 20:38:20
TbspaceID: 2          TableID: 4
Schema: SCHEMA      TableName: TABLE
Status: Completed    Access: Allow write
Sampling: No         Sampling Rate: -
Start Time: 08/13/2009 20:38:16   End Time: 08/13/2009 20:38:17
Total Duration: 00:00:01
Cur Count: 0           Max Count: 0
```

Index Runstats Information:

```
Retrieval Time: 08/13/2009 20:38:20
TbspaceID: 2      TableID: 4
Schema: SCHEMA   TableName: TABLE
Status: Completed   Access: Allow write
Start Time: 08/13/2009 20:38:17   End Time: 08/13/2009 20:38:18
Total Duration: 00:00:01
Prev Index Duration [1]: 00:00:01
Prev Index Duration [2]: -
Prev Index Duration [3]: -
Cur Index Start: 08/13/2009 20:38:18
Cur Index: 2          Max Index: 2           Index ID: 2
Cur Count: 0          Max Count: 0
```

-rustatus

Displays the fix pack update status of the system. See Sample output of the **db2pd -rustatus** command.

-scansharing

Returns scan sharing information about all tables that have table or block index scan sharing in the specified database.

obj=objectID pool=poolID

Returns scan sharing information about the specified table.

all Returns scan sharing information for all tables. For each table, table or range scan sharing information is returned. In addition, for MDC tables, block index scan sharing information is returned.

index=

indexID

Returns scan sharing information for the specified table, and block index scan sharing information for the specified block index.

all Returns block index scan sharing information for all block indexes.

See Sample output of the **db2pd -scansharing** command.

See the **-scansharing** usage notes.

-serverlist

Returns information about which members are available for use and the relative load of each of those members.

There are instances where no output is returned for one or more databases:

- No active databases exist
- The specified database is not active
- The specified database is active, but the server list has not yet been cached
- The **db2pd** command is run in an environment that is not a Db2 pureScale environment
- No remote client has connected to the database

See the **-serverlist** usage notes.

See Sample output of the **db2pd -serverlist** command.

-serviceclasses *serviceclassID*

Returns information about the service classes for a database. *serviceclassID* is an optional parameter to retrieve information for one specific service class. If *serviceclassID* is not specified, information for all service classes is retrieved.

See the **-serviceclasses** usage notes. See also Sample output of the **db2pd -serviceclasses** command.

-sort Starting with Fix Pack 5, this option returns information about the application sort operation. If an application handle ID is specified, information is returned about the sort operation for the specified application.

See the **-sort** usage notes.

-stack all | apphdl=appHandle | eduid

In case of an engine hang, you can use the stack trace file to get information about the Db2 state. This command produces stack trace files in the **diagpath** directory. On UNIX and Linux operating systems, the naming convention of the files is *pid.tid.node.stack.txt*. On Windows operating systems, the EDU's dump information into the stack trace files with the naming convention *pid.tid.stack.bin*. Note that **-stack all** is the only option supported on the Windows operating system.

all Specify this option to produce stack trace files for all processes in the current database partition.

Note: The **all** option can require a sufficient amount of memory for it to function properly.

apphdl=appHandle

Specify this option to produce a stack trace file for just the application handle equal to *appHandle*. This option is available for UNIX and Linux operating systems only.

eduid Limits output to only EDUs with a specified ID. Formatted events and relevant data are dumped to the *pid.tid/EDUID.node.trap.txt* trap files in the db2dump directory. This option is available for UNIX and Linux operating systems only.

Event stack will be output in the following order:

Last event (on the top of event stack)

- Event type and short description
- Customer impact
- Object identifier
- ECF ID, probe
- Top event header
- Top event qualifiers (if any)
- Top event data (if present)

First event (on the bottom of event stack)

- Event type and short description
- Customer impact
- Object identifier
- ECF ID, probe
- Bottom event header

- Bottom event qualifiers (if any)
- Bottom event data (if present)

In the preceding list, ECF ID is ECF identifier (will be formatted as *product, component, function*) and probe is a line of code or some unique number (for a function).

Event flow (recorded event “history”) will be output in the following order:

First event record

- Event type and short description
- Customer impact
- Object identifier
- ECF ID, probe
- Event header
- Object data (if not a string or integer)

Last event record

- Event type and short description
- Customer impact
- Object identifier
- ECF ID, probe
- Event header
- Object data (if not a string or integer)

dumpdir=directory

Specifies a directory where the stack files of EDUs running in **db2sysc** processes are to be redirected. All other stack files are written in the **DIAGPATH** directory. An absolute path must be specified and the specified directory must exist. This option is available for UNIX and Linux operating systems only.

timeout=timeout-value

Specifies the time in seconds during which the stack files are redirected to the directory specified.

-static

Returns information about the execution of static SQL and packages. See the **-static** usage notes.

-statisticscache

Returns information about the statistics cache at the database level.

summary

Summarizes statistics cache. To dump the statistics cache summary for database sample, issue the following command:

```
db2pd -db sample -statisticscache summary
```

detail Specify this option to dump detailed statistics information stored in the statistics cache for all tables with the latest statistics collected by real-time statistics gathering. To dump detailed statistics information stored in the statistics cache for all the databases, issue the following command:

```
db2pd -statisticscache detail -all dbs
```

find schema=schema object=object

Specify this option to dump the detailed statistics information for a

specific table with schema as schema name and object as table name. To dump detailed statistics information for table USER1.T1 of database sample, issue the following command:

```
db2pd -db sample -statisticscache find schema=USER1 object=T1
```

See the **-statisticscache** usage notes.

-storagegroups

Returns information about the storage groups defined for the database.

Specify with the *Storagegroup ID* command parameter to display the information about a specific storage group and its paths.

See the **-storagegroups** usage notes. See also Sample output of the **db2pd -storagegroups** command.

-storagepaths

Returns information about the automatic storage paths for all storage groups defined for the database. Unlike the **storagegroups** parameter, this parameter does not accept storage group ID as input.

See the **-storagepaths** usage notes. See also Sample output of the **db2pd -storagepaths** command.

-subsetid

-sysplex

Returns information about the list of servers associated with the database alias indicated by the **db** parameter. If the **-database** command parameter is not specified, information is returned for all databases.

Specify this command parameter with the **-inst** command parameter, if you have chosen a database for which you want scope output.

See the **-sysplex** usage notes.

-tablespaces

Returns information about the table spaces.

Specify with the **group** command parameter to display the information about the containers of a table space grouped with the table space.

Specify with the *Table_space_ID* command parameter to display the information about a specific table space and its containers.

Specify with the **trackmodstate** command parameter to display the state of a table space with respect to the last or next backup. This parameter requires the **trackmod** configuration parameter to be set to Yes.

See the **-tablespaces** usage notes. See also Sample output of the **db2pd -tablespaces** command.

-tcbstats

Returns information about tables and indexes. The total number of updates on tables, the UDI and real-time statistics UDI counters (RTSUDI), are returned as well.

TbspaceID=table_space_ID

Specify this option to display the information about a specific table space.

TableID=table_ID

Specify this option to display the information about a specific table. The **TbspaceID** option is required when using the **TableID** option.

nocatalog

Specify this option to display table and index information relating to all non-catalog tables.

See the **-tcbstats** usage notes.

-temptable

By default, returns the following information about temporary tables:

- Number of Temp Tables The total number of temporary tables created and dropped since the database manager was started or since the last reset of the counters.
- Comp Eligible Temps Temporary tables that the data base manager has determined is eligible for compression based on these three properties: *query type*, *minimum row size*, and *minimum expected table size*.
- Compressed Temps The total number of temporary tables that were actually compressed. This implies that the table has enough data so that a compression dictionary is created for the temporary table.
- Total Stored Temp Bytes The total number of actual row data for temporary tables that is stored on disk. This can be from both compressed and non-compressed temporary tables.
- Total Bytes Saved The total bytes saved by compressing rows.
- Total Compressed Rows A cumulative count of the number of rows that saved at least one byte using compression.
- Total Temp Table Rows The total number of rows inserted into all the temporary tables, whether they are compressed or not. Not all rows inserted into a compressed temporary table are necessarily compressed.

reset

Specify this option to reset all counters to zero.

See the **-temptable** usage notes. See also Sample output of the **db2pd -temptable** command.

-thresholds thresholdID

Returns information about thresholds. *thresholdID* is optional, but specifying a threshold ID returns information about a specific threshold. If *thresholdID* is not specified, information for all enabled and disabled thresholds is retrieved.

See the **-thresholds** usage notes. See Sample output of the **db2pd -thresholds** command.

-totalmem

Returns information about total amount of memory allocated on a Db2 host, specifically:

- the amount of reserved restart light memory preallocated on the host
- the total memory consumption by the host's resident members and guest members

The **-totalmem** option only reports information about the current host being accessed.

-transactions

Returns information about active transactions. If a transaction handle is specified, information is returned about that transaction handle. If an application handle is specified, information is returned about the application handle of the transaction. See the **-transactions** usage notes.

-utilities

Reports utility information. Descriptions of each reported element can be found in the utilities section of the *Database Monitoring Guide and Reference*.

See the **-utilities** usage notes.

-v | -version

Displays the current version and service level of the installed Db2 database product.

-wlocks

Displays the owner and waiter information for each lock being waited on. In the Sample output of the **db2pd -wlocks** command, the lock status (Sts) value of G designates the owner of the lock, while a Sts value of W designates the waiter of that lock.

detail Displays the table name, schema name, and application node of locks that are being waited on.

file=filename

Sends the **-wlocks** output to a specified file.

See the **-wlocks** usage notes.

-workactionsets workactionsetID

Returns information about all enabled work action sets and all enabled work actions in these sets.

group Returns the same information grouped by work action set.

See the **-workactionsets** usage notes.

-workclasssets workclasssetID

Returns information about all work class sets that are referenced by an enabled work action set and all work classes in the work class sets.

group Returns the same information grouped by work class set.

See Sample output of the **db2pd -workclasssets** command. See the **-workclasssets** usage notes.

-workloads workloadID

Returns the list of workload definitions, user privilege holders, and local partition workload statistics in memory at the time the command is run.

group Returns the same information grouped by workload.

See Sample output of the **db2pd -workloads** command.

See the **-workloads** usage notes.

Examples

Use the **db2pd** command, from the command line, in the following way to obtain information about agents that are servicing client requests:

```
db2pd -agents
```

Use the **db2pd** command, from the command line, in the following way to obtain information about agents that are servicing client requests. In this case, the **DB2PDOPT** environment variable is set with the **-agents** parameter before invoking the **db2pd** command. The command uses the information set in the environment variable when it executes.

```
export DB2PDOPT="-agents"
db2pd
```

Use the **db2pd** command, from the command line, in the following way to obtain information about agents that are servicing client requests. In this case, the **-agents** parameter is set in the file **file.out** before invoking the **db2pd** command. The **-command** parameter causes the command to use the information in the **file.out** file when it executes.

```
echo "-agents" > file.out
db2pd -command file.out
```

Use the **db2pd** command, from the command line, in the following way to obtain all database and instance-scope information:

```
db2pd -inst -all dbs
```

Use the **db2pd -fvp** command, from the command line, in the following way to obtain fenced vendor process state information:

For Log Manager:

- A database named SAMPLE has **logarchmeth1** set to TSM. At any time issue:

```
db2pd -db sample -fvp 1am1
```

The resulting output is as follows:

```
-----  
Fenced Vendor Process State Information:  
-----
```

```
Log Manager:  
-----
```

```
LOGARCHMETH1 available.  
-----
```

```
Vendor EDU is available and running.
  startTime: 1155581841  20060814145721
  function: sqluvint
  operationTimeout: Infinite
  timeRemaining: Infinite
```

This output tells you that the fenced vendor process is running in the vendor function **sqluvint** since August 14, 2006 14:57. The **operationTimeout** and **timeRemaining** values are displayed starting in version 11.1.3.3. Now, if you feel that this has been running too long, or you have determined that this process has hung waiting for TSM resources, you can terminate the fenced vendor process by issuing:

```
db2pd -db sample -fvp 1am1 term
```

The resulting output is as follows:

```
-----  
Fenced Vendor Process State Information:  
-----
```

```
Log Manager:  
-----
```

```
LOGARCHMETH1 available.  
-----
```

```
Vendor EDU is available and running.
  startTime: 1155581841  20060814145721
```

```
function: sqluvint
operationTimeout: Infinite
timeRemaining: Infinite
This fenced vendor process has been sent a signal to terminate.
```

This shows you the same information as the previous output, but also allows you to know that the terminate request has been sent. After waiting a few moments, you should notice that the request has taken affect.

- Starting in version 11.1.3.3, log archiving to TSM or vendor methods can be configured to enforce a timeout for archive log attempts by specifying the `--vendor_archive_timeout` option in the **logarchopt1**/**logarchopt2** database configuration parameters. For more details, see: Configuration parameters for database logging.
 - The `operationTimeout` value reflects the `--vendor_archive_timeout` value of the **logarchopt1**/**logarchopt2** database config parameter, or 'Infinite' if none was configured.
 - The `timeRemaining` value reflects the remaining time before the archive log attempt is automatically interrupted, if a `--vendor_archive_timeout` was configured, or 'Infinite' if none was configured. A value of 'Expired' is displayed when the `timeRemaining` expires and interrupting of the archive log attempt begins.

```
Fenced Vendor Process State Information:
```

```
Log Manager:
```

```
LOGARCHMETH1 available.
```

```
Vendor EDU is available and running.
startTime: 20170929105628
function: sqluvput
operationTimeout: 300 second(s)
timeRemaining: 240 second(s)
```

- If the fenced vendor process is running, but not running in vendor code, you will see this for a regular display request:

```
Fenced Vendor Process State Information:
```

```
Log Manager:
```

```
LOGARCHMETH1 available.
```

```
Vendor EDU is available and running.
No vendor code being run.
```

For Backup:

Note: It should be noted that the **FORCE APPLICATION** command can be used as an alternative to what is described in the following section.

- A database named SAMPLE is being backed up to TSM using 2 sessions. You need to find out the backup agent EDU ID, which can be found through **db2pd -edus** or the Db2 diagnostics log. Once found, one can issue:

```
db2pd -db sample -fvp 149
```

The resulting output is as follows:

```
Fenced Vendor Process State Information:
```

Backup:

Media Controller(s):

EDU ID: 504
mediaSession: 1
mediaSeqNum: 0
Vendor EDU is available and running.
startTime: 1155583315 20060814152155
function: sqluvint

EDU ID: 505
mediaSession: 2
mediaSeqNum: 0
Vendor EDU is available and running.
No vendor code being run.

This says that Db2 Media Controller 0 (EDU ID: 504) is in vendor code, while Db2 Media Controller 1 (EDU ID: 505) has a fenced vendor process, but is not running vendor code. Now, if you feel that this has been running too long, or you have determined that this process has hung waiting for TSM resources, you can terminate the fenced vendor process by issuing:

db2pd -db sample -fvp 149 term

The resulting output is as follows:

Fenced Vendor Process State Information:

Backup:

Media Controller(s):

EDU ID: 504
mediaSession: 1
mediaSeqNum: 0
Vendor EDU is available and running.
startTime: 1155583315 20060814152155
function: sqluvint

This fenced vendor process has been sent a signal to terminate.

EDU ID: 505
mediaSession: 2
mediaSeqNum: 0
Vendor EDU is available and running.
No vendor code being run.
This fenced vendor process has been sent a signal to terminate.

This tells you the same information as the previous output, but notes that both fenced vendor processes have been sent terminate requests and will be terminated shortly.

Usage notes

The following sections describe the output produced by the different **db2pd** parameters.

- **-activestatements**
- **-agents**
- **-apinfo**
- **-applications**
- **-bufferpools**
- **-catalogcache**
- **-dbcfg**

- **-dbmcfg**
- **-dynamic**
- **-edus**
- **-extentmovement**
- **-fcm**
- **-fmp**
- **-fmpeexechistory | -fmpe**
- **-hadr**
- **-latches**
- **-load**
- **-locks**
- **-logs**
- **-memblocks**
- **-mempools**
- **-memsets**
- **-osinfo**
- **-pages**
- **-recovery**
- **-reopt**
- **-reorgs**
- **-scansharing**
- **-serviceclasses**
- **-sort**
- **-static**
- **-statisticscache**
- **-storagegroups**
- **-storagepaths**
- **-sysplex**
- **-tablespaces**
- **-tcbstats**
- **-temptable**
- **-thresholds**
- **-transactions**
- **-utilities**
- **-wlocks**
- **-workactionsets**
- **-workclasssets**
- **-workloads**

-activestatements parameter

For the **-activestatements** parameter, the following information is returned:

Address

Address of the current activity.

AppHandle

Application handle.

UOW-ID UOW-ID at the start of execution.

StmtID The activity ID of the statement within the UOW-ID.

AnchID The anchor ID of the statement.

StmtUID

The unique ID of the statement within the anchor.

EffISO Effective isolation level.

EffLockTOut

Effective lock timeout at start.

EffDegree

Effective SMP parallelism degree at start.

StartTime

The start time of when the statement was executed.

LastRefTime

Last application reference time.

-agents parameter

For the **-agents** parameter, the following information is returned:

AppHandle

The application handle, including the node and the index.

AgentPid

The process ID of the agent process.

Priority

The priority of the agent.

Type

The type of agent.

State

The state of the agent.

ClientPid

The process ID of the client process.

Userid

The user ID running the agent.

ClientNm

The name of the client process.

Rowsread

The number of rows that were read by the agent.

Rowswrtn

The number of rows that were written by the agent.

LkTm0t

The lock timeout setting for the agent.

LastAppID

The outbound application ID that the pooled agent serviced last.

LastPooled

The timestamp when the agent was pooled.

If the event option is specified with the **-agents** parameter, the following, additional information is returned. You use this information to determine whether an agent continues to process the same task or whether the agent moves onto new tasks over time.

AGENT_STATE_LAST_UPDATE_TIME(Tick Value)

The last time that the event, being processed by the agent, was changed. The event currently processed by the agent is identified by the EVENT_STATE, EVENT_TYPE, EVENT_OBJECT, and EVENT_OBJECT_NAME columns.

EVENT_STATE

The state of the event last processed by this agent. The possible values are EXECUTING and IDLE.

EVENT_TYPE

The type of event last processed by this agent. The possible values are ACQUIRE, PROCESS, and WAIT.

EVENT_OBJECT

The object of the event last processed by this agent. The possible values are COMP_DICT_BUILD, IMPLICIT_REBIND, INDEX_RECREATE, LOCK, LOCK_ESCALATION, QP_QUEUE, REMOTE_REQUEST, REQUEST, ROUTINE, and WLM_QUEUE.

EVENT_OBJECT_NAME

The event object name. If the value of EVENT_OBJECT is LOCK, the value of this column is the name of the lock that the agent is waiting on. If the value of EVENT_OBJECT is WLM_QUEUE, the value of the column is the name of the WLM threshold that the agent is queued on. Otherwise, the value is NULL.

The possible combinations of EVENT_STATE, EVENT_TYPE, EVENT_OBJECT and EVENT_OBJECT_NAME column values are listed in the following table:

Table 54. Possible combinations for EVENT_STATE, EVENT_TYPE, EVENT_OBJECT and EVENT_OBJECT_NAME column values

| Event description | EVENT_STATE value | EVENT_TYPE value | EVENT_OBJECT value | EVENT_OBJECT_NAME value |
|--|-------------------|------------------|--------------------|-------------------------|
| Acquire lock | IDLE | ACQUIRE | LOCK | Lock name |
| Escalate lock | EXECUTING | PROCESS | LOCK_ESCALATION | NULL |
| Process request | EXECUTING | PROCESS | REQUEST | NULL |
| Wait for a new request | IDLE | WAIT | REQUEST | NULL |
| Wait for a request to be processed at a remote partition | IDLE | WAIT | REMOTE_REQUEST | NULL |
| Wait on a WLM threshold queue | IDLE | WAIT | WLM_QUEUE | Threshold name |
| Process a routine | EXECUTING | PROCESS | ROUTINE | NULL |
| Re-create an index | EXECUTING | PROCESS | INDEX_RECREATE | NULL |
| Build compression dictionary | EXECUTING | PROCESS | COMP_DICT_BLD | NULL |
| Implicit rebind | EXECUTING | PROCESS | IMPLICIT_REBIND | NULL |

-apinfo parameter

For the **-apinfo** parameter, the following information is returned:

AppHandle

The application handle, including the node and the index.

Application PID

The process ID for the application.

Application Node Name

The name of the application node.

IP Address

The IP address from which the database connection was established.

Connection Start Time

The time stamp at which the application connection started.

Client User ID

The client user ID.

System Auth ID

This is the system authorization ID of the connection.

Coordinator EDU ID

The EDU ID of the coordinator agent for the application.

Coordinator Partition

The partition number of the coordinator agent for the application.

Number of Agents

The number of agents that are working on behalf of the application.

Locks timeout value

The lock timeout value for the application.

Locks Escalation

The locks escalation flag indicates whether the lock, used by the application, has been escalated.

Workload ID

Workload identifier.

Workload Occurrence ID

Workload occurrence identifier.

Trusted Context

The name of the trusted context associated with the connection if the connection is either an implicit trusted connection or an explicit trusted connection.

Connection Trust Type

The connection trust type. This is one of: non-trusted, implicit trusted, or explicit trusted connection.

Role Inherited

This is the role inherited through a trusted connection, if any.

Application Status

The status of the application.

Application Name

The name of the application.

Application ID

The application ID. This value is the same as the **appl_id** monitor element data. For detailed information about how to interpret this value, see the "appl_id - Application ID monitor element".

UOW-ID The ID of the current UOW of the application.**Activity ID**

The activity ID within the UOW.

Package Schema

The package schema.

Package Name

The package name.

| | |
|------------------------------|---|
| Package Version | The package version. |
| Consistency Token | Identifies the version of the package that contains the SQL that is currently executing. |
| Section Number | The section number of the SQL statement. |
| SQL Type | The type of SQL: dynamic or static. |
| Isolation | The isolation mode set for the application. |
| Effective degree | The effective degree of parallelism for the activity. |
| Number of subagent(s) | The number of subagents that are performing the SQL statement. |
| Source ID | The internal identifier that is given to the source of the SQL statement. |
| Cursor ID | The cursor identifier for the SQL statement. |
| Nesting level | The level of nesting or recursion that is in effect when the statement was being run. |
| Invocation ID | Identifies one invocation of a routine from the other at the same nesting level within a unit of work. |
| Package cache ID | The internal package cache identifier for the SQL statement. |
| Anchor ID | The anchor identifier for the SQL statement. |
| Statement UID | The version of the package that contains the SQL that is currently executing. |
| Statement Type | The type of statement operation, such as: DML, DDL. |
| Statement | The SQL statement. |
| ClientUserID | Client userid for the transaction, which is the same as <code>tpmon_client_userid</code> (TP Monitor Client User ID monitor element). |
| ClientWrkstnName | Client workstation name for the transaction, which is the same as <code>tpmon_client_wkstn</code> (TP Monitor Client Workstation Name monitor element). |
| ClientAppName | Client application name driving the transaction, which is the same as <code>tpmon_client_app</code> (TP Monitor Client Application monitor element). |

ClientAccntng

Accounting string of the client driving the transaction, which is the same as **tpmon_acc_str** (TP Monitor Client Accounting String monitor element).

Entry time

The time at which the activity entered the system.

Local start time

The time at which the activity began doing work.

Last reference time

The last time the activity was accessed by a request.

See Sample output of the **db2pd -apinfo** command.

-applications parameter

For the **-applications** parameter, the following information is returned:

App1Hand1

The application handle, including the node and the index.

NumAgents

The number of agents that are working on behalf of the application.

CoorPid

The process ID of the coordinator agent for the application.

Status The status of the application.

Appid The application ID. This value is the same as the **app1_id** monitor element data. For detailed information about how to interpret this value, see the documentation for the **app1_id** monitor element.

ClientIPAddress

The IP address from which the database connection was established.

EncryptionLvl

The data stream encryption used by the connection. This is one of **NONE**, **LOW** or **HIGH**. **NONE** implies that no data stream encryption is being used. **LOW** implies that the database server **authentication** type is set to **DATA_ENCRYPT**. **HIGH** implies that SSL is being used.

SystemAuthID

This is the system authorization ID of the connection.

ConnTrustType

The connection trust type. This is one of: non-trusted, implicit trusted connection, or explicit trusted connection.

TrustedContext

The name of the trusted context associated with the connection if the connection is either an implicit trusted connection or an explicit trusted connection.

RoleInherited

This is the role inherited through a trusted connection, if any.

-bufferpools parameter

For the **-bufferpools** parameter, the following information is returned:

First Active Pool ID

The ID of the first active buffer pool.

Max Bufferpool ID

The maximum ID of all active buffer pools.

Max Bufferpool ID on Disk

The maximum ID of all buffer pools defined on disk.

Num Bufferpools

The number of available buffer pools.

ID

The ID of the buffer pool.

Name

The name of the buffer pool.

PageSz

The size of the buffer pool pages.

PA-NumPgs

The number of pages in the page area of the buffer pool.

BA-NumPgs

The number of pages in the block area of the buffer pool. This value is 0 if

the buffer pool is not enabled for block-based I/O.

BlkSize

The block size of a block in the block area of the buffer pool. This value is 0 if the buffer pool is not enabled for block-based I/O.

NumTbsp

The number of table spaces that are using the buffer pool.

PgsLeft

The number of pages left to remove in the buffer pool if its size is being decreased.

CurrentSz

The current size of the buffer pool in pages.

PostAlter

The size of the buffer pool in pages when the buffer pool is restarted.

SuspndTSct

The number of table spaces mapped to the buffer pool that are currently I/O suspended. If 0 is returned for all buffer pools, the database I/O is not suspended.

Automatic

Shows the self-tuning automatic status. "True" means self-tuning for this buffer pool is enabled. "False" means self-tuning for this buffer pool is not enabled.

DatLRds

Buffer Pool Data Logical Reads. Indicates the number of data pages which have been requested from the buffer pool (logical) for regular and large table spaces.

DatPRds

Buffer Pool Data Physical Reads. Indicates the number of data pages read in from the table space containers (physical) for regular and large table spaces.

HitRatio

Hit ratio for data pages in the buffer pool using formula $1 - \text{DatPRds} / \text{DatLRds}$.

TmpDatLRds

Buffer Pool Temporary Data Logical Reads. Indicates the number of data pages which have been requested from the buffer pool (logical) for temporary table spaces.

TmpDatPRds

Buffer Pool Temporary Data Physical Reads. Indicates the number of data pages read in from the table space containers (physical) for temporary table spaces.

HitRatio

Hit ratio for temporary data pages in the buffer pool using formula 1 - $\text{TmpDatPRds} / \text{TmpDatLRds}$.

IdxLRds

Buffer Pool Index Logical Reads. Indicates the number of index pages which have been requested from the buffer pool (logical) for regular and large table spaces.

IdxPRds

Buffer Pool Index Physical Reads. Indicates the number of index pages read in from the table space containers (physical) for regular and large table spaces.

HitRatio

Hit ratio for index pages in the buffer pool using formula 1 - $\text{IdxPRds} / \text{IdxLRds}$.

TmpIdxLRds

Buffer Pool Temporary Index Logical Reads. Indicates the number of index pages which have been requested from the buffer pool (logical) for temporary table spaces.

TmpIdxPRds

Buffer Pool Temporary Index Physical Reads. Indicates the number of index pages read in from the table space containers (physical) for temporary table spaces.

HitRatio

Hit ratio for temporary index pages in the buffer pool using formula 1 - $\text{TmpIdxPRds} / \text{TmpIdxLRds}$.

DataWrts

Buffer Pool Data Writes. Indicates the number of times a buffer pool data page was physically written to disk.

IdxWrts

Buffer Pool Index Writes. Indicates the number of times a buffer pool index page was physically written to disk.

DirRds Direct Reads From Database. The number of read operations that do not use the buffer pool.

DirRdReq

Direct Read Requests. The number of requests to perform a direct read of one or more sectors of data.

DirRdTIme

Direct Read Time. The elapsed time (in milliseconds) required to perform the direct reads.

DirWrts

Direct Writes to Database. The number of write operations that do not use the buffer pool.

DirWrtReq

Direct Write Requests. The number of requests to perform a direct write of one or more sectors of data.

DirWrtTime

Direct Write Time. The elapsed time (in milliseconds) required to perform the direct writes.

AsDatRds

Buffer Pool Asynchronous Data Reads. Indicates the number of data pages read in from the table space containers (physical) by asynchronous engine dispatchable units (EDUs) for all types of table spaces.

AsDatRdReq

Buffer Pool Asynchronous Read Requests. The number of asynchronous read requests.

AsIdxRds

Buffer Pool Asynchronous Index Reads. Indicates the number of index pages read in from the table space containers (physical) by asynchronous engine dispatchable units (EDUs) for all types of table spaces.

AsIdxRdReq

Buffer Pool Asynchronous Index Read Requests. The number of asynchronous read requests for index pages.

AsRdTme

Buffer Pool Asynchronous Read Time. Indicates the total amount of time spent reading in data and index pages from the table space containers (physical) by asynchronous engine dispatchable units (EDUs) for all types of table spaces. This value is given in microseconds.

AsDatWrts

Buffer Pool Asynchronous Data Writes. The number of times a buffer pool data page was physically written to disk by either an asynchronous page cleaner, or a prefetcher. A prefetcher might have written dirty pages to disk to make space for the pages being prefetched.

AsIdxWrts

Buffer Pool Asynchronous Index Writes. The number of times a buffer pool index page was physically written to disk by either an asynchronous page cleaner, or a prefetcher. A prefetcher might have written dirty pages to disk to make space for the pages being prefetched.

AsWrtTime

Buffer Pool Asynchronous Write Time. The total elapsed time spent writing data or index pages from the buffer pool to disk by database manager page cleaners.

TotRdTme

Total Buffer Pool Physical Read Time. Indicates the total amount of time spent reading in data and index pages from the table space containers (physical) for all types of table spaces. This value is given in microseconds.

TotWrtTime

Total Buffer Pool Physical Write Time. Provides the total amount of time spent physically writing data or index pages from the buffer pool to disk. Elapsed time is given in microseconds.

VectIORds

Total Number of Pages Read by Vectored IO. The total number of pages read by vectored I/O into the page area of the buffer pool.

VectI0Req

Number of Vectored IO Requests. The number of vectored I/O requests. More specifically, the number of times the Db2 database product performs sequential prefetching of pages into the page area of the buffer pool.

BlockIORds

Total Number of Pages Read by Block IO. The total number of pages read by block I/O into the block area of the bufferpool.

BlockI0Req

Number of Block IO Requests. The number of block I/O requests. More specifically, the number of times the Db2 database product performs sequential prefetching of pages into the block area of the bufferpool.

PhyPgMaps

Number of Physical Page Maps. The number of physical page maps.

FilesClose

Database Files Closed. The total number of database files closed.

NoVictAvl

Buffer Pool No Victim Buffers. Number of times an agent did not have a preselected victim buffer available.

UnRdPFetch

Unread Prefetch Pages. Indicates the number of pages that the prefetcher read in that were never used.

-catalogcache parameter

For the **-catalogcache** parameter, the following information is returned:

Catalog Cache:**Configured Size**

The number of bytes as specified by the **catalogcache_sz** database configuration parameter.

Current Size

The current number of bytes used in the catalog cache.

Maximum Size

The maximum amount of memory that is available to the cache (up to the maximum database global memory).

High Water Mark

The largest physical size reached during processing.

SYSTABLES:

Schema The schema qualifier for the table.

Name The name of the table.

Type The type of the table.

TableID

The table identifier.

TbspaceID

The identifier of the table space where the table resides.

LastRefID

The last process identifier that referenced the table.

CatalogCache LoadingLock

The name of the catalog cache loading lock for the cache entry.

CatalogCache UsageLock

The name of the usage lock for the cache entry.

Sts The status of the entry. The possible values are:

- V (valid).
- I (invalid).
- S (soft invalid. Catalog cache entries become *soft invalid* when statistics have been updated by real-time statistics collection. These catalog cache entries may still be used by a database agent, but they are not valid for use by a new catalog cache request. Once the soft invalid entry is no longer in use, it will be removed. New catalog cache requests will use the valid entry.)

SYSRTNS:**RoutineID**

The routine identifier.

Schema The schema qualifier of the routine.

Name The name of the routine.

LastRefID

The last process identifier that referenced the routine.

CatalogCache LoadingLock

The name of the catalog cache loading lock for the cache entry.

CatalogCache UsageLock

The name of the usage lock for the cache entry.

Sts The status of the entry. The possible values are:

- V (valid).
- I (invalid).

SYSRTNS_PROCSCHEMAS:**RtnName**

The name of the routine.

ParmCount

The number of parameters in the routine.

LastRefID

The last process identifier that referenced the PROCSCHEMAS entry.

CatalogCache LoadingLock

The name of the catalog cache loading lock for the cache entry.

CatalogCache UsageLock

The name of the usage lock for the cache entry.

Sts The status of the entry. The possible values are:

- V (valid).
- I (invalid).

SYSDATATYPES:

TypID The type identifier.

LastRefID

The last process identifier that referenced the type.

CatalogCache LoadingLock

The name of the catalog cache loading lock for the cache entry.

CatalogCache UsageLock

The name of the usage lock for the cache entry.

Sts The status of the entry. The possible values are:

- V (valid).
- I (invalid).

SYSCODEPROPERTIES:**LastRefID**

The last process identifier to reference the SYSCODEPROPERTIES entry.

CatalogCache LoadingLock

The name of the catalog cache loading lock for the cache entry.

CatalogCache UsageLock

The name of the usage lock for the cache entry.

Sts The status of the entry. The possible values are:

- V (valid).
- I (invalid).

SYSNODEGROUPS:

PMapID The distribution map identifier.

RBalID The identifier if the distribution map that was used for the data redistribution.

CatalogCache LoadingLock

The name of the catalog cache loading lock for the cache entry.

CatalogCache UsageLock

The name of the usage lock for the cache entry.

Sts The status of the entry. The possible values are:

- V (valid).
- I (invalid).

SYSDBAUTH:

AuthID The authorization identifier (*authid*).

AuthType

The authorization type.

LastRefID

The last process identifier to reference the cache entry.

CatalogCache LoadingLock

The name of the catalog cache loading lock for the cache entry.

SYSRTNAUTH:

AuthID The authorization identifier (*authid*).

AuthType

The authorization type.

Schema The schema qualifier of the routine.

RoutineName

The name of the routine.

RtnType

The type of the routine.

CatalogCache LoadingLock

The name of the catalog cache loading lock for the cache entry.

SYSROLEAUTH:

AuthID The authorization identifier (authid).

AuthType

The authorization type.

Roleid The role identifier if the authorization identifier is a role.

LastRefID

The last process identifier to reference the cache entry.

CatalogCache LoadingLock

The name of the catalog cache loading lock for the cache entry.

TABLESPACES:

Schema The schema qualifier for the table.

Name The name of the table.

Type The type of the table.

TableID

The table identifier.

TbspaceID

The identifier of the table space where the table resides.

LastRefID

The last process identifier that referenced the table.

CatalogCache LoadingLock

The name of the catalog cache loading lock for the cache entry.

CatalogCache UsageLock

The name of the usage lock for the cache entry.

Sts The status of the entry. The possible values are:

- V (valid).
- I (invalid).
- S (soft invalid). Catalog cache entries become *soft invalid* when statistics have been updated by real-time statistics collection. These catalog cache entries may still be used by a database agent, but they are not valid for use by a new catalog cache request. Once the soft invalid entry is no longer in use, it will be removed. New catalog cache requests will use the valid entry.)

See Sample output of the **db2pd -catalogcache** command.

-dbcfg parameter

For the **-dbcfg** parameter, the current values of the database configuration parameters are returned.

-dbmcfg parameter

For the **-dbmcfg** parameter, current values of the database manager configuration parameters including the current effective code level (CECL) and current effective architecture level (CEAL) are returned.

-dynamic parameter

For the **-dynamic** parameter, the following information is returned:

Dynamic Cache:

Current Memory Used

The number of bytes used by the package cache.

Total Heap Size

The number of bytes configured internally for the package cache.

Cache Overflow flag state

A flag to indicate whether the package cache is in an overflow state.

Number of references

The number of times the dynamic portion of the package cache has been referenced.

Number of Statement Inserts

The number of statement inserts into the package cache.

Number of Statement Deletes

The number of statement deletions from the package cache.

Number of Variation Inserts

The number of variation inserts into the package cache.

Number of statements

The number of statements in the package cache.

Dynamic SQL Statements:

AnchID The hash anchor identifier.

StmtID The statement identifier.

NumEnv The number of environments that belong to the statement.

NumVar The number of variations that belong to the statement.

NumRef The number of times that the statement has been referenced.

NumExe The number of times that the statement has been executed.

Text The text of the SQL statement.

Dynamic SQL Environments:

AnchID The hash anchor identifier.

StmtUID The unique statement identifier.

EnvID The environment identifier.

Iso The isolation level of the environment.

QOpt The query optimization level of the environment.

B1k The blocking factor of the environment.

Dynamic SQL Variations:

AnchID The hash anchor identifier.

StmtUID

The unique statement identifier.

EnvID The environment identifier for this variation.

VarID The variation identifier.

NumRef The number of times this variation has been referenced.

Typ The internal statement type value for the variation section.

Lockname

The variation lockname.

Val The variation valid flag. The following are possible values:

Y Object is valid.

N Object is invalid.

X Object is inoperative.

? Object needs revalidation.

Insert Time

The time at which the variation was inserted into the package cache.

Sect Size

The length of section data.

-edus parameter

For the **-edus** parameter, the following information is returned:

EDU ID The unique identifier for the engine dispatchable unit (EDU). Except on Linux operating systems, the EDU ID is mapped to the thread ID. On Linux operating system the EDU ID is a Db2 generated unique identifier.

TID Thread identifier. Except on Linux operating systems, the thread ID is the unique identifier for the specific thread. On Linux operating systems, this is a Db2 generated unique identifier.

Kernel TID

A unique identifier for the operating system kernel thread in service.

EDU Name

Db2 specific name for the EDU.

USR Total CPU user time consumed by the EDU.

SYS Total CPU system time consumed by the EDU.

USR Delta

Indicates the delta of the CPU user time across a specified time interval.

SYS Delta

Indicates the delta of the CPU system time across a specified time interval.

See Sample output of the **db2pd -edus** command.

-extentmovement parameter

For the **-extentmovement** parameter, the following information is returned:

Extent Movement:

Address

The address of the extent being moved.

TbspName

The tablespace name of the extent being moved.

Current

The current extent being moved.

Last

The last extent being moved.

Moved

The number of extents that have been moved.

Left

The number of extents that are left to be moved.

TotalTime

The total amount of time it has taken to move the extents, measured in seconds.

See Sample output of the **db2pd -extentmovement** command.

-fcm parameter

For the **-fcm** parameter, the following information is returned:

FCM Usage Statistics:

Total Buffers

Total number of buffers, including all free and in-use ones.

Free Buffers

Number of free buffers.

Buffers LWM

Lowest number of free buffers.

Max Buffers

Maximum number of buffers that can be allocated based on the amount of virtual memory reserved when the instance was started.

Total Channels

Total number of channels, including all free and in-use ones.

Free Channels

Number of free channels.

Channels LWM

Lowest number of free channels.

Max Channels

Maximum number of channels that can be allocated based on the amount of virtual memory reserved when the instance was started.

Total Sessions

Total number of sessions, including all free and in-use ones.

Free Sessions

Number of free sessions.

Sessions LWM

Lowest number of free sessions.

Partition

The database partition server number.

Bufs Sent

The total number of FCM buffers that are sent from the database partition server where the **db2pd** command is running to the database partition server that is identified in the output.

Bufs Recv

The total number of FCM buffers that are received by the database partition server where the **db2pd** command is running from the database partition server that is identified in the output.

Status The logical connection status between the database partition server where the **db2pd** command is running and the other database partition servers that are listed in the output. The possible values are:

- Inactive: The database partition server is defined in the db2nodes.cfg file but is currently inactive (for example, the user has stopped the partition).
- Active: The database partition server is active.
- Undefined: The database partition server is not defined in the db2nodes.cfg file. This might indicate an error.
- Unknown: The database partition server is in an unknown state. This indicates an error.

Buffers Current[®] Consumption**AppHand1**

The application handle, including the node and the index.

TimeStamp

A unique identifier for the usage of an application handle.

Buffers In-use

The number of buffers currently being used by an application.

Channels Current Consumption**AppHand1**

The application handle, including the node and the index.

TimeStamp

A unique identifier for the usage of an application handle.

Channels In-use

The number of channels currently being used by an application.

Buffers Consumption HWM**AppHand1**

The application handle, including the node and the index.

TimeStamp

A unique identifier for the usage of an application handle.

Buffers Used

The high-watermark number of buffers used by an application since the start of the instance.

Channels Consumption HWM

AppHandle

The application handle, including the node and the index.

TimeStamp

A unique identifier for the usage of an application handle.

Channels Used

The high-watermark number of channels used by an application since the start of the instance.

-fmp parameter

For the **-fmp** parameter, the following information is returned:

- Pool Size: Current number of FMP processes in the FMP pool.
- Max Pool Size: Maximum number of FMP process in the FMP pool.
- Keep FMP: Value of **keepfenced** database manager configuration parameter.
- Initialized: FMP is initialized. Possible values are Yes and No.
- Trusted Path: Path of trusted procedures
- Fenced User: Fenced user ID

FMP Process:

- FmpPid: Process ID of the FMP process.
- Bit: Bit mode. Values are 32 bit or 64 bit.
- Flags: State flags for the FMP process. Possible values are:
 - 0x00000000 - JVM initialized
 - 0x00000002 - Is threaded
 - 0x00000004 - Used to run federated wrappers
 - 0x00000008 - Used for Health Monitor
 - 0x00000010 - Marked for shutdown and will not accept new tasks
 - 0x00000020 - Marked for cleanup by **db2sysc**
 - 0x00000040 - Marked for agent cleanup
 - 0x00000100 - All ipcs for the process have been removed
 - 0x00000200 - .NET runtime initialized
 - 0x00000400 - JVM initialized for debugging
 - 0x00000800 - Termination flag
- ActiveTh: Number of active threads running in the FMP process.
- PooledTh: Number of pooled threads held by the FMP process.
- Active: Active state of the FMP process. Values are Yes or No.

Active Threads:

- FmpPid: FMP process ID that owns the active thread.
- EduPid: EDU process ID that this thread is working.
- ThreadId: Active thread ID.

Pooled Threads:

- FmpPid: FMP process ID that owns the pooled thread.
- ThreadId: Pooled thread ID.

-fmpechistory | -fmpe parameter

For the **-fmpechistory | -fmpe** parameter, the following information is returned:

FMP Process:

- FmpPid - Process ID of the FMP process.
- Bit - Bit mode. Values are 32 bit or 64 bit.
- Flags - State flags for the FMP process. Possible values are:
 - 0x00000000 - JVM initialized
 - 0x00000002 - Is threaded
 - 0x00000004 - Used to run federated wrappers
 - 0x00000008 - Used for Health Monitor
 - 0x00000010 - Marked for shutdown and will not accept new tasks
 - 0x00000020 - Marked for cleanup by **db2sysc**
 - 0x00000040 - Marked for agent cleanup
 - 0x00000100 - All ipcs for the process have been removed
 - 0x00000200 - .NET runtime initialized
 - 0x00000400 - JVM initialized for debugging
 - 0x00000800 - Termination flag
- ActiveThrd - Number of active threads running in the FMP process.
- PooledThrd - Number of pooled threads held by the FMP process.
- ForcedThrd - Number of forced threads generated by the FMP process.
- Active - Active state of the FMP process. Values are Yes or No.

Active Threads:

- EduPid - EDU process ID that this thread is working.
- ThreadId - Active thread ID.
- RoutineID - The routine identifier.
- Timestamp - A unique identifier for the usage of an application handle.

Pooled Threads:

- ThreadId - Pooled thread ID.
- RoutineID - The routine identifier.
- Timestamp - A unique identifier for the usage of an application handle.

Forced Threads:

- ThreadId - Forced thread ID.
- RoutineID - The routine identifier.
- Timestamp - A unique identifier for the usage of an application handle.

See Sample output of the **db2pd -fmpechistory** command.

-hadr parameter

For the **-hadr** parameter, information related to high availability disaster recovery is returned. The information returned by this command depends on where it is issued:

- If it's issued from a standby, the command returns information about that standby and the primary only.

- If it's issued from a primary, the command returns information about the primary and all of the standbys.

In a Db2 pureScale environment, the command returns HADR information about log streams being processed by the local member. On a standby, if the command is issued on the replay member, it returns HADR information about all log streams, otherwise, it returns a message indicating that the database is not active on that member and no HADR information. If you use the `-allmembers` option, it returns the concatenated output from all members. This is one way to tell which member is the replay member. The other way is to look at `STANDBY_MEMBER` field from primary's monitoring output. If it's issued from a member on the primary, the command returns information about the stream owned by the member and all streams being assisted by the member. To see all of the streams in the cluster, issue the command with the `-allmembers` option.

Only information relevant to the current settings is shown, so for example if reads on standby is not enabled, information about the replay-only window is not shown.

HADR_ROLE

The current HADR role of the local database. Possible values are:

- PRIMARY
- STANDBY

REPLAY_TYPE

The type of HADR replication of the database. The possible value is:

- PHYSICAL

HADR_SYNCMODE

The current HADR synchronization mode of the local database. Possible values are:

- ASYNC
- NEARSYNC
- SUPERASYNC
- SYNC

Note: The `HADR_SYNCMODE` value of the standby is shown as an empty string (a zero-length string) until the primary connects to the standby database.

STANDBY_ID

The identifier for all the standbys in the current setup. This value has meaning only when the command is issued on the primary. If you issue it on a standby, it always returns 0 because standbys are not visible to each other. The 1 identifier is always assigned to the standby if there is only one standby. If you have multiple standbys in your setup, 1 indicates the principal standby.

LOG_STREAM_ID

The identifier for the log stream that is being shipped from the primary database.

HADR_STATE

The current HADR state of the database. Possible values are:

- DISCONNECTED
- DISCONNECTED_PEER
- LOCAL_CATCHUP

- PEER
- REMOTE_CATCHUP
- REMOTE_CATCHUP_PENDING

HADR_FLAGS

A string of one or more of the following flags indicating HADR condition:

ASSISTED_REMOTE_CATCHUP

The stream is in assisted remote catchup.

ASSISTED_MEMBER_ACTIVE

During assisted remote catchup, the member on the primary that is being assisted is active. This is an abnormal condition because an active member is expected to connect to standby directly.

STANDBY_LOG_RETRIEVAL

The standby database is interacting with the log archive device to retrieve log files.

STANDBY_RECV_BLOCKED

The standby temporarily cannot receive more logs. Possible causes are:

- When log spooling is disabled, the log receive buffer is full (STANDBY_RECV_BUF_PERCENT is 100%).
- When log spooling is enabled, spooling has reached the spool limit (STANDBY_SPOOL_PERCENT is 100%).
- The standby log device is full (indicated by the STANDBY_LOG_DEVICE_FULL flag). This condition can happen when spooling is enabled or disabled.

In all of these cases, after replay makes progress, more space is released and log receive can resume. .

STANDBY_LOG_DEVICE_FULL

The standby log device is full. This condition blocks log receive until some more space is released as replay proceeds.

STANDBY_REPLY_NOT_ON_PREFERRED

The current replay member on the standby is not the preferred replay member.

STANDBY_KEY_ROTATION_ERROR

The standby database encountered a master key rotation error. No logs are received until the error is corrected. The system shuts down if the error is not corrected within the timeout period (30 minutes).

PRIMARY_MEMBER_HOST

The local host, indicated by the **hadr_local_host** configuration parameter, of the member on the primary that is processing the log stream.

PRIMARY_INSTANCE

The instance name of the primary database processing the log stream.

PRIMARY_MEMBER

The member on the primary that is processing the log stream.

STANDBY_MEMBER_HOST

The local host, indicated by the **hadr_local_host** configuration parameter, of the standby member processing the log stream.

STANDBY_INSTANCE

The instance name of the standby database processing the log stream.

STANDBY_MEMBER

The standby member processing the log stream.

HADR_CONNECT_STATUS

The current HADR connection status of the database. Possible values are:

- CONGESTED
- CONNECTED
- DISCONNECTED

HADR_CONNECT_STATUS_TIME

The time when the current HADR connection status began. Depending on the HADR_CONNECT_STATUS value, the HADR_CONNECT_STATUS_TIME value indicates:

- Congestion start time
- Connection start time
- Disconnection time

HEARTBEAT_INTERVAL

The heartbeat interval in seconds, which is computed from various factors such as the values of the **hadr_timeout** and **hadr_peer_window** configuration parameters. The HEARTBEAT_INTERVAL element indicates how often the primary and standby exchange monitor information.

HEARTBEAT_MISSED

Number of heartbeat messages not received on time on this log stream. Messages start accumulating when a database is started on the local member. This number should be viewed relative to the HEARTBEAT_EXPECTED value. For example, 100 missed heartbeats when HEARTBEAT_EXPECTED is 1000 is a 10% miss rate. This miss rate indicates a network problem. However, 100 missed heartbeats when HEARTBEAT_EXPECTED is 10000 is a 1% miss rate and is unlikely to be a network issue. Take the HEARTBEAT_INTERVAL value into account when assessing the HEARTBEAT_EXPECTED value. A short HEARTBEAT_INTERVAL value can cause the HEARTBEAT_MISSED value to appear high even though it is safe.

HEARTBEAT_EXPECTED

Number of heartbeat messages expected on this log stream. These messages accumulate when a database is started on the local member. With the HEARTBEAT_MISSED value, you can determine the health of a network for a given time duration.

HADR_TIMEOUT

The time, in seconds, by which an HADR database must receive a message from its partner database. After this period of time, an HADR database server considers that the connection between the databases has failed and disconnects.

TIME_SINCE_LAST_RECV

The time, in seconds, that has elapsed since the last message was received, so the larger the number, the longer the delay in message delivery. When the TIME_SINCE_LAST_RECV value equals the HADR_TIMEOUT value, the connection between the databases is closed.

PEER_WAIT_LIMIT

The length of time, in seconds, that the primary database waits before

breaking out of peer state if logging is blocked waiting for HADR log shipping to the standby. A value of 0 indicates no timeout.

LOG_HADR_WAIT_CUR

The length of time, in seconds, that the logger has been waiting on an HADR log shipping request. A value of 0 is returned if the logger is not waiting. When the wait time reaches the value that is returned in the PEER_WAIT_LIMIT field, HADR breaks out of peer state to unblock the primary database.

LOG_HADR_WAIT_RECENT_AVG

The average time, in seconds, for each log flush.

LOG_HADR_WAIT_ACCUMULATED

The accumulated time, in seconds, that the logger has spent waiting for HADR to ship logs.

LOG_HADR_WAIT_COUNT

The total count of HADR wait events in the logger. The count is incremented every time the logger initiates a wait on HADR log shipping, even if the wait returns immediately. As a result, this count is effectively the number of log flushes while the databases are in peer state.

SOCK_SEND_BUF_REQUESTED,ACTUAL

- The requested socket send buffer size (SOCK_SEND_BUF_REQUESTED), in bytes. A value of 0 indicates no request (the system default is used).
- The actual socket send buffer size (SOCK_SEND_BUF_ACTUAL), in bytes.

SOCK_RECV_BUF_REQUESTED,ACTUAL

- The requested socket receive buffer size (SOCK_RECV_BUF_REQUESTED), in bytes. A value of 0 indicates no request (the system default is used).
- The actual socket receive buffer size (SOCK_RECV_BUF_ACTUAL), in bytes.

PRIMARY_LOG_FILE,PAGE,POS

- The name of the current log file of the log stream on the primary database (PRIMARY_LOG_FILE).
- The page number in the current log file indicating the current log position on the primary HADR database. The page number is relative to its position in the log file. For example, page 0 is the beginning of the file (PRIMARY_LOG_PAGE).
- The current receive log position (byte offset) of the log stream on the primary database (PRIMARY_LOG_POS).

STANDBY_LOG_FILE,PAGE,POS

- The name of the log file corresponding to the standby receive log position on the log stream (STANDBY_LOG_FILE).
- The page number (relative to its position in the log file) corresponding to the standby receive log position (STANDBY_LOG_PAGE).
- The current log position of the standby HADR database (STANDBY_LOG_POS).

HADR_LOG_GAP

The running average, in bytes, of the gap between the PRIMARY_LOG_POS value and STANDBY_LOG_POS value.

STANDBY_REPLY_LOG_FILE,PAGE,POS

- The name of the log file corresponding to the standby replay log position on the log stream (`STANDBY_REPLAY_LOG_FILE`).
- The page number in the standby replay log file corresponding to the standby replay log position (`STANDBY_REPLAY_LOG_PAGE`). The page number is relative to its position in the log file. For example, page 0 is the beginning of the file.
- The byte offset of the standby replay log position on the log stream (`STANDBY_REPLAY_LOG_POS`).

`STANDBY_RECV_REPLAY_GAP`

The average, in bytes, of the gap between the standby log receive position and the standby log replay position. If the value of this gap reaches the combined value of the standby's receive buffer size and the standby's spool limit, the standby stops receiving logs and blocks the primary if it is in peer state.

`PRIMARY_LOG_TIME`

The latest transaction timestamp of the log stream on the primary database.

`STANDBY_LOG_TIME`

The latest transaction timestamp of received logs on the log stream on the standby database.

`STANDBY_REPLAY_LOG_TIME`

The transaction timestamp of logs being replayed on the standby database.

`STANDBY_RECV_BUF_SIZE`

The standby receive buffer size, in pages.

`STANDBY_RECV_BUF_PERCENT`

The percentage of standby log receive buffer that is currently being used. Even if this value is 100, indicating that the receive buffer is full, the standby can continue to receive logs if you enabled log spooling.

`STANDBY_SPOOL_LIMIT`

The maximum number of pages to spool. A value of 0 indicates that log spooling is disabled; a value of -1 indicates that there is no limit. When the `hadr_spool_limit` configuration parameter is AUTOMATIC (the default in V11.1), this field returns the computed spool size in units of pages; that is, the actual maximum size of the spool.

`STANDBY_SPOOL_PERCENT`

The percentage of spool space used, relative to the configured spool limit. If the spool limit is 0 (spooling disabled) or -1 (unlimited spooling), NULL is returned. When `STANDBY_SPOOL_PERCENT` percent reaches 100%, the standby stops receiving logs, until some more space is released as replay proceeds. Note that spooling can stop before the limit is hit (before `STANDBY_SPOOL_PERCENT` reaches 100%), if the spool device (standby log path) is full.

`STANDBY_ERROR_TIME`

The most recent time when the standby database encountered a major error. Check the administration notification log and `db2diag.log` for error messages that have occurred since the last time you checked for errors. Check the logs fully, not just until the value reported by the `STANDBY_ERROR_TIME` value. There might be multiple errors. Log entries might include, but are not limited to, the following errors:

- Replay errors taking a table space to an abnormal state

- Load replay errors taking a table to an invalid state

The STANDBY_ERROR_TIME value is reset to NULL when a database changes its role from primary or standard to standby. It is not reset when a standby database is deactivated and reactivated.

PEER_WINDOW

The value of the **hadr_peer_window** database configuration parameter.

READS_ON_STANDBY_ENABLED

An indicator of whether the HADR reads on standby feature is enabled.

Possible values are:

- Y
- N

STANDBY_REPLAY_ONLY_WINDOW_ACTIVE

An indicator of whether the replay-only window (caused by DDL or maintenance-operation replay) is in progress on the standby, meaning that readers are not allowed on the standby. Possible values are:

- Y
- N

PEER_WINDOW_END

The point in time until which the primary database stays in peer or disconnected peer state, as long as the primary database is active. The field is displayed only if you enabled a peer window.

STANDBY_REPLAY_DELAY

Indicates the value of the **hadr_replay_delay** database configuration parameter.

TAKEOVER_APP_REMAINING_PRIMARY

The current number of applications still to be forced off the primary during a non-forced takeover. This field is displayed only if there is a non-forced takeover in progress.

TAKEOVER_APP_REMAINING_STANDBY

The current number of applications still to be forced off the read-enabled standby during a takeover. This field is displayed only if there is a takeover in progress.

STANDBY_REPLAY_ONLY_WINDOW_START

The time at which the current replay-only window became active. This field is displayed only if there is an active replay-only window on the read-enabled standby.

STANDBY_REPLAY_ONLY_WINDOW_TRAN_COUNT

The total number of existing uncommitted DDL or maintenance transactions that have been executed so far in the current replay-only window. This field is displayed only if there is an active replay-only window on the read-enabled standby.

-latches parameter

For the **-latches** parameter, the following information is returned:

Address

Address of the holding latch in the virtual address space.

Holder The EDU ID of the EDU that is holding the latch.

Waiter The EDU ID of the EDU waiting for the latch.

Filename

The source file name where the latch is obtained.

LOC The line of code in the file indicated by the file name where the latch is obtained.

LatchType

The identity of the latch being held.

-load parameter

For the **-load** parameter, the following information is returned:

LoadID The ID of a specific load operation.

EDU ID The unique identifier for the engine dispatchable unit (EDU). Except on Linux operating systems, the EDU ID is mapped to the thread ID. On Linux operating system the EDU ID is a Db2 generated unique identifier.

EDU Name

Db2 specific name for the EDU.

TableName

The name of the table.

SchemaName

The schema that qualifies the table name.

AppHandle

The application handle, including the node and the index.

Application ID

The application ID. This values is the same as the **app1_id** monitor element data.

StartTime

The date and time when the load operation was originally invoked.

LoadPhase

The phase that the load operation is currently in.

-locks parameter

For the **-locks** parameter, the following information is returned:

TranHdl

The transaction handle that is requesting the lock.

Lockname

The name of the lock.

Type The type of lock. The possible values are:

- Row (row lock)
- Pool (table space lock)
- Partition (data partition lock)
- Table (table lock)
- AlterTab (internal alter table lock)
- ObjectTab (internal object table lock)
- OnlBackup (on line backup lock)
- DMS Seq (DMS sequence lock)
- Internal P (internal plan lock)

- Internal V (internal variation lock)
- Key Value (key value lock)
- No Lock (no lock held)
- Block Lock (MDC block lock)
- LF Release (long field lock)
- LFM File (long field lock)
- LOB/LF 4K (LOB / long field buddy space lock)
- APM Seq (internal sequence lock)
- Tbsp Load (internal loading table space lock)
- DJ UserMap (federated user mapping lock)
- DF NickNm (federated nick name lock)
- CatCache (internal catalog lock)
- OnlReorg (on line reorg lock)
- Buf Pool (buffer pool lock)
- Col Table Serialize (column-organized table update/delete serialization lock)

Mode The lock mode. The possible values are:

- IS (intent share)
- IX (intent exclusive)
- S (share)
- SIX (share with intention exclusive)
- X (exclusive)
- IN (intent none)
- Z (super exclusive)
- U (update)
- NS (scan share)
- NW (next key weak exclusive)

Sts The lock status. The possible values are:

- G (granted)
- C (converting)
- W (waiting)

Owner

The transaction handle that owns the lock.

In certain timing scenarios, when a transaction is waiting for a lock, the transaction holding the lock cannot be identified. In these cases, the Owner field will contain the transaction handle of the transaction requesting the lock.

Dur The duration of the lock.

HoldCount

The number of holds placed on the lock. Locks with holds are not released when transactions are committed.

Att The attributes of the lock. Possible values are:

- 0x00000001 Wait for availability.
- 0x00000002 Acquired by escalation.
- 0x00000004 RR lock "in" block.
- 0x00000008 Insert Lock.
- 0x00000010 Lock by RR scan.
- 0x00000020 Update/delete row lock.
- 0x00000040 Allow new lock requests.
- 0x00000080 A new lock requestor.
- 0x00000400 Lock held by low priority application.

- 0x00010000 Lock held by Indoubt Transaction.

ReleaseFlg

The lock release flags. Possible values are:

- 0x80000000 Locks by SQL compiler.
- 0x40000000 Non-unique, untracked locks.

rrIID The IID of the index through which the RR lock (0x10 attribute shown previously) was acquired. Possible values are:

- 0 Not related to a single, specific index (or not an RR lock).
- <>0 The specific index IID used to acquire the lock.

TableNm

The table name of the transaction that is holding the lock.

SchemaNm

The schema name of the transaction that is holding the lock.

-logs parameter

For the **-logs** parameter, the following information is returned:

Current Log Number

The number of the current active log.

Pages Written

The current page being written in the current log.

Cur Commit Disk Log Reads

The number of times the currently committed version of a row was retrieved via a log read from disk (versus log buffer).

Cur Commit Total Log Reads

The total number of times the currently committed version of a row was retrieved from the logs (log buffer and disk).

Method 1 Archive Status

The result of the most recent log archive attempt. Possible values are Success or Failure.

Method 1 Next Log to Archive

The next log file to be archived.

Method 1 First Failed

The first log file that was unsuccessfully archived.

Method 2 Archive Status

The result of the most recent log archive attempt. Possible values are Success or Failure.

Method 2 Next Log to Archive

The next log file to be archived.

Method 2 First Failed

The first log file that was unsuccessfully archived.

StartLSN

The starting log sequence number.

StartLSO

The first LSO of the log file.

State 0x00000020 indicates that the log has been archived.

Size The size of the log's extent, in pages.

Pages The number of pages in the log.

Filename

The file name of the log.

Log Chain ID

The identifier of the log chain number

Current LSN

The current log sequence number (LSN)

Current LSO

The current LSO.

See Sample output of the **db2pd -logs** command.

-memblocks parameter

For the **-memblocks** parameter, there are three sections of output: individual blocks for the memory set, sorted totals grouped by memory pool, and sorted totals for the memory set:

Memory blocks:

PoolID The memory pool id that owns the memory block.

PoolName

The memory pool name that owns the memory block.

BlockAge

The block age of the memory block. This is an incremental counter assigned as blocks are allocated.

Size The size of the memory block in bytes.

I The type of allocation. Value 1 means block will be freed individually while value 0 means it will be freed with the pool.

LOC Line of code that allocated the memory block.

File Filename hash value from where the block was allocated.

Sorted totals reported for each memory pool:

PoolID The memory pool id that owns the memory block.

PoolName

The memory pool name that owns the memory block.

TotalSize

The total size of blocks (in bytes) allocated from the same line of code and file.

TotalCount

The number of blocks allocated from the same line of code and file.

LOC Line of code that allocated the memory block.

File Filename hash value from where the block was allocated.

Sorted totals reported for each memory set:

PoolID The memory pool id that owns the memory block.

PoolName

The memory pool name that owns the memory block.

TotalSize

The total size of blocks (in bytes) allocated from the same line of code and file.

%Bytes The percentage bytes allocated from the same line of code and file.

TotalCount

The number of blocks allocated from the same line of code and file.

%Count The percentage count allocated from the same line of code and file.

LOC Line of code that allocated the memory block.

File Filename hash value from where the block was allocated.

-mempools parameter

For the **-mempools** parameter, the following information is returned (All sizes are specified in bytes):

MemSet The memory set that owns the memory pool.

PoolName

The name of the memory pool.

Id The memory pool identifier.

SecondId

The second memory pool identifier to distinguish between multiple memory pools of the same type.

Overhead

The internal usage information required for the pool structures.

LogSz The current total of pool memory requests.

LogHWM The logical size high water mark.

PhySz The physical memory required for logical size.

PhyHWM The largest physical size reached during processing.

CfgSize

The configured size of the memory pool.

Bnd Specifies whether the memory pool has a fixed upper limit.

B1kCnt The current number of allocated blocks in the memory pool.

CfgParm

The configuration parameter that declares the size of the pool being reported.

-memsets parameter

For the **-memsets** parameter, the following information is returned:

Name The name of the memory set.

Address

The address of the memory set.

Id The memory set identifier.

Size(Kb)

The size of the memory set in kilobytes.

Key The memory set key (for UNIX operating systems only).

DBP The database partition server that owns the memory set.

Type The type of memory set.

Unrsv(Kb)

Memory not reserved for any particular pool. Any pool in the set can use this memory if needed.

Used(Kb)

Memory currently allocated to memory pools.

HWM(Kb)

Maximum memory ever allocated to memory pools.

Cmt(Kb)

All memory that has been committed by the Db2 database, and occupies physical RAM, paging space, or both.

Uncmt(Kb)

Memory not currently being used, and marked by the Db2 database to be uncommitted. Depending on the operating system, this memory could occupy physical RAM, paging space, or both.

CmtRt(Kb)

The largest contiguous area of committed memory that is available.

DcmtRt(Kb)

The largest contiguous area of uncommitted memory that is available.

HoldRt(Kb)

The largest contiguous area of committed memory that is available for volatile requests.

Sngl The number of pre-allocated regions that are available for faster allocation.

-osinfo parameter

For the **-osinfo** parameter, the following information is returned:

CPU information: (On Windows, AIX, HP-UX, Solaris and Linux operating systems)

TotalCPU

Total number of CPUs.

OnlineCPU

Number of CPUs online.

ConfigCPU

Number of CPUs configured.

Speed(MHz)

Speed, in MHz, of CPUs.

HMTDegree

Systems supporting hardware multithreading return a value showing the number of processors that will appear to be present on the operating system. On nonHMT systems, this value is always

1. On HMT systems, TOTAL reflects the number of logical CPUs. To get the number of physical CPUs, divide the total by THREADING DEGREE.

Timebase

Frequency, in Hz, of the timebase register increment. This is supported on Linux PPC only.

Cores/Socket

Number of cores per socket

Physical memory and swap in megabytes: (On Windows, AIX, HP-UX, Solaris and Linux operating systems)

TotalMemTotal

Size of memory in megabytes.

FreeMem

Amount of free memory in megabytes.

AvailMem

Amount of memory available to the product in megabytes.

TotalSwap

Total amount of swap space in megabytes.

FreeSwap

Amount of swap space free in megabytes.

Virtual memory in megabytes (On Windows, AIX, HP-UX, and Solaris operating systems)

Total Total amount of virtual memory on the system in megabytes.

Reserved

Amount of reserved virtual memory in megabytes.

Available

Amount of virtual memory available in megabytes.

Free

Amount of virtual memory free in megabytes.

Operating system information (On Windows, AIX, HP-UX, Solaris and Linux operating systems)

OSName Name of the operating system software.

NodeName

Name of the system.

Version

Version of the operating system.

Machine

Machine hardware identification.

Message queue information (On AIX, HP-UX, and Linux operating systems)

MsgSeg System-wide total of SysV msg segments.

MsgMax System-wide maximum size of a message.

MsgMap System-wide number of entries in message map.

MsgMni System-wide number of message queue identifiers for system.

MsgTql System-wide number of message headers.

MsgMnb Maximum number of bytes on a message queue.

MsgSsz Message segment size.

Shared memory information (On AIX, HP-UX, and Linux operating systems)

ShmMax System-wide maximum size of a shared memory segment in bytes.

ShmMin System-wide minimum size of a shared memory segment in bytes.

ShmIds System-wide number of shared memory identifiers.

ShmSeg Process-wide maximum number of shared memory segments per process.

Semaphore information: (On AIX, HP-UX, and Linux operating systems)

SemMap System-wide number of entries in semaphore map.

SemMni System-wide maximum number of a semaphore identifiers.

SemMns System-wide maximum number of semaphores on system.

SemMnu System-wide maximum number of undo structures on system.

SemMs1 System-wide maximum number of semaphores per ID.

SemOpm System-wide maximum number of operations per semop call.

SemUme Process-wide maximum number of undo structures per process.

SemUsz System-wide size of undo structure. Derived from semume.

SemVmx System-wide maximum value of a semaphore.

SemAem System-wide maximum adjust on exit value.

CPU load information (On Windows, AIX, HP-UX, Solaris, and Linux operating systems)

shortPeriod

The number of runnable processes over the preceding 1 minute.

mediumPeriod

The number of runnable processes over the preceding 5 minutes.

longPeriod

The number of runnable processes over the preceding 15 minutes.

CPU Usage Information (percent) (On Windows, AIX, HP-UX, Solaris, and Linux operating systems)

Total This shows the total percent of Usr + Sys CPU usage.

Usr This shows the percent of CPU used by programs executing in user mode.

Sys This shows the percent of CPU used by programs executing in system mode.

Wait This shows the percent of time spent waiting for IO.

Idle This shows the percent of time the CPU(s) is idle.

Note: These metrics are aggregated across all logical processors on the system. On the AIX operating system, the metrics are for the Workload Partition (WPAR) and Logical Partition (LPAR) where the Db2 server is running.

Disk information

BkSz(bytes)

File system block size in bytes.

Total(bytes)

Total number of bytes on the device in bytes.

Free(bytes)

Number of free bytes on the device in bytes.

Inodes Total number of inodes.

FSID File system ID.

DeviceType

Device type.

FSName File system name.

MountPoint

Mount point of the file system.

-pages parameter

For the **-pages** parameter, the following information is returned for each page:

BPID Bufferpool ID that contains the page.

TbspaceID

Table space ID that contains the page.

TbspacePgNum

Logical page number within the table space (DMS only).

ObjID Object ID that contains the page.

ObjPgNum

Logical page number within the object.

ObjClass

Class of object contained in the page. Possible values are Perm, Temp, Reorg, Shadow, and EMP.

ObjType

Type of object contained in the page. Possible values are Data, Index, LongField, XMLData, SMP, LOB, LOBA, and BlockMap.

Dirty Indicates if the page is dirty. Possible values are Y and N. In the summary information section of the pages output, the value indicates the number of dirty pages.

Permanent

In the summary information section of the pages output, the value indicates the number of PERMANENT pages.

Temporary

In the summary information section of the pages output, the value indicates the number of TEMPORARY pages.

Prefetched

Indicates if the page has been prefetched. Possible values are Y and N.

See Sample output of the **db2pd -pages** command.

-recovery parameter

For the **-recovery** parameter, the following information is returned:

Database State

The state of the catalog partition in partitioned database environments if the database catalog partition fails. If the database catalog partition fails, the CATALOGNODEFAIL state is returned. Otherwise, no information is returned. This state can be displayed from any database partition.

Recovery Status

The internal recovery status.

Current Log

The current log being used by the recovery operation.

Current LSN

The current log sequence number.

Current LRI

The current LRI.

Current LSO

The current LSO.

Job Type

The type of recovery being performed. The possible values are:

- 5: Crash recovery.
- 6: Rollforward recovery on either the database or a table space.

Job ID

The job identifier.

Job Start Time

The time the recovery operation started.

Job Description

A description of the recovery activity. The possible values are:

- Tablespace Rollforward Recovery
- Database Rollforward Recovery
- Crash Recovery

Invoker Type

How the recovery operation was invoked. The possible values are:

- User
- DB2

Total Phases

The number of phases required to complete the recovery operation.

Current phase

The current phase of the recovery operation.

Phase

The number of the current phase in the recovery operation.

Forward phase

The first phase of rollforward recovery. This phase is also known as the REDO phase.

Backward phase

The second phase of rollforward recovery. This phase is also known as the UNDO phase.

Metric

The units of work. The possible values are:

- 1: Bytes.

- 2: Extents.
- 3: Rows.
- 4: Pages.
- 5: Indexes

TotWkUnits

The total number of units of work (UOW) to be done for this phase of the recovery operation.

TotCompUnits

The total number of UOWs that have been completed.

-reopt parameter

For the **-reopt** parameter, the following information is returned:

Dynamic SQL Statements

See **-dynamic**.

Dynamic SQL Environments

See the **-dynamic**.

Dynamic SQL Variations

See the **-dynamic**.

Reopt Values

Displays information about the variables that were used to reoptimize a given SQL statement. Information is not returned for variables that were not used. Valid values are:

AnchID The hash anchor identifier.

StmtID The statement identifier for this variation.

EnvID The environment identifier for this variation.

VarID The variation identifier.

OrderNum

Ordinal number of the variable that was used to reoptimize of the SQL statement

SQLZType

The variable type.

CodPg The variable code page.

NulID The flag indicating whether or not the value is null-terminated.

Len The length in bytes of the variable value.

Data The value used for the variable.

-reorgs parameter

For the **-reorgs** parameter, the following information is returned:

Index Reorg Stats:

Retrieval time

Retrieval time of this set of index reorg statistics information.

TabSpaceID

The table space identifier.

TableID

The table identifier.

Schema Table schema.**TableName**

The name of the table.

MaxPartition

Total number of partitions for the table being processed. For partition-level reorg, MaxPartition will always have a value of 1 since only a single partition is being reorganized. This field is only displayed for partitioned indexes.

PartitionID

The data partition identifier for the partition being processed. This field is only displayed for partitioned indexes.

Access Access level, possible values are:

- Allow none
- Allow read
- Allow write

Status Current reorg status, one of:

- In Progress (operation is in progress)
- Completed (operation has completed successfully)
- Stopped (operation has stopped due to error or interrupt)

Start time

Start time of this reorg session.

End time

End time of this reorg session.

Total duration

Total duration time of this reorg session.

Prev Index Duration

Reorg duration of the previous (completed) index.

Cur Index Start

Reorg start time of the current (in progress) index.

Cur Index

Sequence number of the current (in progress) index.

Max Index

Total number of indexes being monitored. This is not the same as total number of indexes on the table, because some system-generated indexes are not monitored.

Index ID

Index ID of the current (in progress) index.

Cur Phase

Sequence number of the current phase. Enclosed within the braces is the name of the current phase, one of:

- Scan (the table is being scanned and sorted one data page at a time)
- Build (the index is being built from the sorted input one row at a time)

- Catchup (transactions that occurred while building the index are being replayed; only seen for index reorgs where access level is allow write)

Max Phase

Total number of phases for the current (in-progress) index; differs for different types of indexes.

CurCount

Units of work processed so far. Unit has a different meaning for each reorg phase, as follows:

- Scan phase: number of data pages scanned
- Build phase: number of rows processed
- Catchup: number of transaction log records replayed

MaxCount

Total number of units for the current phase (see CurCount for explanation on units).

Total Row Count

Total number of rows processed. May or may not show up depending on the phase and index type.

See Sample output of the **db2pd -reorgs index** command.

Table Reorg Stats:

Address

A hexadecimal value.

TableName

The name of the table.

Start The time that the table reorganization started.

End The time that the table reorganization ended.

PhaseStart

The start time for a phase of table reorganization.

MaxPhase

The maximum number of reorganization phases that will occur during the reorganization. This value only applies to offline table reorganization.

Phase The phase of the table reorganization. This value only applies to offline table reorganization. The possible values are:

- Sort
- Build
- Replace
- InxRecreat

CurCount

A unit of progress that indicates the amount of table reorganization that has been completed. The amount of progress represented by this value is relative to the value of MaxCount, which indicates the total amount of work required to reorganize the table.

MaxCount

A value that indicates the total amount of work required to reorganize the table. This value can be used in conjunction with CurCount to determine the progress of the table reorganization.

Status The status of an online table reorganization. This value does not apply to offline table reorganizations. The possible values are:

- Started
- Paused
- Stopped
- Done
- Truncat

Completion

The success indicator for the table reorganization. The possible values are:

- 0: The table reorganization completed successfully.
- -1: The table reorganization failed.

PartID The data partition identifier. One row is returned for each data partition, showing the reorganization information.

MasterTbs

For partitioned tables, this is the logical table space identifier to which the partitioned table belongs. For non-partitioned tables, this value corresponds to the TbspaceID.

MasterTab

For partitioned tables, this is the logical table identifier of the partitioned table. For non-partitioned tables, this value corresponds to the TableID.

Type The type of reorganization. The possible values are:

- Online
- Offline

IndexID

The identifier of the index that is being used to reorganize the table.

TempSpaceID

The table space in which the table is being reorganized.

-scansharing parameter

For the **-scansharing** parameter, the following fields are returned, specific to the headings:

Individual shared scan

- Agent ID
- Application ID
- ScanMode (prewrap or postwrap)
- IsScanWrappable
- Scan speed
- Time spent getting throttled
- Relative location of scan in pages within group (for block index scans). Absolute location of scan in pages (for table and range scans)
- Predicted speed category (SLOW or FAST)
- Remaining pages to process (accurate for table and range scans). For block index scans, the optimizer estimate is returned instead.

See Sample output of the **db2pd -scansharing** command.

Sharing set

- Table space ID
- Table ID
- Scan object (0 for table scans or ID of block index)
- Number of groups
- Sharing set footprint in pages
- Table size in pages (for table scans and block index scans on nonpartitioned tables, and for range scans on partitioned tables; for block index scans on partitioned tables the value is unknown)
- Fast scan speed (speed at which FAST scans are going)
- Slow scan speed (speed at which SLOW scans are going)

Sharing group

- Number of scans in the group
- Group footprint (in number of pages)

-serverlist parameter

For the **-serverlist** parameter, the following information is returned:

Time The time when the server list was cached

Database Name

The name of the database

Count The number of entries in the server list

Hostname

The TCP/IP hostname of a member

Non-SSL Port

The non-SSL port that a member is listening on for client connections

SSL Port

The SSL TCP/IP port that a member is listening on for client connections

Priority

The relative load of a member, also known as the weight. A member (A) having a higher value compared with another member (B) indicates to the client that more work should be directed at member A.

-serviceclasses parameter

For the **-serviceclasses** parameter, the following fields are returned, specific to the headings:

Service class fields:

- Service Class Name: Name of service class
- Service Class ID: System generated ID of service class
- Service Class Type: Type of service class: superclass or subclass
- Service Class State (Effective and Catalog): State of service class: enabled or disabled
- Effective Prefetch Priority and Catalog Prefetch Priority: Effective prefetch priority setting for service class that maps to priority recorded in SYSCAT.SERVICECLASSES
- Effective Bufferpool Priority and Catalog Bufferpool Priority: Effective buffer pool priority setting for service class that maps to priority recorded in SYSCAT.SERVICECLASSES

- Effective Outbound Correlator and Catalog Outbound Correlator: Effective outbound correlator setting for service class that maps to correlator recorded in SYSCAT.SERVICECLASSES)
- CPU Shares: number of WLM dispatcher CPU shares configured for the service class
- CPU Shares Type: WLM dispatcher CPU share type
- CPU Limit: WLM dispatcher CPU limit configured for the service class
- Last Statistics Reset Time: Timestamp of last statistics reset for service class

Service superclass fields:

- Default Subclass ID: Service class ID of Default Subclass
- Work Action Set ID: ID of work action set associated with service superclass
- Collect Request Metrics: Setting of COLLECT REQUEST METRICS option for service class
- Num Connections: Current number of coordinator and remote connections in service superclass
- Num Coordinator Connections: Current number of coordinator connections in service superclass
- Coordinator Connections HWM: High water mark for coordinator connections since last statistics reset
- Associated Workload Occurrences (WLO): List of workload occurrences currently in service superclass

Service subclass fields:

- Parent Superclass ID: Service class ID of parent superclass
- Collect Activity Opt: Setting of COLLECT ACTIVITY DATA option for service subclass
- Collect Aggr Activity Opt: Setting of COLLECT AGGREGATE ACTIVITY option for service subclass
- Collect Aggr Request Opt: Setting of COLLECT AGGREGATE REQUEST option for service subclass
- Act Lifetime Histogram Template ID: ID of Activity Lifetime Histogram Template
- Act Queue Time Histogram Template ID: ID of Activity Queue Time Histogram Template
- Act Execute Time Histogram Template ID: ID of Activity Execute Time Histogram Template
- Act Estimated Cost Histogram Template ID: ID of Activity Estimated Cost Histogram Template
- Act Interarrival Time Histogram Template ID: ID of Activity Interarrival Time Histogram Template
- Request Execute Time Histogram Template ID: ID of Request Execute Time Histogram Template
- Access Count: Current number of activities in service subclass
- Activities HWM: High water mark for activities since last statistics reset, counting both activities that entered the system through this subclass and activities that you remap into this subclass by a REMAP ACTIVITY threshold action.

- Activities Completed: Total number of activities completed since last statistics reset. If you remap an activity to a different subclass with a REMAP ACTIVITY action before it completes, then this activity counts only toward the total of the subclass it completes in.
- Activities Rejected: Total number of activities rejected since last statistics reset
- Activities Aborted: Total number of activities aborted since last statistics reset. If you remap an activity to a different subclass with a REMAP ACTIVITY action before it aborts, then this activity counts only toward the total of the subclass it aborts in.
- Associated Agents: List of agent currently working in service subclass
- Associated Non-agent threads: List of non-agent entities currently working in service subclass

See Sample output of the **db2pd -serviceclasses** command.

-sort parameter

For the **-sort** parameter, the following information is returned:

App1Hand1

The application handle, including the node and the index.

SortCB

MaxRowSize

The sum of the maximum length of all columns of the row being sorted

EstNumRows

The Optimizer estimated number of rows that will be inserted into the sort

EstAvgRowSize

The Optimizer estimated average length of the rows being sorted

NumSMPSorts

The number of concurrent subagents processing this sort

NumSpills

The total number of times this sort has spilled to disk

KeySpec

A description of the type and length of each column being sorted

SortheapMem

The number of KB of sortheap memory reserved and allocated by this sort

NumSpilledRows

The total number of rows spilled to disk for this sort

NumBufferedRows

The total number of rows inserted into this sort since the last time it spilled

-static parameter

For the **-static** parameter, the following information is returned:

Static Cache:

Current Memory Used

The number of bytes used by the package cache.

Total Heap Size

The number of bytes internally configured for the package cache.

Cache Overflow flag state

A flag to indicate whether the package cache is in an overflow state.

Number of References

The number of references to packages in the package cache.

Number of Package Inserts

The number of package inserts into the package cache.

Number of Section Inserts

The number of static section inserts into the package cache.

Packages:

Schema The qualifier of the package.

PkgName

The name of the package.

Version

The version identifier of the package.

UniqueID

The consistency token associated with the package.

NumSec The number of sections that have been loaded.

UseCount

The usage count of the cached package.

NumRef The number of times the cached package has been referenced.

Iso The isolation level of the package.

QOpt The query optimization of the package.

B1k The blocking factor of the package.

Lockname

The lockname of the package.

Sections:

Schema The qualifier of the package that the section belongs to.

PkgName

The package name that the section belongs to.

UniqueID

The consistency token associated with the package that the section belongs to.

SecNo The section number.

NumRef The number of times the cached section has been referenced.

UseCount

The usage count of the cached section.

StmtType

The internal statement type value for the cached section.

Cursor The cursor name (if applicable).

W-Hld Indicates whether the cursor is a WITH HOLD cursor.

-statisticscache parameter

For the **-statisticscache** parameter, the following information is returned:

Current Size

The current number of bytes used in the statistics cache.

Address

The address of the entry in the statistics cache.

Schema

The schema qualifier for the table.

Name

The name of the table.

LastRefID

The last process identifier that referenced the table.

LastStatsTime

The time for the latest statistics collection for the table.

Sts

The status of the entry. The possible values are:

- V (valid).
- I (invalid).

Additional information that can help IBM Support to analyze and troubleshoot problems might also be returned.

For additional details about the returned information using the **-statisticscache** command parameter, see the topic “Catalog statistics tables” in *Troubleshooting and Tuning Database Performance*.

-storagegroups parameter and storagepaths parameter

Both the **-storagegroups** parameter and the **-storagepaths** parameter return the following information:

Storage Group Configuration:

SGID

Storage group identifier.

Deflt

Indicates if the storage group is the current designated default storage group.

DataTag

An identifying tag used to uniquely identify and group data.

Name

Name of the storage group.

Storage Group Statistics:

SGID

Storage group identifier.

State

State of the storage group. One of the following values:

- 0x0000000000000000 - SQLB_STORAGEGROUP_STATE_NORMAL
- 0x0000000000000001 - SQLB_STORAGEGROUP.Alter_PENDING
- 0x0000000000000002 - SQLB_STORAGEGROUP_SKIP_ALTERS
- 0x0000000000000004 - SQLB_STORAGEGROUP.KEEP_ON_DISK_PATHS
- 0x0000000000000008 - SQLB_STORAGEGROUP.REDEFINE_CONTAINERS
- 0x0000000000000010 - SQLB_STORAGEGROUP.CREATE_PENDING
- 0x0000000000000020 - SQLB_STORAGEGROUP.DROP_PENDING
- 0x0000000000000040 - SQLB_STORAGEGROUP.RENAME_PENDING

NumPaths

Number of storage paths defined in this storage group.

NumDropPen

Number of storage paths in the Drop Pending state.

Storage Group Paths:

SGID Storage group identifier.

PathID Storage path identifier.

PathState

Current state of the storage path: NotInUse, InUse, or DropPending.

PathName

Name of an automatic storage path defined for the database. If the path contains a database partition expression, it is included, in parentheses, after the expanded path.

See Sample output of the **dp2pd -storagegroups** command and **db2pd -storagepaths** command.

-sysplex parameter

For the **-sysplex** parameter, the following information is returned:

Alias The database alias.

Location Name

The unique name of the database server.

Count The number of entries found in the list of servers.

IP Address

The IP address of the server

Port The IP port being used by the server.

Priority

The normalized Workload Manager (WLM) weight.

Connections

The number of active connections to this server.

Status The status of the connection. The possible values are:

- 0: Healthy.
- 1: Unhealthy. The server is in the list but a connection cannot be established. This entry currently is not considered when establishing connections.
- 2: Unhealthy. The server was previously unavailable, but currently it will be considered when establishing connections.

PRDID The product identifier of the server as of the last connection.

-tablespaces parameter

For the **-tablespaces** parameter, the output is organized into four segments:

Table space Configuration:

Id The table space ID.

Type The type of table space. The possible values are:

- SMS

- DMS

Content

The type of content. The possible values are:

- Regular
- Large
- SysTmp
- UsrTmp

PageSz The page size used for the table space.

ExtentSz

The size of an extent in pages.

Auto Indicates whether the prefetch size is set to AUTOMATIC. The possible values are:

- Yes
- No

Prefetch

The number of pages read from the table space for each range prefetch request.

BufID The ID of the buffer pool that this table space is mapped to.

BufIDDisk

The ID of the buffer pool that this table space will be mapped to at next startup.

FSC File system caching mode: (For more information, see `fs_caching` - file system caching monitor element)

- Yes
- No
- Def (default)

RSE Reclaimable space enabled, indicates whether the reclaimable space feature is enabled. The possible values are:

- Yes
- No
- N/A

NumCntrs

The number of containers owned by a table space.

MaxStripe

The maximum stripe set currently defined in the table space (applicable to DMS table spaces only).

LastConsecPg

The last consecutive object table extent.

Name The name of the table space.

Table space Statistics:

Id The table space ID.

TotalPages

For DMS table spaces, the sum of the gross size of each of the table space's containers (reported in the total pages field of the container).

For SMS table spaces, this value reflects the number of pages in the filesystem owned by the table space.

UsablePgs

For DMS table spaces, the sum of the net size of each of the table space's containers (reported in the usable pages field of the container).

For SMS table spaces, this value reflects the number of pages in the filesystem owned by the table space.

UsedPgs

For DMS table spaces, the total number of pages currently in use in the table space.

For SMS table spaces, this value reflects the number of pages in the filesystem owned by the table space.

PndFreePgs

The number of pages that are not available for use but will be available if all the currently outstanding transactions commit.

FreePgs

For DMS table spaces, the number of pages available for use in the table space.

For SMS table spaces, this value is always 0.

HWM The highest allocated page in the table space.**Max HWM**

The maximum HWM for the table space since the instance was started.

State

- 0x0000000 - NORMAL
- 0x0000001 - QUIESCED: SHARE
- 0x0000002 - QUIESCED: UPDATE
- 0x0000004 - QUIESCED: EXCLUSIVE
- 0x0000008 - LOAD PENDING
- 0x0000010 - DELETE PENDING
- 0x0000020 - BACKUP PENDING
- 0x0000040 - ROLLFORWARD IN PROGRESS
- 0x0000080 - ROLLFORWARD PENDING
- 0x0000100 - RESTORE PENDING
- 0x0000200 - DISABLE PENDING
- 0x0000400 - REORG IN PROGRESS
- 0x0000800 - BACKUP IN PROGRESS
- 0x0001000 - STORAGE MUST BE DEFINED
- 0x0002000 - RESTORE IN PROGRESS
- 0x0004000 - OFFLINE
- 0x0008000 - DROP PENDING
- 0x0010000 - WRITE SUSPENDED
- 0x0020000 - LOAD IN PROGRESS
- 0x0200000 - STORAGE MAY BE DEFINED
- 0x0400000 - STORAGE DEFINITION IS IN FINAL STATE
- 0x0800000 - STORAGE DEFINITION CHANGED PRIOR TO ROLLFORWARD
- 0x1000000 - DMS REBALANCER IS ACTIVE
- 0x2000000 - DELETION IN PROGRESS
- 0x4000000 - CREATION IN PROGRESS

MinRecTime

The minimum recovery time for the table space.

NQuiescers

The number of quiescers.

PathsDropped

For automatic storage table spaces, specifies whether one or more containers reside on a storage path that has been dropped. The possible values are:

- Yes
- No

TrackmodState

The modification status of a table space with respect to the last or next backup. The possible values are:

- Clean - No modifications have occurred in the table space since the previous backup. If an incremental or delta backup is executed at this time, no data pages from this table space would be backed up.
- Dirty - Table space contains data that needs to be picked up by the next backup.
- InIncremental - Table space contains modifications that were copied into an incremental backup. This state is in a Dirty state relative to a full backup such that a future incremental backup needs to include some pages from this pool. This state is also in a Clean state such that a future delta backup does not need to include any pages from this pool.
- ReadFull - The latest table space modification state change was caused by a dirty table space being read by a full backup that might not have completed successfully, or is currently in progress.
- ReadIncremental - The latest table space modification state change was caused by a dirty table space being read by an incremental backup that might not have completed successfully, or is currently in progress.
- n/a - The **trackmod** configuration parameter is set to No. Therefore, no table space modification status information is available.

Table space Autoresize Statistics:

Id The table space ID.

AS Indicates whether or not the table space is using automatic storage. The possible values are:

- Yes
- No

AR Indicates whether or not the table space is enabled to be automatically resized. The possible values are:

- Yes
- No

InitSize

For automatic storage table spaces, the value of this parameter is the initial size of the table space in bytes.

IncSize

If the value of this parameter is -1, the database manager automatically determines an appropriate value. For automatically resized table spaces, if the value of the IIP field is No, the value of this parameter is the size, in bytes, that the table space will

automatically be increased by (per database partition) when the table space is full and a request for space is made. If the value of the IIP field is Yes, the value of this parameter is a percentage.

- IIP** For automatically resized table spaces, the value of this parameter indicates whether the increment value in the IncSize field is a percent or not. The possible values are:
- Yes
 - No

MaxSize

For automatically resized table spaces, the value of this parameter specifies the maximum size, in bytes, to which the table space can automatically be increased (per database partition). A value of NONE indicates that there is no maximum size.

LastResize

The timestamp of the last successful automatic resize operation.

- LRF** Last resize failed indicates whether the last automatic resizing operation was successful or not. The possible values are:
- Yes
 - No

Table space Storage Statistics:

Id The table space ID.

DataTag

An identifying tag used to uniquely identify and group data.

Rebalance

Indicates if a rebalance is active.

SGID For automatic storage managed table spaces, indicates the storage group the table space is associated with.

SourceSGID

For automatic storage managed table spaces that are changing storage group association, indicates the source storage group the table space was associated with.

Table space Containers:

TspId The ID of the table space that owns the container.

ContainNum

The number assigned to the container in the table space.

Type The type of container. The possible values are:

- Path
- Disk
- File
- Striped Disk
- Striped File

TotalPgs

The number of pages in the container.

UsablePgs

The number of usable pages in the container.

StripeSet

The stripe set where the container resides (applicable to DMS table spaces only).

Container

The name of the container.

PathID For automatic storage table spaces, the identifier of the storage path on which the container resides.

See Sample output of the **db2pd -tablespaces** command.

-tcbstats parameter

For the **-tcbstats** parameter, the following information is returned:

TCB Table Information:**TbspaceID**

The table space identifier.

TableID

The table identifier.

PartID For partitioned tables, this is the data partition identifier. For non-partitioned table this will display 'n/a'.

MasterTbs

For partitioned tables, this is the logical table space identifier to which the partitioned table belongs. For non-partitioned tables, this value corresponds to the TbspaceID.

MasterTab

For partitioned tables, this is the logical table identifier of the partitioned table. For non-partitioned tables, this value corresponds to the TableID.

TableName

The name of the table.

SchemaNm

The schema that qualifies the table name.

ObjClass

The object class. The possible values are:

- Perm (permanent).
- Temp (temporary).

DataSize

The number of pages in the data object.

LfSize The number of pages in the long field object.

LobSize

The number of pages in the large object.

XMLSize

The number of pages in the XML object.

TCB Table Stats:**TableName**

The name of the table.

SchemaNm

The schema that qualifies the table name.

Scans The number of scans that have been performed against the table.

UDI The number of update, delete, and insert operations that have been performed against the table since the last time that the table statistics were updated through the background statistics collection process or manually using the **RUNSTATS** command.

RTSUDI The number of update, delete, and insert operations that have been performed against the table since the last time that the table statistics were updated by real-time statistics gathering, background statistics collection process, or manual **RUNSTATS**.

PgReorgs

The number of page reorganizations performed.

NoChgUpdts

The number of updates that did not change any columns in the table.

Reads The number of rows read from the table when the table switch was on for monitoring.

FscrUpdates

The number of updates to a free space control record.

Inserts

The number of insert operations performed on the table.

Updates

The number of update operations performed on the table.

Deletes

The number of delete operations performed on the table.

OvFlReads

The number of overflows read on the table when the table switch was on for monitoring.

OvFlCrtes

The number of new overflows that were created.

CCLogReads

The number of times the currently committed version of a row was retrieved for the table.

StoredBytes

This column corresponds to the “Total stored temp bytes” from the **db2pd -temptable** output.

BytesSaved

This column corresponds to the “Total bytes saved” value from the **db2pd -temptable** output.

PgDictsCreated

The total number of successfully created page-level dictionaries.

Note The following data is only displayed when the **-all** or **-index** option is specified with the **-tcbstats** parameter.

TCB Index Information:

InxTbspace

The table space where the index resides.

ObjectID

The object identifier of the index.

PartID For partitioned tables, the data partition identifier. For nonpartitioned tables, N/A is displayed.

TbspaceID

The table space identifier.

TableID

The table identifier.

MasterTbs

For partitioned tables, this is the logical table space identifier to which the partitioned table belongs. For non-partitioned tables, this value corresponds to the TbspaceID.

MasterTab

For partitioned tables, this is the logical table identifier of the partitioned table. For non-partitioned tables, this value corresponds to the TableID.

TableName

The name of the table.

SchemaNm

The schema that qualifies the table name.

IID The index identifier.

IndexObjSize

The number of pages in the index object. The value reported in IndexObjSize has been deprecated. If you perform a reorganization to reclaim extents, IndexObjSize output does not accurately reflect the number of pages in the index object because the value still includes the pages that were released during the reorganization. You should use instead the INDEX_OBJECT_P_SIZE or INDEX_OBJECT_L_SIZE columns of the ADMIN_GET_INDEX_INFO table function to obtain accurate values.

TCB Index Stats:**TableName**

The name of the table.

IID The index identifier.

PartID For partitioned tables, the data partition identifier. For nonpartitioned tables, N/A is displayed.

EmpPgDel

The number of empty leaf nodes that were deleted.

RootSplits

The number of key insert or update operations that caused the index tree depth to increase.

BndrySplits

The number of boundary leaf splits that result in an insert operation into either the lowest or the highest key.

PseuEmptPg

The number of leaf nodes that are marked as being pseudo empty.

EmPgMkdUsd

The number of pseudo empty pages that have been reused.

Scans The number of scans against the index.

IxOnlyScns

The number of index-only scans that were performed on the index (scans that were satisfied by access to only an index), regardless of how many pages were read during the scan.

KeyUpdates

The number of updates to the key.

InclUpdates

The number of included column updates.

NonBndSpts

The number of non-boundary leaf splits.

PgAllocs

The number of allocated pages.

Merges The number merges performed on index pages.

PseuDelts

The number of keys that are marked as pseudo deleted.

DelClean

The number of pseudo deleted keys that have been deleted.

IntNodSpl

The number of intermediate level splits.

-temptable parameter

In order to calculate the cumulative compression ratio across all of the temporary tables, the following formula can be used:

```
% Compression = ( Total Bytes Saved ) /  
                  ( Total Bytes Saved + Total Stored Temp Bytes )
```

Note:

- The term Eligible indicates temporary tables that meet the compression criteria.
- The term Compressed indicates temporary tables that finally have sufficient data inserted to be compressed.

```
hotel26:/home/billyp> db2pd -db billdb -temptable  
System Temp Table Stats:
```

| | | |
|------------------------|---|---|
| Number of Temp Tables | : | 0 |
| Comp Eligible Temps | : | 0 |
| Compressed Temps | : | 0 |
| Total Temp Bytes | : | 0 |
| Total Bytes Saved | : | 0 |
| Total Compressed Rows | : | 0 |
| Total Temp Table Rows: | : | 0 |

```
User Temp Table Stats:
```

| | | |
|-----------------------|---|---|
| Number of Temp Tables | : | 0 |
| Comp Eligible Temps | : | 0 |
| Compressed Temps | : | 0 |

```
Total Stored Temp Bytes : 0
Total Bytes Saved       : 0
Total Compressed Rows   : 0
Total Temp Table Rows   : 0
```

All of the counters can be reset to zero by using the hidden reset option.

```
hotel26:/home/billyp> db2pd -db bill -temptable reset
      Resetting counters to 0.
```

See Sample output of the **db2pd -temptable** command.

-thresholds parameter

For the **-thresholds** parameter, the following information is returned:

- Threshold Name: Threshold name
- Threshold ID: Threshold identifier
- Domain: Threshold domain
- Domain ID: Threshold domain identifier
- Predicate ID: Threshold predicate identifier
- Maximum Value: Threshold maximum value
- Statement Text: Statement text associated with a statement threshold
- Enforcement: Threshold enforcement scope
- Queuing: Threshold is a queuing threshold
- Queue Size: Threshold queue size setting
- Collect Flags: Setting of COLLECT ACTIVITY DATA option for threshold
- Partition Flags: Partitions where COLLECT ACTIVITY option setting applies
- Execute Flags: Threshold action setting
- Enabled: State of threshold, enabled or disabled
- Check Interval (seconds): Frequency setting for threshold
- Remap Target Serv. Subclass: Target service subclass setting for remapping threshold action
- Log Violation Evmon Record: THRESHOLD VIOLATIONS event monitor log setting

If the threshold is a queuing threshold, the queue section will also show:

- Queue information for threshold: Threshold Name
- Max Concurrency: Maximum concurrency setting
- Concurrency: Actual concurrency value
- Max Queue Size: Maximum threshold queue size setting
- Agents Currently Queued: At the catalog database partition, the list of all agents waiting in the threshold queue (shown only when agents are queued)

-transactions parameter

For the **-transactions** parameter, the following information is returned:

App1Hand1

The application handle of the transaction.

TranHd1

The transaction handle of the transaction.

Locks The number of locks held by the transaction.

- State** The transaction state.
- Tflag** The transaction flag. The possible values are:
- 0x00000002. This value is only written to the coordinator node of a two-phase commit application, and it indicates that all subordinate nodes have sent a "prepare to commit" request.
 - 0x00000010. The transaction has performed an operation that causes replay-only-window on the HADR Standby database with Reads On Standby (ROS) enabled. This flag is only set on HADR Standby database during log replay.
 - 0x00000020. The transaction must change a capture source table (used for data replication only).
 - 0x00000040. Crash recovery considers the transaction to be in the prepare state.
 - 0x00010000. This value is only written to the coordinator partition in a partitioned database environment, and it indicates that the coordinator partition has not received a commit request from all subordinate partitions in a two-phase commit transaction.
 - 0x00040000. The rolling back of the transaction is pending.
 - 0x01000000. The transaction resulted in an update on a database partition server that is not the coordinator partition.
 - 0x04000000. Loosely coupled XA transactions are supported.
 - 0x08000000. Multiple branches are associated with this transaction and are using the loosely coupled XA protocol.
 - 0x10000000. A data definition language (DDL) statement has been issued, indicating that the loosely coupled XA protocol cannot be used by the branches participating in the transaction.

- Tflag2** Transaction flag 2. The possible values are:
- 0x00000001. The transaction is being rolled back in asynchronous backward phase of database recovery.
 - 0x00000004. The transaction has exceeded the limit specified by the **num_log_span** database configuration parameter.
 - 0x00000008. The transaction resulted because of the running of a Db2 utility.
 - 0x00000020. The transaction will cede its locks to an application with a higher priority (this value ordinarily occurs for jobs that the Db2 database system automatically starts for self tuning and self management).
 - 0x00000040. The transaction will not cede its row-level locks to an application with a higher priority (this value ordinarily occurs for jobs that the Db2 database system automatically starts for self-tuning and self-management)

Firstlsn
First LSN of the transaction.

Lastlsn
Last LSN of the transaction.

Firstlso
First LSO of the transaction.

Lastlso
Last LSO of the transaction.

SpaceReserved

The amount of log space that is reserved for the transaction.

LogSpace

The total log space that is required for the transaction, including the used space and the reserved space for compensation log records.

TID Transaction ID.**AxRegCnt**

The number of applications that are registered for a global transaction. For local transactions, the value is 1.

GXID Global transaction ID. For local transactions, the value is 0.**ClientUserID**

Client userid for the transaction, which is the same as tpmon_client_userid (TP Monitor Client User ID monitor element).

ClientWrkstnName

Client workstation name for the transaction, which is the same as tpmon_client_wkstn (TP Monitor Client Workstation Name monitor element).

ClientApplName

Client application name driving the transaction, which is the same as tpmon_client_app (TP Monitor Client Application monitor element).

ClientAccntng

Accounting string of the client driving the transaction, which is the same as tpmon_acc_str (TP Monitor Client Accounting String monitor element).

Total Application commits

The total number of application commits that have been made.

Total Application rollbacks

The total number of application rollbacks that have been made.

See Sample output of the **db2pd -transactions** command.

-utilities parameter

For the **-utilities** parameter, the following information is returned:

ID Unique identifier corresponding to the utility invocation.

Type Identifies the class of the utility.

State Describes the state of the utility.

Invoker

Describes how a utility was invoked.

Priority

Specifies the amount of relative importance of a throttled utility with respect to its throttled peers. A priority of 0 implies that a utility is executing unthrottled. Non-zero priorities must fall in the range of 1-100, with 100 representing the highest priority and 1 representing the lowest.

StartTime

Specifies the date and time when the current utility was originally invoked.

DBName Identifies the database operated on by the utility.

NumPhases

Specifies the number of phases a utility has.

CurPhases

Specifies the phase that is currently executing.

Description

A brief description of the work a utility is performing. This includes the load operation ID and the application ID.

-wlocks parameter

For the **-wlocks** parameter, the following information is returned:

App1Hand1

The application handle, including the node and the index.

TranHd1

The transaction handle that is requesting the lock.

LockName

The name of the lock.

Type

The type of lock.

Mode

The lock mode. The possible values are:

- IS
- IX
- S
- SIX
- X
- IN
- Z
- U
- NS
- NW

Conv

The lock mode to which the lock will be converted after the lock wait ends.

Sts

The lock status. The possible values are:

- G (granted)
- C (converting)
- W (waiting)

CoorEDU

The EDU ID of the coordinator agent for the application.

AppName

The name of the application.

AuthID

The authorization identifier.

AppID

The application ID. This value is the same as the **app1_id** monitor element data.

AppNode

The application node of the agent.

TableNm

The table name of the agent that is waiting on the lock.

SchemaNm

The schema name of the agent that is waiting on the lock.

See Sample output of the **db2pd -wlocks** command.

-workactionsets parameter

For the **-workactionsets** parameter, the following information is returned:

- Address
- Work action set ID
- Work action set name
- Associated work class set ID
- Type of object work action set is associated (database or service class)
- ID of the object (service class or database) work action set is associated with
- All the work actions within the work action set:
 - address
 - action ID
 - action type
 - reference object ID (threshold ID or service class ID or null depending on the action type)

-workclasssets parameter

For the **-workclasssets** parameter, the following information is returned:

- address
- work class ID
- reference counter (number of different work action sets that reference this work class set)
- All the work classes within the work class set (shown in their evaluation order):
 - address
 - class ID
 - class name
 - attributes
 - work type
 - timeron cost from
 - timeron cost to

-workloads parameter

For the **-workloads** parameter, the following information is returned, specific to the headings:

Workload definitions

- Workload ID and name
- Database access permission for workload occurrences
- Maximum degree of parallelism
- Number of concurrent workload occurrences
- Workload thresholds
- Associated service class

- Statistics collection settings
- Histogram template IDs

Usage privilege holders

- Workload ID
- Type of holder
- Authorization ID

Local partition workload statistics

- Workload ID and name
- Workload occurrence statistics
- Time since last statistics reset
- Activity statistics

See Sample output of the **db2pd -workloads** command.

Sample output

-addnode

The following example is a sample of the output of the **db2pd -addnode** command:

Summary of add partition processing done for partition[50]

```
00:Creating database partitions : True
01:Database partitions are created : True
08:Collecting storage information : True
09:Storage information is collected : True
11:FCM Send & Receive daemons are blocked : True
12:FCM Send & Receive daemons are reactivated : True
13:db2start processing is complete : True
```

Conflicting states or activities for add partition for partition[50]

[14] Messages found for partition [50]

```
[Fri Oct 24 16:16:27 2008]:Addnode agent:Got automatic storage details
[Fri Oct 24 16:16:28 2008]:Addnode agent:Skeleton database is created
[Fri Oct 24 16:16:28 2008]:Addnode agent:Scanning for db alias=[PE ] name=[PE ]
[Fri Oct 24 16:16:28 2008]:Addnode agent:Found db alias=[PE ] name=[PE ]
[Fri Oct 24 16:16:28 2008]:Addnode agent:Instance directory already exists
[Fri Oct 24 16:16:28 2008]:Addnode agent:Node directory already exists
[Fri Oct 24 16:16:28 2008]:Addnode agent:Node directory is created
[Fri Oct 24 16:16:29 2008]:Addnode agent:Getting automatic storage details
[Fri Oct 24 16:16:29 2008]:Addnode agent:Got automatic storage details
[Fri Oct 24 16:16:30 2008]:Addnode agent:Skeleton database is created
[Fri Oct 24 16:16:30 2008]:Addnode agent:Database activation is not required
[Fri Oct 24 16:16:30 2008]:Addnode agent:Database activation is complete
[Fri Oct 24 16:16:30 2008]:Addnode agent:Online mode processing is complete
[Fri Oct 24 16:16:30 2008]:db2start is complete
```

oldviewapps

Returns information about which applications see the number of database partition servers in the instance before the add database partition server operation occurred.

The following example is a sample of the output of the **db2pd -addnode oldviewapps** command:

```
-----  
Summary of add partition processing done for partition[0]  
-----
```

```
Conflicting states or activities for add partition for partition[0]  
-----
```

```
Applications with old view of instance for partition [0]  
-----
```

```
App.Handle(00000000,00000072) view has [3] nodes, instance has [4] nodes  
App.Handle(00000000,00000065) view has [3] nodes, instance has [4] nodes  
App.Handle(00000000,00000071) view has [3] nodes, instance has [4] nodes  
App.Handle(00000000,00000005) view has [3] nodes, instance has [4] nodes  
App.Handle(00000000,00000051) view has [3] nodes, instance has [4] nodes  
App.Handle(00000000,00000070) view has [3] nodes, instance has [4] nodes  
App.Handle(00000000,00000069) view has [3] nodes, instance has [4] nodes  
App.Handle(00000000,00000068) view has [3] nodes, instance has [4] nodes  
App.Handle(00000001,00000058) view has [3] nodes, instance has [4] nodes  
App.Handle(00000000,00000067) view has [3] nodes, instance has [4] nodes  
App.Handle(00000000,00000073) view has [3] nodes, instance has [4] nodes
```

detail When used with the **db2pd** command, returns detailed information about the add database partition server operation, including the step in progress and events that are incompatible with the add database partition server operation. When used with the **oldviewapps** option, also returns information about which applications have a view of the instance that does not include recently added database partition servers.

The following example is a sample of the output of the **db2pd -addnode detail** command:

```
-----  
Add partition processing with detail for partition[50]  
-----
```

```
00:Creating database partitions : True  
01:Database partitions are created : True  
02:Dropping database entries : False  
03:Dropping db entries are completed : False  
04:Activating databases explicitly : False  
05:Database explicit activation is completed : False  
06:Updating database configuration : False  
07:Database configuration is updated : False  
08:Collecting storage information : True  
09:Storage information is collected : True  
10:Add partition operation is complete : False  
11:FCM Send & Receive daemons are blocked : True  
12:FCM Send & Receive daemons are reactivated : True  
13:db2start processing is complete : True
```

```
Conflicting states or activities for add partition for partition[50]  
-----
```

```
restricted :False  
db2start :False  
db2stop :False  
instance quiesced :False  
database quiesced :False  
quiesce instance :False  
unquiesce instance :False  
quiesce db :False  
unquiesce db :False  
activate db :False  
deactivate db :False  
exclusive use of db :False  
create db :False  
drop db :False  
create tablespace :False
```

```
alter tablespace    :False
drop tablespace   :False
add partition     :False
backup database   :False
restore database  :False
snapshot restore  :False
```

[14] Messages found for partition [50]

```
[Fri Oct 24 16:16:27 2008]:Addnode agent:Got automatic storage details
[Fri Oct 24 16:16:28 2008]:Addnode agent:Skeleton database is created
[Fri Oct 24 16:16:28 2008]:Addnode agent:Scanning for db alias=[PE      ] name=[PE      ]
[Fri Oct 24 16:16:28 2008]:Addnode agent:Found db alias=[PE      ] name=[PE      ]
[Fri Oct 24 16:16:28 2008]:Addnode agent:Instance directory already exists
[Fri Oct 24 16:16:28 2008]:Addnode agent:Node directory already exists
[Fri Oct 24 16:16:28 2008]:Addnode agent:Node directory is created
[Fri Oct 24 16:16:29 2008]:Addnode agent:Getting automatic storage details
[Fri Oct 24 16:16:29 2008]:Addnode agent:Got automatic storage details
[Fri Oct 24 16:16:30 2008]:Addnode agent:Skeleton database is created
[Fri Oct 24 16:16:30 2008]:Addnode agent:Database activation is not required
[Fri Oct 24 16:16:30 2008]:Addnode agent:Database activation is complete
[Fri Oct 24 16:16:30 2008]:Addnode agent:Online mode processing is complete
[Fri Oct 24 16:16:30 2008]:db2start is complete
```

Total [00] Conflicting application handles for partition [50]

Conflicting operations are shown as in the following example:

Total [01] Conflicting application handles for partition [20]

Agents for app_handle 00000000 00000052 : Activity occurrence:[1] time(s) ActivityName:[exclusive use of db]

The following example is a sample of the output of the db2pd
-addnode oldviewapps detail command:

Add partition processing with detail for partition[0]

```
00:Creating database partitions                      : False
01:Database partitions are created                 : False
02:Dropping database entries                      : False
03:Dropping db entries are completed             : False
04:Activating databases explicitly              : False
05:Database explicit activation is completed    : False
06:Updating database configuration               : False
07:Database configuration is updated            : False
08:Collecting storage information              : False
09:Storage information is collected            : False
10:Add partition operation is complete          : False
11:FCM Send & Receive daemons are blocked    : False
12:FCM Send & Receive daemons are reactivated : False
13:db2start processing is complete            : False
```

Conflicting states or activities for add partition for partition[0]

```
restricted           :False
db2start            :False
db2stop             :False
instance quiesced  :False
database quiesced  :False
quiesce instance   :False
unquiesce instance :False
quiesce db          :False
unquiesce db        :False
activate db         :False
deactivate db       :False
exclusive use of db :False
```

```

create db          :False
drop db           :False
create tablespace :False
alter tablespace  :False
drop tablespace   :False
add partition     :False
backup database   :False
restore database  :False
snapshot restore  :False
create/alter nodegroup :False
drop nodegroup    :False
add storage       :False
redistribute      :False

Total [00] Conflicting application handles for partition [0]
-----
Applications with old view of instance for partition [0]
-----
App.Handle(00000000,00000072) view has [3] nodes, instance has[4] nodes
[Viewnodes:0:1:2:]
App.Handle(00000000,00000065) view has [3] nodes, instance has[4] nodes
[Viewnodes:0:1:2:]
App.Handle(00000000,00000071) view has [3] nodes, instance has[4] nodes
[Viewnodes:0:1:2:]
App.Handle(00000000,00000005) view has [3] nodes, instance has[4] nodes
[Viewnodes:0:1:2:]
App.Handle(00000000,00000051) view has [3] nodes, instance has[4] nodes
[Viewnodes:0:1:2:]
App.Handle(00000000,00000070) view has [3] nodes, instance has[4] nodes
[Viewnodes:0:1:2:]
App.Handle(00000000,00000069) view has [3] nodes, instance has[4] nodes
[Viewnodes:0:1:2:]
App.Handle(00000000,00000068) view has [3] nodes, instance has[4] nodes
[Viewnodes:0:1:2:]
App.Handle(00000001,00000058) view has [3] nodes, instance has[4] nodes
[Viewnodes:0:1:2:]
App.Handle(00000000,00000067) view has [3] nodes, instance has[4] nodes
[Viewnodes:0:1:2:]
App.Handle(00000000,00000073) view has [3] nodes, instance has[4] nodes
[Viewnodes:0:1:2:]

```

-apinfo

The following example is a sample of the output of the **db2pd -apinfo** command. If the **MON_DEADLOCK** database parameter is set to HISTORY and there is an active lock event monitor, then the **db2pd -apinfo** command displays the list of past activities of current UOW. The following example is a sample of the output displayed:

```

$ db2pd -apinfo AppHd1 -db sample

Database Member 0 -- Database SAMPLE -- Active -- Up 0 days 00:01:07 -- Date 2012-11-21-21.16.35.182584

snapapp Time: 11/21/2012 21:16:35

Application :
  Address : 0x0000000206490080
  AppHandle [nod-index] : 7      [000-00007]
  TranHandle : 3
  Application PID : 23044
  Application Node Name : hotel149
  IP Address: n/a
  Connection Start Time : (1353550528)Wed Nov 21 21:15:28 2012
  Client User ID : juntang
  System Auth ID : JUNTANG
  Coordinator EDU ID : 18
  Coordinator Member : 0
  Number of Agents : 1
  Locks timeout value : NotSet
  Locks Escalation : No

```

```

Workload ID : 1
Workload Occurrence ID : 1
Trusted Context : n/a
Connection Trust Type : non trusted
Role Inherited : n/a
Application Status : UOW-Waiting
Application Name : db2bp
Application ID : *LOCAL.juntang.121122021528
ClientUserID : n/a
ClientWrkstnName : n/a
ClientApplName : n/a
ClientAcctng : n/a
CollectActData: N
CollectActPartition: C
SectionActuals: N
UOW start time : 11/21/2012 21:15:57.181341
UOW stop time : 11/21/2012 21:15:30.354421

Last executed statements :
  Package cache ID : 0x0000027500000001
  Anchor ID : 629
  Statement UID : 1
  SQL Type : Dynamic
  Statement Type : DML, Select(blockable)
  Statement : select * from org

List of current activities :
  Activity ID : 2
  UOW-ID : 2
  Package schema : NULLID
  Package name : SQLC2K24
  Package Version :
  Consistency Token : AAAAJHc
  Section number : 1
  Statement number : 1
  Isolation : CS
  Effective degree : 0
  Number of subagent(s) : 1
  Source ID : 0
  Cursor ID : 0
  Nesting level : 0
  Invocation ID : 0
  Package cache ID : 0x0000034300000001
  Anchor ID : 835
  Statement UID : 1
  SQL Type : Dynamic
  Statement Type : DML, Select (blockable)
  Statement : select * from employee
  Entry time : 11/21/2012 21:16:07.179827
  Local start time : 11/21/2012 21:16:07.179830
  Last reference time : 11/21/2012 21:16:07.179827

List of past activities of current UOW :
  Activity ID : 3
  UOW-ID : 2
  Package schema : NULLID
  Package name : SQLC2K24
  Package Version :
  Consistency Token : AAAAJHc
  Section number : 201
  Statement number : 1
  Isolation : CS
  Effective degree : 0
  Number of subagent(s) : 1
  Source ID : 0
  Cursor ID : 0
  Nesting level : 0
  Invocation ID : 0
  Package cache ID : 0x0000027500000001
  Anchor ID : 629
  Statement UID : 1
  SQL Type : Dynamic
  Statement Type : DML, Select (blockable)
  Statement : select * from org
  Entry time : 11/21/2012 21:16:19.068520
  Local start time : 11/21/2012 21:16:19.068523
  Last reference time : 11/21/2012 21:16:19.069663

Activity ID : 1

```

| | |
|-------------------------|----------------------------|
| UOW-ID : | 2 |
| Package schema : | NULLID |
| Package name : | SQLC2K24 |
| Package Version : | |
| Consistency Token : | AAAAAJHc |
| Section number : | 201 |
| Statement number : | 1 |
| Isolation : | CS |
| Effective degree : | 0 |
| Number of subagent(s) : | 1 |
| Source ID : | 0 |
| Cursor ID : | 0 |
| Nesting level : | 0 |
| Invocation ID : | 0 |
| Package cache ID : | 0x0000030100000001 |
| Anchor ID : | 769 |
| Statement UID : | 1 |
| SQL Type : | Dynamic |
| Statement Type : | DML, Select (blockable) |
| Statement : | select * from dept |
| Entry time : | 11/21/2012 21:15:57.270305 |
| Local start time : | 11/21/2012 21:15:57.270309 |
| Last reference time : | 11/21/2012 21:15:57.272555 |

-catalogcache

The following example is a sample of the SYSTABLES and TABLESPACES output of the **db2pd -catalogcache** command:

| | | | | | | | | | |
|--------------------|------------|-----------------|------|---------|-----------|-----------|---------------------------|------------------------------------|-----|
| Catalog Cache: | | | | | | | | | |
| Configured Size | 819200 | | | | | | | | |
| Current Size | 537464 | | | | | | | | |
| Maximum Size | 4294901760 | | | | | | | | |
| High Water Mark | 589824 | | | | | | | | |
| SYSTABLES: | | | | | | | | | |
| Address | Schema | Name | Type | TableID | TbspaceID | LastRefID | CatalogCacheLoadingLock | CatalogCacheUsageLock | Sts |
| 0x00002B3AD9CB5C40 | SYSCAT | TABLESPACES | V | 0 | 0 | 165 | 01000003A2B0000405CCBD9C3 | 00005000C11000405CCBD9C3 | V |
| 0x00002B3AD9E97680 | DBUSER1 | SALES | T | 16 | 2 | 164 | 01000003A2B00008076E9D9C3 | 00005000E1B00008076E9D9C3 | S |
| 0x00002B3AD9E5F920 | DBUSER1 | VSTAFAC2 | V | 0 | 0 | 164 | 01000003A2B000020F9E5D9C3 | 0000500001D00020F9E5D9C3 | V |
| 0x00002B3AD9B6DD0 | DBUSER1 | PRODUCT | T | 4 | 4 | 164 | 01000003A2B000060DBBED9C3 | 0000500061D00060DBBED9C3 | S |
| 0x00002B3AD9E62920 | SYSTBM | SYSPERIODS | T | 164 | 0 | 164 | 01000003A2B00002029E6D9C3 | 0000500050800002129E6D9C3 | V |
| 0x00002B3AD9E61A0 | DBUSER1 | EMP_PHOTO | T | 7 | 2 | 164 | 01000003A2B0000A0E1E6D9C3 | 0000500021B0000A0E1E6D9C3 | V |
| 0x00002B3AD9E5A500 | SYSPUBLI | HMON_COLLECTION | O | 0 | 0 | 164 | 01000003A2B00000A5E5D9C3 | 00000000000000000000000000000000 I | |
| 0x00002B3AD9E11C60 | SYSTBMS | SYSTABLES | T | 5 | 0 | 164 | 01000003A2B0000601CE1D9C3 | 00005000400000611CE1D9C3 | V |
| 0x00002B3AD9E6D060 | DBUSER1 | EMP_RESUME | T | 8 | 2 | 164 | 01000003A2B000060D0E6D9C3 | 0000500031B000060D0E6D9C3 | V |
| 0x00002B3AD9CB56A0 | SYSTOOLS | POLICY | T | 4 | 5 | 164 | 01000003A2B0000A056CBD9C3 | 00005000D1D0000A056CBD9C3 | V |
| 0x00002B3AD9E66C60 | DBUSER1 | EMPLOYEE | T | 6 | 2 | 164 | 01000003A2B0000606CE6D9C3 | 0000500001B0000606CE6D9C3 | S |
| 0x00002B3AD9CBE600 | SYSCAT | TABLES | V | 0 | 0 | 164 | 01000003A2B00000E6CBD9C3 | 00005000B11000000E6CBD9C3 | V |
| 0x00002B3AD9E642E0 | DBUSER1 | EMPPROJECT | T | 11 | 2 | 164 | 01000003A2B0000E042E6D9C3 | 0000500071B0000E042E6D9C3 | S |
| 0x00002B3AD9DA26A0 | DBUSER1 | CUSTOMER | T | 6 | 4 | 164 | 01000003A2B0000A026AD9C3 | 0000500081D0000A026AD9C3 | S |
| 0x00002B3AD9E996E0 | DBUSER1 | ACT | T | 12 | 2 | 164 | 01000003A2B0000E096E9D9C3 | 00005000A1B0000E196E9D9C3 | V |

| | | | | | | | |
|---------------------|-----------------|-----------|-----------|---------------------------|----------------------------|-----|--|
| TABLESPACES: | | | | | | | |
| Address | Name | TbspaceID | LastRefID | CatalogCacheLoadingLock | CatalogCacheUsageLock | Sts | |
| 0x00002B3AD9B6D6C0 | SYSCATSPACE | 0 | 164 | 11000003A2B0000C0D6BED9C3 | 0000210004000000C0D6BED9C3 | V | |
| 0x00002B3AD9BEE3080 | TEMPSPACE1 | 1 | 31 | 11000003A2B00008030BED9C3 | 00002100050000008030BED9C3 | V | |
| 0x00002B3AD9BF2F00 | USERSPACE1 | 2 | 164 | 11000003A2B000002FBFD9C3 | 000021000600000002FBFD9C3 | V | |
| 0x00002B3AD9E62EC0 | IBMDB2SAMPLEXML | 4 | 164 | 11000003A2B0000C02EE6D9C3 | 0000210008000000C02EE6D9C3 | V | |
| 0x00002B3AD9BF2E00 | SYSTOOLSPACE | 5 | 164 | 11000003A2B000002EBFD9C3 | 000021000900000002EBFD9C3 | V | |

-cleaner

The following is sample output of the **-cleaner** option:

db2pd -db sample -cleaner

Database Partition 0 - Database SAMPLE - Active - Up 0 days 00:06:34 -
Date 08/09/2010 14:17:58

Page Cleaners:

| Group | ID | Clnr | Idx | State | Cycle | Task | Pgs | Gthr | Pgs | Ga'd | ... |
|---|----|------|-----|-------|-------|------|-----|------|-----|------|-----|
| -1 | 0 | | | Wait | 0 | None | 0 | 0 | 0 | ... | |
| -1 | 1 | | | Wait | 0 | None | 0 | 0 | 0 | ... | |
| -1 | 2 | | | Wait | 0 | None | 0 | 0 | 0 | ... | |
| -1 | 3 | | | Wait | 0 | None | 0 | 0 | 0 | ... | |
| -1 | 4 | | | Wait | 0 | None | 0 | 0 | 0 | ... | |
|
...IO outstdn Max AIO Pgs Thrsh Pgs D Stl Pgs Skppd | | | | | | | | | | | |
| ...0 | | | 32 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| ...0 | | | 32 | 0 | 0 | 0 | 0 | 0 | 0 | | |

```

...0      32      0      0      0
...0      32      0      0      0
...0      32      0      0      0

...
Dirty lists for Bufferpool ID : 1
List ID  # Dirty   Clnr Iidx Trigger Target LSN      Pgs for Gap
0        4        0       None    0000000000000000 0
0        0        0       None    0000000000000000 0
1        8        1       None    0000000000000000 0
1        0        1       None    0000000000000000 0
2        2        2       None    0000000000000000 0
2        0        2       None    0000000000000000 0
3        1        3       None    0000000000000000 0

```

-dirtyPages

The following is sample output of the **-dirtyPages** option:

```
db2pd -db sample -dirtyPages
```

```
Database Partition 0 -- Database SAMPLE -- Active -- Up 0 days 00:00:20 --
Date 08/09/2010 14:11:44
```

```
Bufferpool: 1
  Dirty pages %       : 34 / 1000 (3.40% dirty)
  Bufferpool minbuflsn: 000000000138800C
```

Oldest page info:

| DirtyLst | TspID | PPNum | ObjID | OPNum | Typ | UFlag | fixcount | wgt | ... |
|----------|-------|-------|-------|-------|-----|-------|----------|-----|-----|
| n/a | 0 | 327 | 15 | 3 | 4 | 3 | 0 | 2 | ... |

```
... CPC LSN          pgLtch
... 0 000000000138800C 0x07000000323508E8
```

Dirty pages:

| DirtyLst | TspID | PPNum | ObjID | OPNum | Typ | UFlag | fixcount | wgt | ... |
|----------|-------|-------|-------|-------|-----|-------|----------|-----|-----|
| 0 | 0 | 272 | 14 | 0 | 0 | 3 | 0 | 2 | ... |
| 0 | 0 | 273 | 14 | 1 | 0 | 3 | 0 | 1 | ... |
| 0 | 0 | 7541 | 18 | 9 | 1 | 3 | 0 | 2 | ... |
| 0 | 0 | 7540 | 18 | 8 | 1 | 3 | 0 | 2 | ... |
| 1 | 0 | 6945 | 15 | 5 | 1 | 3 | 0 | 2 | ... |
| 1 | 0 | 300 | 14 | 4 | 1 | 3 | 0 | 2 | ... |

```
... CPC LSN          pgLtch
... 0 000000000138881C 0x070000003236C2E8 hX:0 sH:0 xW:0 rC:0
... 0 000000000138881C 0x070000003236B228 hX:0 sH:0 xW:0 rC:0
... 0 000000000138E237 0x07000000323678A8 hX:0 sH:0 xW:0 rC:0
... 0 000000000138E402 0x0700000032367A28 hX:0 sH:0 xW:0 rC:0
... 0 0000000001388107 0x070000003236F3E8 hX:0 sH:0 xW:0 rC:0
... 0 000000000138889D 0x070000003236B6A8 hX:0 sH:0 xW:0 rC:0
```

...

Recovery information:

| | | |
|-------------------------|---|------------------|
| lowtranlsn | : | 000000000138E486 |
| minbuflsn | : | 000000000138800C |
| nextlsn | : | 000000000138E4B0 |
| LFH lowtranlsn | : | 000000000138E486 |
| LFH minbuflsn | : | 000000000138800C |
| LFH nextlsn | : | 000000000138800C |
| Active Log bytes in use | : | 25764 |
| Current Softmax | : | 4096000 |

DirtyLst - dirty list ID in this bufferpool

TspID - tablespace ID of this page

PPNum - pool page number

ObjID - object ID

OPNum - object page number

Typ - type of the object

UFlag - internal page flag

fixcount - number of active fixes on this page (in-use count)

wgt - weight of the page
 CPC - clock
 LSN - page LSN
 pgLtch - page latch address, hX - held X, sh - # shard holders, xW - # of X waiters

Important: The **softmax** database configuration parameter is deprecated is deprecated in Version 10.5 and might be removed in a future release. For more information, see Some database configuration parameters are deprecated in *What's New for Db2 Version 10.5*.

-edus The following example is a sample of the output of the **db2pd -edus** command:

```
Database Partition 0 -- Active -- Up 0 days 01:14:05
```

```
List of all EDUs for database partition 0
```

```
db2sysc PID: 18485
db2wdog PID: 18483
db2acd PID: 18504
```

| EDU ID | TID | Kernel TID | EDU Name | USR | SYS |
|--------|----------------|------------|-------------------------------|----------|----------|
| 24 | 47155322546496 | 12108 | db2pfchr (TESTDB) | 0.010000 | 0.000000 |
| 23 | 47155326740800 | 12107 | db2pclnr (TESTDB) | 0.000000 | 0.000000 |
| 22 | 47155330935104 | 12106 | db2pclnr (TESTDB) | 0.000000 | 0.000000 |
| 21 | 47155335129408 | 12105 | db2pclnr (TESTDB) | 0.000000 | 0.000000 |
| 20 | 47155339323712 | 12104 | db2dlock (TESTDB) | 0.000000 | 0.000000 |
| 19 | 47155343518016 | 12103 | db2lfr (TESTDB) | 0.000000 | 0.000000 |
| 18 | 47155347712320 | 12102 | db2loggw (TESTDB) | 0.000000 | 0.000000 |
| 17 | 47155351906624 | 12101 | db2loggr (TESTDB) | 0.080000 | 0.000000 |
| 16 | 47155356100928 | 27704 | db2agent (TESTDB) (suspended) | 0.930000 | 0.140000 |
| 15 | 47155360295232 | 18502 | db2resync | 0.080000 | 0.000000 |
| 14 | 47155364489536 | 18500 | db2ipccm | 0.030000 | 0.000000 |
| 13 | 47155368683840 | 18499 | db2licc | 0.000000 | 0.000000 |
| 12 | 47155372878144 | 18498 | db2thc1n | 0.000000 | 0.000000 |
| 11 | 47155377072448 | 18497 | db2alarm | 0.000000 | 0.000000 |
| 1 | 47155117025600 | 18493 | db2sysc | 3.340000 | 0.070000 |

If you include an interval, such as **db2pd -edus interval=10** then an additional two columns would be added to the right side of the output after the SYS column:

| ... | USR DELTA | SYS DELTA |
|-----|-----------|-----------|
| ... | ===== | ===== |
| ... | 0.141799 | 0.045431 |
| ... | 0.101154 | 0.045117 |
| ... | 0.038113 | 0.020154 |
| ... | 0.005668 | 0.007978 |
| ... | 0.005139 | 0.004392 |
| ... | 0.005003 | 0.004105 |
| ... | 0.003913 | 0.004100 |
| ... | 0.001785 | 0.001282 |
| ... | 0.001083 | 0.001550 |
| ... | 0.001005 | 0.000433 |
| ... | 0.000181 | 0.000098 |
| ... | 0.000095 | 0.000091 |
| ... | 0.000000 | 0.000000 |
| ... | 0.000000 | 0.000000 |
| ... | 0.000000 | 0.000000 |

-encryptioninfo

The following example is a sample of the output of the **db2pd -encryptioninfo** command:

```

db2pd -db testdb -encryptioninfo

Database Member 0 -- Database TESTDB -- Active -- Up 0 days 00:00:16 -- Date 2014-10-03-13.14.20.282623

Encryption Info:
  Object Name:           TESTDB
  Object Type:          DATABASE
Encryption Key Info:
  Encryption Algorithm: AES
  Encryption Algorithm Mode: CBC
  Encryption Key Length: 256
  Master Key Label: DB2_SYSGEN_geoffrey_TESTDB_2014-10-01-10.05.01
Master Key Rotation Timestamp: 2014-10-01-10.05.03.000000
Master Key Rotation Appl ID: *LOCAL.geoffrey.141001140444
Master Key Rotation Auth ID: GEOFFREY
  Previous Master Key Label: DB2_SYSGEN_geoffrey_TESTDB_2014-10-01-10.05.01
KeyStore Info:
  KeyStore Type: PKCS12
  KeyStore Location: /home/geoffrey/sqllib/keystore.p12
  KeyStore Host Name: hotel85.torolab.ibm.com
  KeyStore IP Address: 9.26.120.161
  KeyStore IP Address Type: IPV4

```

-extentmovement

The following example is a sample of the output of the **db2pd -extentmovement** command:

```

db2pd -extentmovement -db PDTEST

Database Member 0 -- Database PDTEST -- Active -- Up 0 days 00:04:33 -- Date 2012-10-26-11.19.52.056414

```

Extent Movement:
Address TbspName Current Last Moved Left TotalTime
0x00002AAB356D4BA0 DAVID 1168 1169 33 426 329636

-fmpexehistory | -fmpe

The following example is a sample of the output of the **db2pd -fmpexehistory** command:

```

db2pd -fmpexehistory pid=761872 n=10

```

Database Partition 0 -- Active -- Up 0 days 00:00:11

FMP Process:
FmpPid Bit Flags ActiveThrd PooledThrd ForcedThrd Active
761872 64 0x00000002 2 1 1 YES

Active Threads:

| | | | |
|-----------|----------------------------|-----------|--------|
| EduPid: | 123456 | ThreadId: | 987654 |
| RoutineID | Timestamp | | |
| 1 | 2009-05-06-17.12.30.000000 | | |
| 2 | 2009-05-06-17.12.30.005000 | | |
| 1 | 2009-05-06-17.12.30.100000 | | |

EduPid: 234567 ThreadId: 987000

| | | | |
|-----------|----------------------------|--|--|
| RoutineID | Timestamp | | |
| 1 | 2009-05-06-17.12.31.000000 | | |
| 3 | 2009-05-06-17.12.30.000000 | | |

Pooled Threads:

| | | | |
|-----------|----------------------------|--|--|
| ThreadId: | 540021 | | |
| RoutineID | Timestamp | | |
| 4 | 2009-05-06-17.10.30.000000 | | |

Forced Threads:

| | | | |
|-----------|----------------------------|--|--|
| ThreadId: | 120021 | | |
| RoutineID | Timestamp | | |
| 10 | 2009-05-06-15.10.30.000000 | | |

The following example is a sample of the output of the **db2pd -fmpexechistory** command with genquery option:

```
db2pd -fmpExecHistory pid=761872 n=10 genquery
```

Database Partition 0 -- Active -- Up 0 days 00:00:11

```

WITH RTNHIST ( PID, TID, RTNID, RTNTIME) AS
    ( VALUES (761872, 987654, 1, TIMESTAMP('2009-07-13-16.17.10.818705')),
        (761872, 987654, 2, TIMESTAMP('2009-07-13-16.17.11.818710')),... )
SELECT R.PID, R.TID, R.RTNTIME, ROUTINESCHEMA, ROUTINEMODULENAME, ROUTINENAME, SPECIFICNAME, ROUTINEID
FROM syscat.routines, RTNHIST as R
WHERE ROUTINEID = R.RTNID
ORDER BY R.PID, R.TID, R.RTNTIME ;

```

-1ogs

The following example is a sample of the output of the **db2pd -logs** command:

Logs:

| | |
|------------------------------|--------------------|
| Current Log Number | 9 |
| Pages Written | 2 |
| Cur Commit Disk Log Reads | 0 |
| Cur Commit Total Log Reads | 0 |
| Method 1 Archive Status | n/a |
| Method 1 Next Log to Archive | 9 |
| Method 1 First Failure | n/a |
| Method 2 Archive Status | n/a |
| Method 2 Next Log to Archive | n/a |
| Method 2 First Failure | n/a |
| Log Chain ID | 0 |
| Current LSO | 41372312 |
| Current LSN | 0x0000000000092E88 |

| Address | StartLSN | StartLSO | State | Size | Pages | Filename |
|--------------------|------------------|----------|------------|------|-------|--------------|
| 0x00002AAF85D9A7D8 | 000000000008AE1D | 41363249 | 0x00000000 | 4 | 4 | S0000009.LOG |
| 0x00002AAF85D9B038 | 0000000000000000 | 41379553 | 0x00000000 | 4 | 4 | S0000010.LOG |
| 0x00002AAF85D9B898 | 0000000000000000 | 41395857 | 0x00000000 | 4 | 4 | S0000011.LOG |

-membersubsetstatus

detail

The following example is a sample of the output of the **db2pd -membersubsetstatus detail** command:

```
Member Subset Id = 1
Member Subset Name = MY_SUBS
Member Subset Creation Time = 2016-01-22-07.20.27.127120
Member Subset Enabled = YES
Include Alternate Server = YES
Inclusive = NO
Catalog Database Alias = YES
Member Priority Basis = EQUALPRIORITY
Number of Members = 4
Database Alias = MY_DB
```

| Member List | Failover Priority |
|-------------|-------------------|
| 0 | 0 |
| 2 | 1 |
| 1 | 254 |
| 3 | 254 |

-pages

The following example is a sample of the output of the **db2pd -pages** command without specifying the **summary** parameter:

```
venus@baryon:/home/venus =>db2pd -pages -db pdtest
Database Partition 0 -- Database PDTEST -- Active -- Up 0 days 00:01:28
```

Bufferpool Pages:
First Active Pool ID 1
Max Bufferpool ID 1
Max Bufferpool ID on Disk 1
Num Bufferpools 5

Pages for all bufferpools:

| Address | BPID | TbspaceID | TbspacePgNum | ObjID | ObjPgNum | ObjClass | ObjType | Dirty | Prefetched |
|--------------------|------|-----------|--------------|-------|----------|----------|---------|-------|------------|
| 0x0000002AC22ABC0 | 1 | 0 | 92 | 10 | 0 | EMP | Data | N | N |
| 0x0000002AC22ABB80 | 1 | 0 | 2503 | 10 | 11 | Perm | Index | N | N |
| 0x0000002AC22ABC40 | 1 | 0 | 2501 | 10 | 9 | Perm | Index | Y | N |
| 0x0000002AC22ABD00 | 1 | 0 | 2494 | 10 | 2 | Perm | Index | N | N |
| 0x0000002AC22ABD00 | 1 | 0 | 3437 | 5 | 17 | Perm | Data | N | N |
| 0x0000002AC22ABE80 | 1 | 0 | 2504 | 10 | 12 | Perm | Index | Y | N |
| 0x0000002AC22ABF40 | 1 | 0 | 2505 | 10 | 13 | Perm | Index | N | N |
| 0x0000002AC22AC000 | 1 | 0 | 2506 | 10 | 14 | Perm | Index | N | N |
| 0x0000002AC22AC0C0 | 1 | 0 | 28 | 5 | 0 | EMP | LOB | N | N |
| 0x0000002AC22AC180 | 1 | 0 | 2509 | 10 | 17 | Perm | Index | N | N |
| 0x0000002AC22AC240 | 1 | 0 | 2495 | 10 | 3 | Perm | Index | Y | N |
| 0x0000002AC22AC300 | 1 | 0 | 2498 | 10 | 6 | Perm | Index | Y | N |
| 0x0000002AC22AC3C0 | 1 | 2 | 128 | 4 | 0 | Perm | Data | Y | N |
| 0x0000002AC22AC480 | 1 | 0 | 2499 | 10 | 7 | Perm | Index | N | N |
| 0x0000002AC22AC540 | 1 | 0 | 99 | 10 | 3 | Perm | Data | Y | N |
| 0x0000002AC22AC600 | 1 | 0 | 96 | 10 | 0 | Perm | Data | Y | N |
| 0x0000002AC22AC6C0 | 1 | 0 | 110 | 5 | 2 | Perm | Index | N | N |
| 0x0000002AC22AC780 | 1 | 0 | 2500 | 10 | 8 | Perm | Index | N | N |
| 0x0000002AC22AC840 | 1 | 0 | 2740 | 5 | 16 | Perm | Index | N | N |
| 0x0000002AC22AC900 | 1 | 0 | 2507 | 10 | 15 | Perm | Index | Y | N |

Total number of pages: 20

Summary info for all bufferpools:

| BPID | TbspaceID | ObjID | Total | Dirty | Permanent | Temporary | Data | ... |
|------|-----------|-----------|---------|-------|-----------|-----------|------|-----|
| 1 | 0 | 5 | 4 | 0 | 3 | 0 | 1 | ... |
| 1 | 0 | 10 | 15 | 7 | 14 | 0 | 3 | ... |
| 1 | 2 | 4 | 1 | 1 | 1 | 0 | 1 | ... |
| ... | Index | LongField | XMLData | SMP | LOB | LOBA | BMP | |
| ... | 2 | 0 | 0 | 0 | 1 | 0 | 0 | |
| ... | 12 | 0 | 0 | 0 | 0 | 0 | 0 | |
| ... | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

Total number of pages: 20

The following example is a sample of the output of the **db2pd -pages** command specifying the **summary** parameter:

```
venus@baryon:/home/venus =>db2pd -pages summary -db pdtest
Database Partition 0 -- Database PDTEST -- Active -- Up 0 days 00:02:07
```

Bufferpool Pages:
First Active Pool ID 1
Max Bufferpool ID 1
Max Bufferpool ID on Disk 1
Num Bufferpools 5

Total number of pages: 20

Summary info for all bufferpools:

| BPID | TbspaceID | ObjID | Total | Dirty | Permanent | Temporary | Data | ... |
|------|-----------|-----------|---------|-------|-----------|-----------|------|-----|
| 1 | 0 | 5 | 4 | 0 | 3 | 0 | 1 | ... |
| 1 | 0 | 10 | 15 | 7 | 14 | 0 | 3 | ... |
| 1 | 2 | 4 | 1 | 1 | 1 | 0 | 1 | ... |
| ... | Index | LongField | XMLData | SMP | LOB | LOBA | BMP | |
| ... | 2 | 0 | 0 | 0 | 1 | 0 | 0 | |
| ... | 12 | 0 | 0 | 0 | 0 | 0 | 0 | |
| ... | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

Total number of pages: 20

-reorgs index

The following section is an example of output obtained using the **-reorgs**

index parameter which reports the index reorg progress for a range-partitioned table with 2 partitions.

Note: The first output reports the Index Reorg Stats of the non-partitioned indexes. The following outputs report the Index Reorg Stats of the partitioned indexes on each partition; the index reorg statistics of only one partition is reported in each output.

```
Index Reorg Stats:  
Retrieval Time: 02/08/2010 23:04:21  
TbspaceID: -6      TableID: -32768  
Schema: ZORAN    TableName: BIGRPT  
Access: Allow none  
Status: Completed  
Start Time: 02/08/2010 23:03:55   End Time: 02/08/2010 23:04:04  
Total Duration: 00:00:08  
Prev Index Duration: -  
Cur Index Start: -  
Cur Index: 0          Max Index: 2           Index ID: 0  
Cur Phase: 0         ( - )     Max Phase: 0  
Cur Count: 0          Max Count: 0  
Total Row Count: 750000  
Retrieval Time: 02/08/2010 23:04:21  
TbspaceID: 2      TableID: 5  
Schema: ZORAN    TableName: BIGRPT  
PartitionID: 0      MaxPartition: 2  
Access: Allow none  
Status: Completed  
Start Time: 02/08/2010 23:04:04   End Time: 02/08/2010 23:04:08  
Total Duration: 00:00:04  
Prev Index Duration: -  
Cur Index Start: -  
Cur Index: 0          Max Index: 2           Index ID: 0  
Cur Phase: 0         ( - )     Max Phase: 0  
Cur Count: 0          Max Count: 0  
Total Row Count: 375000  
Retrieval Time: 02/08/2010 23:04:21  
TbspaceID: 2      TableID: 6  
Schema: ZORAN    TableName: BIGRPT  
PartitionID: 1      MaxPartition: 2  
Access: Allow none  
Status: Completed  
Start Time: 02/08/2010 23:04:08   End Time: 02/08/2010 23:04:12  
Total Duration: 00:00:04  
Prev Index Duration: -  
Cur Index Start: -  
Cur Index: 0          Max Index: 2           Index ID: 0  
Cur Phase: 0         ( - )     Max Phase: 0  
Cur Count: 0          Max Count: 0  
Total Row Count: 375000
```

-scansharing

The following section is an example of output using the **-scansharing** parameter. The output shows two sharing sets. The table scan set has two groups and the block index scan set has one group.

```
Database Partition 0 -- Database jeanorth; April 2 2012; wsdbu00545538SAMP -- Active -- Up 0 days 00:00:45
```

Scan Sets:

| TbspaceID | TableID | ScanObject | NumGroups | Footprint | TableSize | FastScanRate | SlowScanRate |
|-----------|---------|------------|-----------|-----------|-----------|--------------|--------------|
| 2 | 3 | 0 | 2 | 11520 | 22752 | 2486 | 1000 |

Group Information:

| FootPrint | NumScannersInGroup |
|-----------|--------------------|
| 8288 | 3 |

```

Scans In Group:
AgentID ApplID Mode Wrappable Fast/Slow Speed ThrottleTime Absolute Location Remaining Pages
9768 1173 0 0 1 2486 0 32 22751
11332 1165 0 0 1 2486 0 5056 17727
15466 1155 0 0 1 2486 0 8288 14495

```

Group Information:

```

FootPrint NumScannersInGroup
3232 2

```

```

Scans In Group:
AgentID ApplID Mode Wrappable Fast/Slow Speed ThrottleTime Absolute Location Remaining Pages
15209 1150 0 0 1 2486 0 14080 8703
12103 1148 0 0 1 2486 0 17280 5503

```

Scan Sets:

```

TbspaceID TableID ScanObject NumGroups Footprint TableSize FastScanRate SlowScanRate
2 3 1 1 9056 22752 1000 1000

```

Group Information:

```

FootPrint NumScannersInGroup
9056 3

```

```

Scans In Group:
AgentID ApplID Mode Wrappable Fast/Slow Speed ThrottleTime Relative Location Estimated Remaining Pages
6170 1209 0 0 1 1000 0 896 13535
13645 1215 0 0 1 1000 0 3552 10879
4371 1204 0 0 1 1000 0 9920 4511

```

-serverlist

The following are samples of the serverlist output

Sample serverlist output from db2pd -serverlist -db sample

Database Member 0 -- Active -- Up 0 days 00:10:43 -- Date 10/06/2010 12:22:39

Server List:

```

Time: Wed Oct 6 12:13:17
Database Name: SAMPLE
Count: 2

```

| Hostname | Non-SSL Port | SSL Port | Priority |
|----------------------------|--------------|----------|----------|
| coralxib23.torolab.ibm.com | 49712 | 0 | 34 |
| coralxib24.torolab.ibm.com | 49712 | 0 | 65 |

Sample service subclass output from db2pd -serverlist -alldbs

Database Member 0 -- Active -- Up 0 days 00:06:15 -- Date 10/06/2010 12:18:11

Server List:

```

Time: Wed Oct 6 12:13:17
Database Name: SAMPLE
Count: 2

```

| Hostname | Non-SSL Port | SSL Port | Priority |
|----------------------------|--------------|----------|----------|
| coralxib23.torolab.ibm.com | 49712 | 0 | 34 |
| coralxib24.torolab.ibm.com | 49712 | 0 | 65 |

Database Member 0 -- Active -- Up 0 days 00:06:15 -- Date 10/06/2010 12:18:11

Server List:

```

Time: Wed Oct 6 12:17:00
Database Name: SAMPLE2
Count: 2

```

| Hostname | Non-SSL Port | SSL Port | Priority |
|----------------------------|--------------|----------|----------|
| coralxib23.torolab.ibm.com | 49712 | 0 | 56 |
| coralxib24.torolab.ibm.com | 49712 | 0 | 43 |

-serviceclasses

The following example is a sample of the service classes information output for one service superclass and its subclass.

Sample service superclass output:

```

Service Class Name      = SYSDEFAULTSYSTEMCLASS
Service Class ID        = 1
Service Class Type      = Service Superclass
Default Subclass ID     = 11
Effective Service Class State = Enabled
Catalog Service Class State = Enabled
Effective Prefetch Priority = Medium
Catalog Prefetch Priority = Default
Effective Bufferpool Priority = Low
Catalog Bufferpool Priority = Default
Effective Outbound Correlator = None
Catalog Outbound Correlator = None
CPU Shares              = 1000
CPU Share Type          = Soft
CPU Limit                = None
Work Action Set ID       = N/A
Collect Activity Opt     = None
Collect Request Metrics  = Base

Num Connections          = 5
Last Statistics Reset Time = 12/16/2008 15:27:42.000000
Num Coordinator Connections = 5
Coordinator Connections HWM = 5

```

Associated Workload Occurrences (WLO):

| AppHandle [nod-index] | WL ID | WLO ID | UOW ID | WLO State |
|-----------------------|-------|--------|--------|-----------|
| 10 [000-00010] | 0 | 0 | 1 | UOWWAIT |
| 11 [000-00011] | 0 | 0 | 1 | UOWWAIT |
| 12 [000-00012] | 0 | 0 | 1 | UOWWAIT |
| 13 [000-00013] | 0 | 0 | 1 | UOWWAIT |
| 14 [000-00014] | 0 | 0 | 1 | UOWWAIT |

Sample service subclass output:

```

Service Class Name      = SYSDEFAULTSUBCLASS
Service Class ID        = 11
Service Class Type      = Service Subclass
Parent Superclass ID    = 1
Effective Service Class State = Enabled
Catalog Service Class State = Enabled
Effective Prefetch Priority = Medium
Catalog Prefetch Priority = Default
Effective Bufferpool Priority = Low
Catalog Bufferpool Priority = Default
Effective Outbound Correlator = None
Catalog Outbound Correlator = None
Collect Activity Opt     = None
Collect Request Metrics  = None
Collect Aggr Activity Opt = None
Collect Aggr Request Opt = None
Act Lifetime Histogram Template ID = 1
Act Queue Time Histogram Template ID = 1
Act Execute Time Histogram Template ID = 1
Act Estimated Cost Histogram Template ID = 1
Act Interarrival Time Histogram Template ID = 1
Request Execute Time Histogram Template ID = 1

Access Count             = 0
Last Stats Reset Time   = 12/16/2008 15:27:42.000000
Activities HWM           = 0
Activities Completed     = 0
Activities Rejected     = 0
Activities Aborted       = 0

Associated Agents:
EDU ID      AppHandle [nod-index]  WL ID      WLO ID      UOW ID      Activity ID

```

```

26      10    [000-00010]  0        0        0        0
29      11    [000-00011]  0        0        0        0
28      12    [000-00012]  0        0        0        0
27      13    [000-00013]  0        0        0        0
30      14    [000-00014]  0        0        0        0

```

Associated Non-agent threads:

| PID | TID | Thread Name |
|------|------------|-------------|
| 6834 | 2948590480 | db2loggr |
| 6834 | 2947541904 | db2loggw |
| 6834 | 2946493328 | db2fr |
| 6834 | 2945444752 | db2dlock |
| 6834 | 2944396176 | db2pclnr |
| 6834 | 2943347600 | db2pfchr |
| 6834 | 2942299024 | db2pfchr |
| 6834 | 2941250448 | db2pfchr |

-storagegroups and -storagepaths

The following section is an example of output using the **-storagegroups** parameter or the **-storagepaths** parameter.

```
db2pd -db testdb -storagegroups
```

Storage Group Configuration:

| Address | SGID | Deflt | DataTag | Name |
|--------------------|------|-------|---------|-----------|
| 0x00002BA9E6CFF4C0 | 0 | Yes | 0 | IBMSGROUP |
| 0x00002BA9E6D0F4C0 | 1 | No | 1 | SG_SSD |
| 0x00002BA9E6D1DAE0 | 2 | No | 5 | SG_IBMSAN |

Storage Group Statistics:

| Address | SGID | State | NumPaths | NumDropPen |
|--------------------|------|------------|----------|------------|
| 0x00002BA9E6CFF4C0 | 0 | 0x00000000 | 1 | 0 |
| 0x00002BA9E6D0F4C0 | 1 | 0x00000000 | 2 | 0 |
| 0x00002BA9E6D1DAE0 | 2 | 0x00000000 | 2 | 0 |

Storage Group paths:

| Address | SGID | PathID | PathState | PathName |
|--------------------|------|--------|-----------|--------------|
| 0x00002BA99CD23540 | 0 | 0 | InUse | /filesystem1 |
| 0x00002BA99CE13540 | 1 | 1024 | InUse | /filesystem2 |
| 0x00002BA99CF03540 | 1 | 1025 | InUse | /filesystem3 |
| 0x00002BA99D0F3540 | 2 | 2048 | InUse | /filesystem4 |
| 0x00002BA99D1E3540 | 2 | 2049 | InUse | /filesystem5 |

- tablespaces

The following example is a sample of the output of the **db2pd - tablespaces** command showing information such as PathsDropped and PathID that is applicable to databases (some of the columns have been left out for readability):

Tablespace Configuration:

```
...
```

Tablespace Statistics:

| Address | Id | ... | State | MinRecTime | NQuiescers | PathsDropped |
|--------------------|----|-----|------------|------------|------------|--------------|
| 0x070000004108AB40 | 0 | ... | 0x00000000 | 0 | 0 | Yes |
| 0x070000004108B520 | 1 | ... | 0x00000000 | 0 | 0 | Yes |
| 0x0700000041078100 | 2 | ... | 0x00000000 | 0 | 0 | Yes |

Tablespace Autoresize Statistics:

```
...
```

Tablespace Storage Statistics:

| Address | Id | DataTag | Rebalance | SGID | SourceSGID |
|--------------------|----|---------|-----------|------|------------|
| 0x00002BA9E6CFF4C0 | 0 | 0 | No | 0 | - |
| 0x00002BA9E6D0F4C0 | 1 | 5 | No | 0 | - |
| 0x00002BA9E6D1DAE0 | 2 | 1 | Yes | 1 | 0 |
| 0x00002BA9E73696C0 | 3 | 5 | No | 0 | - |

Containers:

| Address | TspId | ... | PathID | StripeSet | Container |
|--------------------|-------|-----|--------|-----------|---|
| 0x070000004108B240 | 0 | ... | 0 | 0 | /Path1/inst/NODE0000/TESTDB/T0000000/C0000000.CAT |
| 0x070000004108B398 | 0 | ... | 1 | 0 | /Path2/inst/NODE0000/TESTDB/T0000000/C0000001.CAT |
| 0x070000004108BBC0 | 1 | ... | 0 | 0 | /Path1/inst/NODE0000/TESTDB/T0000001/C0000000.TMP |
| 0x070000004108BD18 | 1 | ... | 1 | 0 | /Path2/inst/NODE0000/TESTDB/T0000001/C0000001.TMP |
| 0x07000000410787A0 | 2 | ... | 0 | 0 | /Path1/inst/NODE0000/TESTDB/T0000002/C0000000.LRG |
| 0x07000000410788F8 | 2 | ... | 1 | 0 | /Path2/inst/NODE0000/TESTDB/T0000002/C0000001.LRG |

If the table is managed by manual storage, the SGID will output a dash (-).

A new 'Max HWM' column is added to the **db2pd -tablespaces** output to indicate the maximum HWM for a DMS table space since the instance was started. The 'HWM' column in the output is the current HWM, which for a temporary DMS table space, represents the point-in-time value of the amount of disk space used. For SMS table spaces, the HWM and Max HWM will not have any value.

After a query has been issued, in-memory information about the temporary tables used in the last transaction will be available using **db2pd**. The following example shows the new column in **bold**. The value of the Max HWM will always be equal to, or greater than, the HWM.

```
hotel26:/home/billyp> db2pd -db bill -tablespaces

Database Partition 0 -- Database BILL -- Active -- Up 0 days 00:02:15

Tablespace Configuration:

Address      Id   Type Content PageSz ExtentSz Auto Prefetch ...
0x00002B9DCA582720 0   DMS Regular 4096   4       Yes  4       ...
0x00002B9DCA583560 1   DMS UsrTmp 4096   2       Yes  2       ...
0x00002B9DCA5863E0 2   DMS Large   4096   32      Yes  32      ...
0x00002B9DCA587220 3   DMS SysTmp 4096   2       Yes  2       ...
0x00002B9DCA58A0A0 4   DMS Large   4096   4       Yes  4       ...

... BufID BufIDDisk FSC RSE NumCntrs MaxStripe LastConsecPg Name
... 1     1           Off Yes 1       0       3           SYSCATSPACE
... 1     1           Off Yes 1       0       1           DMSUSRTEMP
... 1     1           Off Yes 1       0       31          USERSPACE1
... 1     1           Off N/A 1      0       1           DMSSYSTEMP
... 1     1           Off No  1      0       3           SYSTOOLSPACE
```

Tablespace Statistics:

| Address | Id | TotalPgs | UsablePgs | UsedPgs | PndFreePgs | ... |
|--------------------|----|----------|-----------|---------|------------|-----|
| 0x00002B9DCA582720 | 0 | 12544 | 12540 | 12308 | 0 | ... |
| 0x00002B9DCA583560 | 1 | 20000 | 19998 | 3266 | 0 | ... |
| 0x00002B9DCA5863E0 | 2 | 7168 | 7136 | 3232 | 0 | ... |
| 0x00002B9DCA587220 | 3 | 20000 | 19998 | 1700 | 0 | ... |
| 0x00002B9DCA58A0A0 | 4 | 256 | 252 | 144 | 0 | ... |

| ...FreePgs | HWM | Max HWM | State | MinRecTime | NQuiescers |
|------------|-------|--------------|--------------|------------|------------|
| ...232 | 12308 | 12308 | 0x00000000 0 | 0 | 0 |
| ...16732 | 3266 | 3266 | 0x00000000 0 | 0 | 0 |
| ...3904 | 7072 | 7072 | 0x00000000 0 | 0 | 0 |
| ...18298 | 1700 | 2000 | 0x00000000 0 | 0 | 0 |
| ...108 | 144 | 200 | 0x00000000 0 | 0 | 0 |

-temptable

The system monitor elements could also be used to determine the effectiveness of temporary table compression by examining the amount of buffer pool reads and writes. The following example is a sample of the output of the **db2pd -temptable** command:

```
hotel26:/home/billyp> db2pd -db billdb -temptable
System Temp Table Stats:
  Number of Temp Tables : 0
  Comp Eligible Temps   : 0
  Compressed Temps      : 0

  Total Stored Temp Bytes : 0
  Total Bytes Saved       : 0
```

```
Total Compressed Rows : 0
Total Temp Table Rows : 0
```

User Temp Table Stats:

```
Number of Temp Tables : 0
Comp Eligible Temps : 0
Compressed Temps : 0
```

```
Total Stored Temp Bytes : 0
Total Bytes Saved : 0
Total Compressed Rows : 0
Total Temp Table Rows : 0
```

The same information is stored for system temporary tables as well as user temporary tables. However, all of the counters mentioned previously are cumulative, and are updated as temporary tables are dropped. As such, these counters represent only historical information.

-thresholds

The following example is a sample of the threshold information for a database threshold and its queue.

```
Threshold Name      = MAXDBACTIVITIES
Threshold ID       = 6
Domain             = 10
Domain ID          = 10
Predicate ID       = 90
Maximum Value     = 2
Enforcement        = D
Queueing            = Y
Queue Size          = 0
Collect Flags       = V
Partition Flags     = C
Execute Flags       = C
Enabled              = Y
Check Interval (seconds) = -1
Remap Target Serv. Subclass = 0
Log Violation Evmon Record = Y
```

Sample database threshold queue output:

Database Threshold Tickets:

```
Ticket information for threshold: TH1 with threshold ID 1
Activity ID  UOW ID      Classification  AppHandl [nod-index]
1           6           READ_DML       51          [000-00051]
```

```
Queue information for threshold: MAXDBACTIVITIES
Max Concurrency      = 2
Concurrency          = 2
Max Queue Size       = 0
```

```
Agents Currently Queued:
EDU ID      AppHandl [nod-index]      Agent Type Activity ID  UOW ID
36          14994    [000-14994]      1          4          1
```

The following example is a sample of the threshold information for a statement threshold:

```
db2pd -thresholds -db sample db2
```

```
Database Member 0 -- Database SAMPLE -- Active -- Up 0 days 00:01:28 -- Date 04/13/2011 09:57:09
```

Statement Thresholds:

```
Threshold Name      = T_THRESHOLD_FIRING_23
Threshold ID       = 1
```

```

Domain          = 60
Domain ID      = 1
Predicate ID   = 30
Maximum Value  = 60
Enforcement    = D
Queueing        = N
Queue Size     = 0
Collect Flags  = V
Partition Flags = C
Execute Flags   = C
Enabled         = Y
Check Interval (seconds) = -1
Remap Target Serv. Subclass = 0
Log Violation Evmon Record = Y
Statement Text  = CREATE TABLE T2 (X INT)

```

```
$ db2 "select thresholdname, domain from sysibm.systhresholds"
```

| THRESHOLDNAME | DOMAIN |
|-----------------------|--------|
| T_THRESHOLD_FIRING_23 | SQ |

1 record(s) selected.

-transactions

The following is a sample of the output of the db2pd -transactions command:

```
db2pd -transactions -db sample
```

```
Database Member 0 -- Database SAMPLE -- Active -- Up 0 days 01:27:38 -- Date 2012-12-04-14.23.08.373888
```

Transactions:

| Address | AppHand1 | [nod-index] | TranHdl | Locks | State | ... |
|--------------------|----------|-------------|---------|-------|-------|-----|
| 0x00002AAAE633A480 | 7 | [000-00007] | 3 | 0 | READ | ... |
| 0x00002AAAE633C080 | 8 | [000-00008] | 4 | 0 | READ | ... |
| 0x00002AAAE633DC80 | 9 | [000-00009] | 5 | 0 | READ | ... |
| 0x00002AAAE633F880 | 10 | [000-00010] | 6 | 0 | READ | ... |
| 0x00002AAAE6341480 | 11 | [000-00011] | 7 | 0 | READ | ... |
| 0x00002AAAE6343080 | 12 | [000-00012] | 8 | 0 | READ | ... |
| 0x00002AAAE6344C80 | 13 | [000-00013] | 9 | 0 | READ | ... |
| 0x00002AAAE6346880 | 14 | [000-00014] | 10 | 0 | READ | ... |
| 0x00002AAAE6348480 | 15 | [000-00015] | 11 | 0 | READ | ... |
| 0x00002AAAE634A080 | 16 | [000-00016] | 12 | 0 | READ | ... |
| 0x00002AAAE634BC80 | 17 | [000-00017] | 13 | 0 | READ | ... |

Output from Transactions continued:

| ... | Tflag | Tflag2 | Firstlsn | Lastlsn | ... |
|-----|------------|------------|--------------------|---------------------|-----|
| ... | 0x00000000 | 0x00000000 | 0x0000000000000000 | 0x0000000000000000 | ... |
| ... | 0x00000000 | 0x00000000 | 0x0000000000000000 | 0x0000000000000000 | ... |
| ... | 0x00000000 | 0x00000000 | 0x0000000000000000 | 0x0000000000000000 | ... |
| ... | 0x00000000 | 0x00000000 | 0x0000000000000000 | 0x0000000000000000 | ... |
| ... | 0x00000000 | 0x00000020 | 0x0000000000000000 | 0x0000000000003EB46 | ... |
| ... | 0x00000000 | 0x00000000 | 0x0000000000000000 | 0x0000000000000000 | ... |
| ... | 0x00000000 | 0x00000000 | 0x0000000000000000 | 0x0000000000000000 | ... |
| ... | 0x00000000 | 0x00000000 | 0x0000000000000000 | 0x0000000000000000 | ... |
| ... | 0x00000000 | 0x00000000 | 0x0000000000000000 | 0x0000000000000000 | ... |
| ... | 0x00000000 | 0x00000000 | 0x0000000000000000 | 0x0000000000000000 | ... |
| ... | 0x00000000 | 0x00000000 | 0x0000000000000000 | 0x0000000000000000 | ... |
| ... | 0x00000000 | 0x00000000 | 0x0000000000000000 | 0x0000000000000000 | ... |

Output from Transactions continued:

| ... | Firstlso | Lastlso | SpaceReserved | LogSpace | TID | ... |
|-----|----------|---------|---------------|----------|------------------|-----|
| ... | 0 | 0 | 0 | 0 | 0x0000000000031A | ... |
| ... | 0 | 0 | 0 | 0 | 0x00000000000103 | ... |
| ... | 0 | 0 | 0 | 0 | 0x00000000000318 | ... |
| ... | 0 | 0 | 0 | 0 | 0x00000000000105 | ... |
| ... | 0 | 0 | 0 | 0 | 0x00000000000221 | ... |
| ... | 0 | 0 | 0 | 0 | 0x00000000000107 | ... |
| ... | 0 | 0 | 0 | 0 | 0x00000000000108 | ... |
| ... | 0 | 0 | 0 | 0 | 0x00000000000109 | ... |

```
... 0      0      0      0      0x000000000010B ...
... 0      0      0      0      0x000000000010C ...
... 0      0      0      0      0x000000000010E ...
```

Output from Transactions continued:

| ... AxRegCnt | GXID | ClientUserID | ClientWrkstnName | ClientApplName | ClientAccntng |
|--------------|------|--------------|------------------|---------------------------|---------------|
| ... 1 | 0 | n/a | n/a | n/a | n/a |
| ... 1 | 0 | n/a | n/a | n/a | n/a |
| ... 1 | 0 | n/a | n/a | n/a | n/a |
| ... 1 | 0 | n/a | n/a | n/a | n/a |
| ... 1 | 0 | n/a | n/a | n/a | n/a |
| ... 1 | 0 | n/a | n/a | n/a | n/a |
| ... 1 | 0 | n/a | n/a | n/a | n/a |
| ... 1 | 0 | n/a | n/a | n/a | n/a |
| ... 1 | 0 | n/a | n/a | n/a | n/a |
| ... 1 | 0 | n/a | n/a | n/a | n/a |
| ... 1 | 0 | n/a | n/a | db2evml_DB2DETAILDEADLOCK | n/a |

Total Application commits : 123

Total Application rollbacks : 139

-sort The following example is a sample of the output of the **db2pd -sort** command:

```
db2pd -sort -db pdtest
```

Database Partition 0 -- Database PDTEST -- Active -- Up 0 days 00:05:29

| AppHandle [nod-index] | | SortCB | MaxRowSize | EstNumRows | EstAvgRowSize | NumSMPSorts | NumSpills |
|-------------------------------------|-------------|--------------------|-------------|-----------------|----------------|-------------|-----------|
| 13 | [000-00013] | 0x0000002AB7587300 | 919 | 50716 | 644 | 1 | 1 |
| KeySpec | | | | | | | |
| VARCHAR:300,VARCHAR:400 | | | | | | | |
| | | SMPSSort# | SortheapMem | NumBufferedRows | NumSpilledRows | | |
| | | 0 | 16 | 0 | 101 | | |
| AppHandle [nod-index] | | SortCB | MaxRowSize | EstNumRows | EstAvgRowSize | NumSMPSorts | NumSpills |
| 7 | [000-00007] | 0x0000002AB74FC540 | 919 | 1000 | 644 | 1 | 1 |
| KeySpec | | | | | | | |
| VARCHAR:400,VARCHAR:200,VARCHAR:300 | | | | | | | |
| | | SMPSSort# | SortheapMem | NumBufferedRows | NumSpilledRows | | |
| | | 0 | 16 | 0 | 101 | | |

-wlocks

The following example is a sample of the output of the **db2pd -wlocks** command:

```
db2pd -wlocks -db mydb2
```

Database Partition 0 -- Database MYDB2 -- Active -- Up 0 days 00:02:17

Locks being waited on:

| AppHandle [nod-index] | TranHdl | Lockname | Type | Mode | ... | |
|-----------------------|---------|----------------------------|---------|---------|---------------------------|-------|
| 13 [000-00013] | 7 | 0002000B000000000340000452 | Row | .X | ... | |
| 15 [000-00015] | 9 | 0002000B000000000340000452 | Row | .NS | ... | |
| 12 [000-00012] | 2 | 0002000B000000000340000452 | Row | .NS | ... | |
| 12 [000-00012] | 2 | 00020004000000000080001652 | Row | .X | ... | |
| 14 [000-00014] | 8 | 00020004000000000080001652 | Row | .NS | ... | |
| ... | | | | | ... | |
| ... | Conv | Sts | CoorEDU | AppName | AuthID | AppID |
| ... | G | 352614 | db2bp | VENUS | *LOCAL.venus.071117030309 | |
| ... | W | 1176046 | db2bp | VENUS | *LOCAL.venus.071117030358 | |
| ... | W | 1052748 | db2bp | VENUS | *LOCAL.venus.071117030231 | |
| ... | G | 1052748 | db2bp | VENUS | *LOCAL.venus.071117030231 | |
| ... | W | 634900 | db2bp | VENUS | *LOCAL.venus.071117030340 | |

-workclasssets

The following example is a sample of the output for the basic work class information:

```
Work Class Sets:  
Address ClassSetID ReferenceCounter  
0x00002BA89DDF5AE0 1 1  
  
Work Classes:  
Address ClassSetID ClassID ClassName  
0x00002BA89DDF5BC0 1 1 WCDML  
Attributes:  
Work Type: DML  
Timeron Cost From: 1 Timeron Cost To: 1000  
  
Address ClassSetID ClassID ClassName  
0x00002BA89DDF5C40 1 2 WCDDL  
Work Type: DML
```

-workloads

The following example is a sample of the output for the default workloads SYSDEFAULTUSERWORKLOAD and SYSDEFAULTADMWORKLOAD:

```
Database Partition 0 -- Database SB -- Active -- Up 0 days 00:00:57
```

```
Workload Definitions:  
Address = 0x00002B3E772ACB40  
WorkloadID = 1  
WorkloadName = SYSDEFAULTUSERWORKLOAD  
DBAccess = ALLOW  
Maximum Degree = 4  
ConcWLOThresID = 0  
ConcWLOThresName = ^H  
MaxConcWLOs = 9223372036854775806  
WLOActsThresName = ^H  
WLOActsThresID = 0  
MaxWLOActs = 9223372036854775806  
ServiceClassID = 13  
Collect Activity Opt = None  
Collect Lock Timeout = Without History  
Collect Deadlock = Without History  
Collect Lock Wait = None  
Collect Aggr Activity Opt = None  
Collect Activity Metrics = Base  
Collect Unit of Work Data = None  
Act Lifetime Histogram Template ID = 1  
Act Queue Time Histogram Template ID = 1  
Act Execute Time Histogram Template ID = 1  
Act Estimated Cost Histogram Template ID = 1  
Act Interarrival Time Histogram Template ID = 1  
  
Address = 0x00002B3E772ACD50  
WorkloadID = 2  
WorkloadName = SYSDEFAULTADMWORKLOAD  
DBAccess = ALLOW  
Maximum Degree = DEFAULT  
ConcWLOThresID = 0  
ConcWLOThresName = ^H  
MaxConcWLOs = 9223372036854775806  
WLOActsThresName = ^H  
WLOActsThresID = 0  
MaxWLOActs = 9223372036854775806  
ServiceClassID = 13  
Collect Activity Opt = None  
Collect Lock Timeout = Without History  
Collect Deadlock = Without History  
Collect Lock Wait = None  
Collect Aggr Activity Opt = None
```

```

Collect Activity Metrics      = Base
Collect Unit of Work Data   = None
Act Lifetime Histogram Template ID      = 1
Act Queue Time Histogram Template ID    = 1
Act Execute Time Histogram Template ID  = 1
Act Estimated Cost Histogram Template ID = 1
Act Interarrival Time Histogram Template ID = 1

Usage Privilege Holders:
Address          WorkloadID  Type        AuthID
0x00002B3E772BCD60 1           GROUP      PUBLIC

Local Partition Workload Statistics:
Address          = 0x00002B3E772DA0C0
WorkloadID       = 1
WorkloadName     = SYSDEFAULTUSERWORKLOAD
NumWLO          = 0
LastResetTime   = 10/07/2008 16:34:43.000000
WLO HWM         = 0
WLOActHWM       = 0
WLOCompleted    = 0
ActCompleted    = 0
ActAborted      = 0
ActRejected     = 0

Address          = 0x00002B3E7730A0C0
WorkloadID       = 2
WorkloadName     = SYSDEFAULTADMWORKLOAD
NumWLO          = 0
LastResetTime   = 10/07/2008 16:34:43.000000
WLO HWM         = 0
WLOActHWM       = 0
WLOCompleted    = 0
ActCompleted    = 0
ActAborted      = 0
ActRejected     = 0

```

-rustatus

The following example is a sample of the output of the **db2pd -rustatus** command:

| ROLLING UPDATE STATUS: Disk Value | | Memory Value | |
|--|---|----------------|--|
| Record Type | = INSTANCE | | |
| ID | = 0 | | |
| Code Level | = V:10 R:5 M:0 F:3 I:0 SB:0 (0xA05000300000000) | Not Applicable | |
| Architecture Level | = V:10 R:5 M:0 F:3 I:0 SB:0 (0xA05000300000000) | Not Applicable | |
| State | = [NONE] | | |
| Last updated | = 2013/04/18:02:58:58 | | |
| | | | |
| Record Type | = MEMBER | | |
| ID | = 0 | | |
| Code Level | = V:10 R:5 M:0 F:4 I:0 SB:0 (0xA05000400000000) V:10 R:5 M:0 F:4 I:0 SB:0 (0xA05000400000000) | | |
| CECL | = V:10 R:5 M:0 F:3 I:0 SB:0 (0xA05000300000000) V:10 R:5 M:0 F:3 I:0 SB:0 (0xA05000300000000) | | |
| Architecture Level | = V:10 R:5 M:0 F:4 I:0 SB:0 (0xA05000400000000) V:10 R:5 M:0 F:4 I:0 SB:0 (0xA05000400000000) | | |
| CEAL | = V:10 R:5 M:0 F:3 I:0 SB:0 (0xA05000300000000) V:10 R:5 M:0 F:3 I:0 SB:0 (0xA05000300000000) | | |
| Section Level | = V:10 R:5 M:0 F:0 I:0 SB:0 (0xA05000000000000) V:10 R:5 M:0 F:0 I:0 SB:0 (0xA05000000000000) | | |
| Last updated | = 2013/04/18:07:59:48 | | |
| | | | |
| mbserver53.domain.com: db2pd -ruStatus -localhost ... completed ok | | | |
| Record Type | = MEMBER | | |
| ID | = 1 | | |
| Code Level | = V:10 R:5 M:0 F:4 I:0 SB:0 (0xA05000400000000) V:10 R:5 M:0 F:4 I:0 SB:0 (0xA05000400000000) | | |
| CECL | = V:10 R:5 M:0 F:3 I:0 SB:0 (0xA05000300000000) V:10 R:5 M:0 F:3 I:0 SB:0 (0xA05000300000000) | | |
| Architecture Level | = V:10 R:5 M:0 F:4 I:0 SB:0 (0xA05000400000000) V:10 R:5 M:0 F:4 I:0 SB:0 (0xA05000400000000) | | |
| CEAL | = V:10 R:5 M:0 F:3 I:0 SB:0 (0xA05000300000000) V:10 R:5 M:0 F:3 I:0 SB:0 (0xA05000300000000) | | |
| Section Level | = V:10 R:5 M:0 F:0 I:0 SB:0 (0xA05000000000000) V:10 R:5 M:0 F:0 I:0 SB:0 (0xA05000000000000) | | |
| Last updated | = 2013/04/18:09:24:18 | | |
| | | | |
| mbserver55.domain.com: db2pd -ruStatus -localhost ... completed ok | | | |
| Record Type | = CF | | |
| ID | = 128 | | |

```

Code Level      = V:10 R:5 M:0 F:4 I:0 SB:0 (0x0A05000400000000) Not Applicable
Architecture Level = V:10 R:5 M:0 F:4 I:0 SB:0 (0x0A05000400000000) Not Applicable
Last updated    = 2013/04/18:07:31:14

Record Type     = CF
ID              = 129
Code Level      = V:10 R:5 M:0 F:4 I:0 SB:0 (0x0A05000400000000) Not Applicable
Architecture Level = V:10 R:5 M:0 F:4 I:0 SB:0 (0x0A05000400000000) Not Applicable
Last updated    = 2013/04/18:07:25:55

```

db2pdcfg - Configure Db2 database for problem determination behavior

Sets flags in the Db2 database memory sets to influence the database system behavior for problem determination purposes.

Authorization

One of the following authority levels is required:

- The SYSADM authority level.
- The SYSCTRL authority level.
- The SYSMAINT authority level.
- The SYSMON authority level.

When only the SYSMON authorization level is granted, the following parameters do not work unless the status suboption is specified:

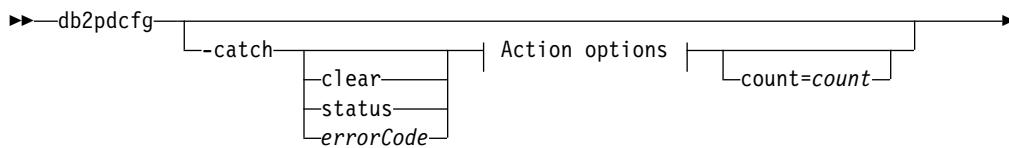
- **catch**
- **cos**
- **dbcfg**
- **dbmcfg**
- **fodc**
- **trapresilience**

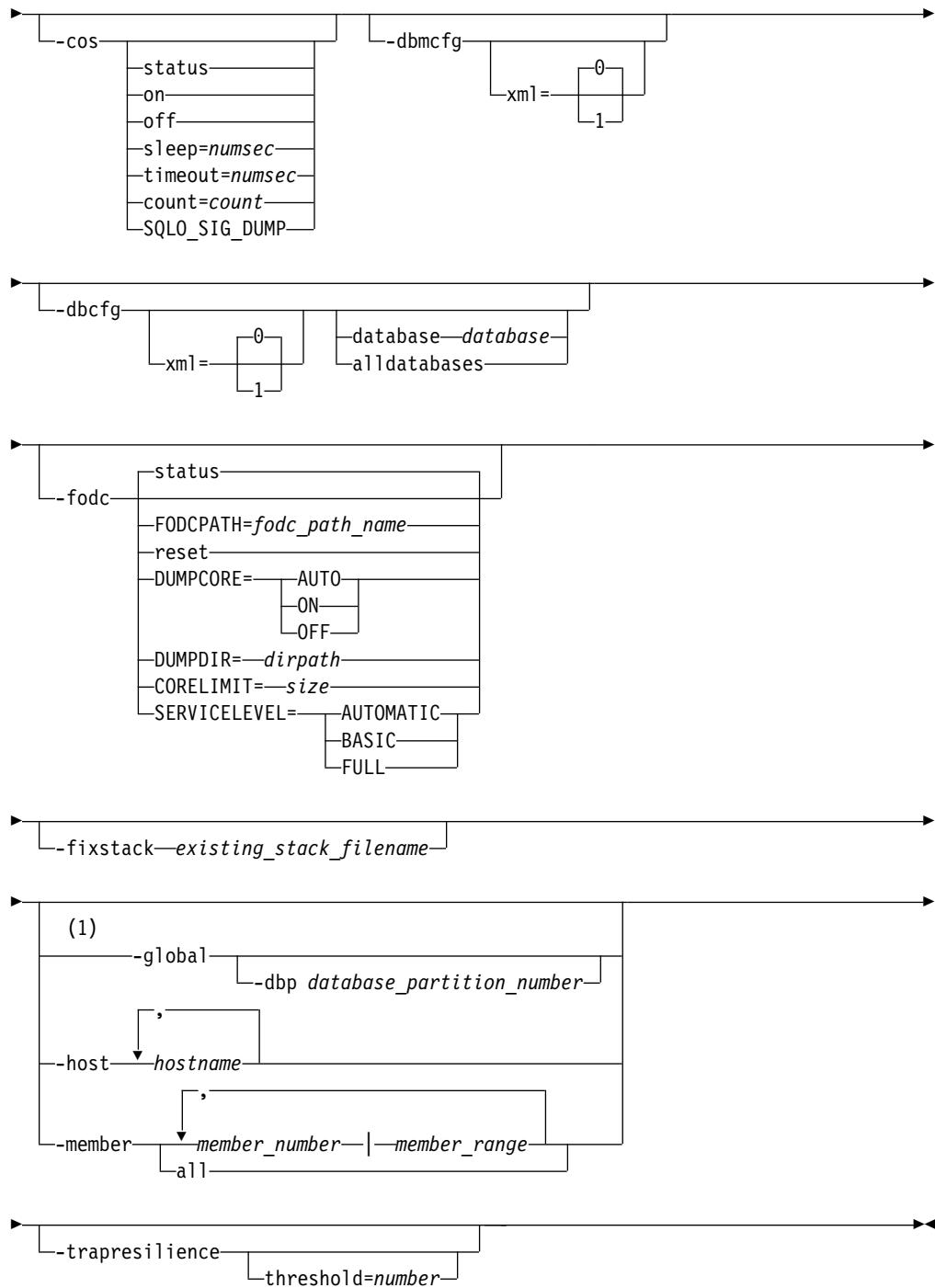
Note: On Windows, you must have administrator authority to use the **db2pdcfg** command.

Required connection

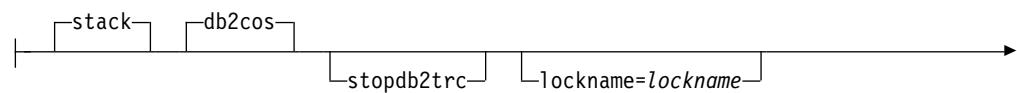
There is no minimum connection requirement. However, if a database scope option is specified, that database must be active before the command can return the requested information.

Command syntax





Action options:





Notes:

- 1 The **-global** parameter has been deprecated. You can use the **-member all** parameter options to obtain information globally.

Command parameters

-catch Instructs the database manager to catch an error or warning.

clear Clear any catch flags that are set.

status Display any catch flags that are set.

errorCode

Catch specific flags that are set.

Possible *errorCode* options are:

- *sqlCode[,reasonCode]* / *sqlCode=sqlCode[,reasonCode]*
- ZRC (hex or integer)
- ZRC #define (such as SQLP_LTIMEOUT)
- ADM (such as ADM1611)
- String (such as diagstr="Hello World")
- ECF (hex or integer)
- "deadlock" or "locktimeout"

Catching specific flags that you specify, such as an administration notification message (ADM1611) or any string ("Hello World") observed in the db2diag log, causes the db2cos script to dump out this information.

Note: If you intend to specify a string for diagstr option with quotation marks on a remote member, use "\\" with the quotation marks. For example, on remote member 5 the command would be:

```
db2pdcfg -catch diagstr=\"Hello World\" -member 5
```

stack Produce stack trace in **db2diag** log file. Default.

db2cos

Run the **db2cos** callout script found in the **bin** directory. Default.

stopdb2trc

Stop **db2trc** command.

lockname=lockname

Lockname for catching specific lock
(lockname=000200030000001F0000000052).

locktype=locktype

Locktype for catching specific lock (locktype=R or locktype=52).

count=count

The number of times the database manager executes **db2cos** during a database manager trap. The default is 255.

-cos Instructs the database manager how to invoke the **db2cos** callout script upon a database manager trap.

status Print the status.
off Turn off the database manager call to **db2cos** during a database manager trap.
on Turn on the database manager call to **db2cos** during a database manager trap.

sleep=numsec

Amount of time to sleep between checking the size of the output file generated by **db2cos**. The default is 3 seconds.

timeout=numsec

Amount of time to wait before assuming **db2cos** script has completed. The default is 30 seconds.

count=count

The number of times to execute **db2cos** during a database manager trap. The default is 255.

SQLO_SIG_DUMP

Enable **db2cos** execution when SQLO_SIG_DUMP signal is received.

-dbmcfg

Sets DBM Config Reserved Bitmap. This option is password protected which can be obtained from IBM Db2 Service.

xml=0 | 1

Values 0 (default) or 1 (instance has xml data).

-dbcfg Sets Database Config Reserved Bitmap. This option is password protected which can be obtained from IBM Db2 Service.

xml=0 | 1

Values 0 (default) or 1 (database has xml data).

-fodc Sets flags in the Db2 database memory sets. This influences the database system behavior during problem determination situations involving first occurrence data collection (FODC).

The supported **-fodc** options with their potential values and defaults are:

reset Restore all the FODC options to their defaults.

status Display status of all FODC options. This is a default option, that is, FODC status will be displayed when **db2pdcfg** is invoked without parameters.

FODCPATH=fodc_path_name

Specifies the full path name of an existing directory where the FODC data package is created. The path you specify must be writable by the members on the machine and by the fmp processes running on the member or partition.

DUMPCORE=

Enables or disables core file generation on only UNIX and Linux operating systems.

AUTO

Core file is generated if trap cannot be sustained and instance is shut down.

ON Enables core file generation and overrides **DB2RESILIENCE** registry variable setting.

OFF Disables core file generation.

DUMPDIR=dirpath

Specifies absolute path name of the directory where core file is created.

CORELIMIT=size

The maximum size of core files created. This value will override the current core file size limit setting. A default value of unlimited is enforced. Consideration should be given to the available file system space because core files can be quite large. The actual size is dependent on the Db2 configuration and the state of the process at the time the problem occurs.

If **CORELIMIT** is to be changed using **db2pdcfg**, it is subject to the usual UNIX access permissions and in some cases **CORELIMIT** will not be able to exceed your ulimit setting. Use **DB2FODC** registry variable to change that value on **db2start** or use large ulimit setting before starting Db2 product.

SERVICELEVEL=

Specifies how data is collected during panics, traps, or errors that might indicate data corruption. The default behavior setting is AUTOMATIC. Note that dynamically setting either BASIC or FULL overrides any previous DUMPCORE settings, so if you want to keep it as it is, you have to specify it as a part of your **db2pdcfg** setting. Setting this dynamically does not affect the CF unless the CF is restarted through a failure or if it was stopped and restarted intentionally. The following options are supported for this parameter:

AUTOMATIC

This setting specifies that the effective SERVICELEVEL setting (that is, BASIC or FULL) is to be chosen at runtime, for the members, and at start time, for the CF process. At present, the only times that BASIC is chosen are for Db2 pureScale environments that have multiple members and for trap resilience.

BASIC

This SERVICELEVEL setting specifies that a minimal amount of FODC data is to be dumped. Core dump processing is disabled by default (but can be overridden by the COREDUMP setting), diagnostics are restricted to the affected thread only, and callout scripts are disabled.

FULL

This SERVICELEVEL setting specifies that the maximum amount of FODC data is to be dumped. This includes core dumps, any associated components dumps, and the invocation of the callout scripts. In addition, there is no attempt to sustain traps.

-fixstack existing_stack_filename

Reads an existing stack file and generates a new file in the same location, with the same file name, but with an additional .fmt file extension. The new .fmt file generated will have improved symbol details on some of the frames in the stack trace if the library where the symbol is defined is available when running this command.

Note: Only applicable on Linux operating systems.

-global

Specifies that **db2pdcfg** will also be run on remote hosts. If the **-file** parameter is specified, a single file consisting of all the individual files from remote host will be created on the computer from where you issued the **db2pdcfg** command.

Note: This command parameter is available in Db2 Version 9.8 Fix Pack 3 and later fix packs. This command parameter is deprecated in Db2 Version 9.7 Fix Pack 4 and later fix packs.

-dbp database partition number

Specifies that **db2pdcfg** will be run on the remote host of the specified database partition. If no database partition is specified with the **-global** option, **db2pdcfg** will run on all remote hosts.

-host hostname

Specifies the host or hosts on which the command is issued. The command is issued for all members that reside on the host. If this option is not specified, the command is issued on the local host. If multiple hosts are specified, all host names must be valid for the command to complete. This option cannot be specified together with the **-member** option.

-member member_number | member_range

Specifies the member or members on which the command is issued. If this option is not specified, the command is issued on the current member. Multiple members can be specified as a comma separated list of *member_number* (member1, member2), or using *member_range*, where *member_range* is a range of members (member1-member3), or using any combination of the first two methods. This option cannot be specified together with the **-host** option.

all Specifies that the command is issued on all members, including members on remote hosts.

-trapresilience

This option displays or modifies trap resilience parameters for problem determination purposes.

The following is a sample output when this option is specified:

Db2 trap resilience is enabled.

```
Current threshold setting : 0 (threshold disabled)
Number of traps sustained : 0
```

threshold=number

Default value: 0 (threshold disabled)

Minimum value: 0

Maximum value: 4294967295

Specifying a number after the **threshold=** option sets the upper limit of traps which will be sustained for the life of the instance. When this threshold is surpassed, the instance will be stopped regardless if the next trap could have been sustained.

The following is a sample output when this option is specified:

```
db2pdcfg -trapresilience threshold=1
```

```
Db2 trap resilience threshold is set to 1
```

Examples

To display the current FODC package settings on members 11, 12, 13, and 15:

```
db2pdcfg -fodc status -member 11-13,15
```

To direct the FODC package to a directory on the local host:

```
db2pdcfg -fodc FODCPATH=/home/hotel49/user/FODC/FODClocal
```

Usage notes

db2pdcfg is a method for dynamically changing (online) the FODC options.

Since **db2pdcfg** sets flags in the Db2 database memory, changes done with the **db2pdcfg** tool will be active only while the instance is up. In order to make the changes permanent, use the **DB2FODC** registry variable.

In the **-fodc** option, some of the settings are specified with the format *variable=value*. Multiple options can be specified in a single command line:

```
db2pdcfg -fodc DUMPCORE=ON -fodc CORELIMIT=8GB
```

Alternatively, several settings can be concatenated in a single command line string using spaces:

```
db2pdcfg -fodc DUMPCORE=ON CORELIMIT=8GB
```

Executing the **db2pdcfg** command, without any options, provides the following informative summary output with respect to trap resilience (highlighted in bold):

```
$ db2pdcfg  
Current PD Control Block Settings:
```

All error catch flag settings cleared.

```
db2cos is enabled for engine traps.  
PD Bitmap: 0x1000  
Sleep Time: 3  
Timeout: 300  
Current Count: 0  
Max Count: 255
```

```
Current bitmap value: 0x0
```

Instance is not in a sleep state

```
Db2 trap resilience is enabled.  
Current threshold setting : 0 ( disabled )  
Number of traps sustained : 0
```

Database Member 0

```
FODC (First Occurrence Data Capture) options:  
Dump directory for large objects (DUMPDIR)= /home/hotel85/vivmak/sql1ib/db2dump/  
Dump Core files (DUMPCORE)= AUTO  
Current hard core file size limit = Unlimited  
Current soft core file size limit = 0 Bytes
```

db2perfc - Reset database performance values

Resets the performance values for one or more databases. It is used with the performance monitor on Windows operating systems.

Authorization

Local Administrator

Required connection

None

Command syntax



Command parameters

-d Specifies that performance values for DCS databases should be reset.

dbalias

Specifies the databases for which the performance values should be reset. If no databases are specified, the performance values for all active databases will be reset.

Examples

The following example resets performance values for all active Db2 databases:
db2perfc

The following example resets performance values for specific Db2 databases:
db2perfc dbalias1 dbalias2

The following example resets performance values for all active Db2 DCS databases:
db2perfc -d

The following example resets performance values for specific Db2 DCS databases:
db2perfc -d dbalias1 dbalias2

Usage notes

When an application calls the Db2 monitor APIs, the information returned is normally the cumulative values since the Db2 server was started. However, it is often useful to reset performance values, run a test, reset the values again, and then rerun the test.

The program resets the values for all programs currently accessing database performance information for the relevant Db2 server instance (that is, the one held in db2instance in the session in which you run **db2perfc**). Invoking **db2perfc** also resets the values seen by anyone remotely accessing Db2 performance information when the command is executed.

The db2ResetMonitor API allows an application to reset the values it sees locally, not globally, for particular databases.

db2perfi - Performance counters registration utility

Adds the Db2 performance counters to the Windows operating system. This must be done to make Db2 and Db2 Connect performance information accessible to the Windows performance monitor.

Authorization

Local Administrator

Required connection

None

Command syntax

```
►—db2perfi [ -i ] —►
```

Command parameters

- i Registers the Db2 performance counters.
- u Deregisters the Db2 performance counters.

Usage notes

The **db2perfi -i** command will do the following action:

1. Add the names and descriptions of the Db2 counter objects to the Windows registry.
2. Create a registry key in the Services key in the Windows registry as follows:

```
HKEY_LOCAL_MACHINE  
  \System  
    \CurrentControlSet  
      \Services  
        \DB2_NT_Performance  
          \Performance  
            Library=Name of the Db2 performance support DLL  
            Open=Open function name, called when the DLL is  
              first loaded  
            Collect=Collect function name, called to request  
              performance information  
            Close=Close function name, called when the DLL is  
              unloaded
```

db2perfr - Performance monitor registration tool

The **db2perfr** command is used to register an administrator user name and password with Db2 when accessing the performance monitor on Windows operating systems.

This allows a remote performance monitor request to correctly identify itself to the Db2 database manager, and be allowed access to the relevant Db2 performance

information. You also need to register an administrator user name and password if you want to log counter information into a file using the Performance Logs function.

Authorization

Local Administrator

Required connection

None

Command syntax

```
>>--db2perfr--r--username--password-->
```

The diagram shows the command line 'db2perfr' followed by two options: '-r' and '-u'. The option '-r' is associated with 'username' and 'password', while '-u' is associated with both. Arrows point from the labels 'username' and 'password' to their respective parts of the option '-r'.

Command parameters

- r Registers the user name and password.
- u Deregisters the user name and password.

Usage notes

- Once a user name and password combination has been registered with the Db2 database system, even local instances of the performance monitor will explicitly log on using that user name and password. This means that if the user name information registered with the Db2 database system does not match, local sessions of the performance monitor will not show Db2 performance information.
- The user name and password combination must be maintained to match the user name and password values stored in the Windows security database. If the user name or password is changed in the Windows security database, the user name and password combination used for remote performance monitoring must be reset.
- The default Windows performance monitor user name, SYSTEM, is a reserved word in Db2 database products and cannot be used.

db2prereqcheck - Check installation prerequisites

Checks whether your system meets the prerequisites for the installation of a specific version of Db2.

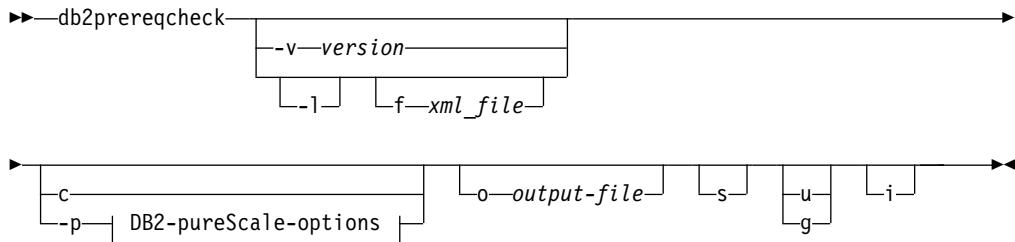
By using this command, you can determine whether your system satisfies the prerequisites before you download Db2 and start the installation process. The **db2prereqcheck** command uses a resource XML file that contains the prerequisites. The default path of the XML file for Linux and UNIX is located in DB2 installation/cfg/DB2prereqs.xml. You must have read or write permissions on the XML file. Do not modify the contents of the XML file.

Note: If you do not specify any options for the **db2prereqcheck** command, both Db2 pureScale and non Db2 pureScale server prerequisites are checked for all Db2 versions listed in the DB2prereqs.xml file.

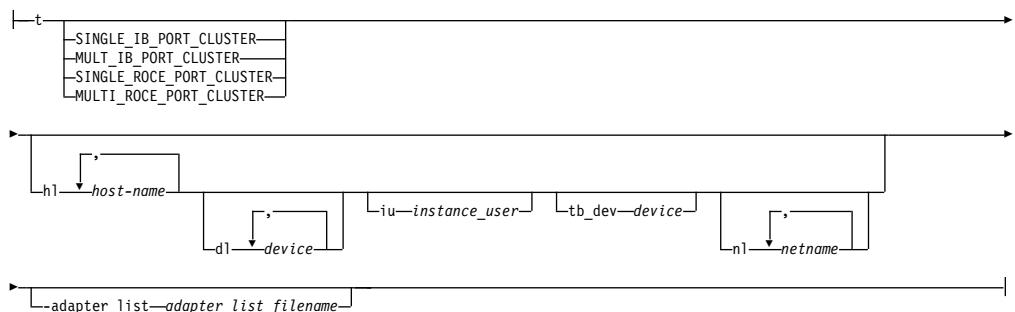
Authorization

None

Command Syntax



DB2-pureScale-options:



Command Parameters

-v version

Checks the prerequisites for a specific Db2 version. The **-i** and **-v** parameters are mutually exclusive.

- 1** Checks the prerequisites related to Db2 pureScale and unrelated to Db2 pureScale environments for the latest Db2 version that is defined in the XML resource file. The **-1** and **-v** parameters are mutually exclusive. The **-l** parameter will not output any screen output if all prerequisites are met.

-f xml-file

Specifies the name of the XML resource file. If you do not specify the **-f** parameter, the DB2 installation/cfg/DB2prereqs.xml file is used.

- c** Checks the prerequisites for thin client.

The **-c**, **-u**, **-g**, and **-p** parameters are mutually exclusive.

- p** Checks the prerequisites for the Db2 pureScale environment (Linux and AIX operating systems only). This is the default option.

The **-c**, **-u**, **-g**, and **-p** parameters are mutually exclusive.

Important: To validate prerequisites requirement for a specific network configuration of a Db2 pureScale installation, the **-t** *network configuration type* option must be specified along with this option.

-o output-file

Specifies a name for the output file such as db2prereqcheck.rpt. If you do not specify a filename the output is displayed on the screen.

- s Prints prerequisite validation summary on screen.
- u Checks the uDAPL requirement for the Db2 pureScale environment (Linux and AIX operating systems only).

The **-c**, **-u**, **-g**, and **-p** parameters are mutually exclusive.
 On RoCE networks, you must manually ensure that the AIX and uDAPL software prerequisites are satisfied. The **db2prereqcheck** command does not validate the levels of the AIX and uDAPL software.
- g Checks the GPL compilation requirement (Linux operating systems only)

The **-c**, **-u**, **-g**, and **-p** parameters are mutually exclusive
- i Checks the prerequisites that are unrelated to Db2 pureScale environments for the latest Db2 version that you defined in the XML resource file. The **-i** and **-v** parameters are mutually exclusive.
- t Validates the prerequisites for a specific type of network configuration (Linux operating systems only)

The network configuration type must be a single InfiniBand port cluster, multiple InfiniBand port cluster, single RoCE port cluster, or multiple RoCE port cluster (**SINGLE_IB_PORT_CLUSTER**, **MULTI_IB_PORT_CLUSTER**, **SINGLE_ROCE_PORT_CLUSTER** or **MULTI_ROCE_PORT_CLUSTER**)
- h1 host-name**
 Specifies a list of hosts that are checked for passwordless root SSH access between all hosts.
- d1 device**
 Specifies one or more PVIDs (on AIX operating systems) or WWNs (on Linux operating systems) of the shared disks that are verified to make sure that they are accessible by all hosts. If you specify this parameter, you must also specify the **-h1** parameter.
- adapter_list adapter_list_filename**
 Specifies the file name that contains the list of hostname(s), netname(s), adapter name(s), and mac address(es) for each of the host to verify the network connectivity between all the hosts are pingable using RDMA.

The input file must have the following format:

| #Hostname | Netname | Interface-Adapter | Mac-Address |
|-----------|--------------|-------------------|--------------|
| hostname1 | netname1-ib0 | deviceName-1 | macAddress-1 |
| hostname2 | netname2-ib1 | deviceName-2 | macAddress-2 |
| hostname3 | netname3-ib2 | deviceName-3 | macAddress-3 |

Note: In the input file, any line that is preceded by # is considered as comment and skipped.
- iu instance_user**
 Specifies the instance user name. The UID and GID of the instance user name are verified to make sure they are the same across all hosts. If you specify this parameter, you must also specify the **-h1** parameter.
- tb_dev device**
 Specifies the device name of the shared disk that is verified to make sure that it can be used as the "quorum tie-breaker" device for the pureScale cluster. If you specify this parameter, you must also specify the **-h1** parameter.
- n1 netname**
 Specifies the list of netnames. These netnames are used to ping the RocE & IB networks to verify that they are pingable between all hosts.

Examples

To check whether the system meets the basic pureScale prerequisites for a specific Db2 version, issue the following command:

```
$ ./db2prereqcheck -p -v 11.1.0.0 -hl <host1,host2..> -dl <shared_disk1,shared_disk2..>  
-iu <user>
```

To check whether the system meets the comprehensive pureScale prerequisites for a specific type of network configuration (Linux operating systems only) and for a specific Db2 version, issue the following command:

```
$ ./db2prereqcheck -p -v 11.1.0.0 -hl <host1,host2..> -dl <shared_disk1,shared_disk2..>  
-iu <user> -nl <netname1,netname2..>
```

To check whether the system meets the prerequisites for Db2 Version 11.1, issue the following command:

```
db2prereqcheck -v 11.1.0.0 -s
```

To check whether the system meets the prerequisites for the thin client of Db2 Version 10.5, issue the following command:

```
db2prereqcheck -c -v 11.1.0.0 -s
```

db2rbind - Rebind all packages

Rebinds packages in a database.

Authorization

- SYSADM
- SYSCTRL
- SYSMAINT

Required connection

None

Command syntax

```
►►—db2rbind—database—-l—logfile— [all] [—u—userid—p—password]  
►►—r— [conservative] [any]  
►►
```

Command parameters

database

Specifies an alias name for the database whose packages are to be revalidated.

-l *logfile*

Specifies the (optional) path and the (mandatory) file name to be used for recording the package revalidation process.

Example:

```

cat <logfile>
Starting time .... Thu Jun 18 02:47:11 2009
Succeeded to rebind = 0
Failed to rebind = 0
Ending time .... Thu Jun 18 02:47:11 2009

```

- all** Specifies that rebinding of all valid and invalid packages is to be done. If this option is not specified, all packages in the database are examined, but only those packages that are marked as invalid are rebound, so that they are not rebound implicitly during application execution.
- u userid** User ID. This parameter must be specified if a password is specified.
- p password** Password. This parameter must be specified if a user ID is specified.
- r** Resolve. Specifies whether rebinding of the package is to be performed with or without conservative binding semantics. This affects whether new objects that use the SQL path for resolution are considered during resolution on static DML statements in the package. This option is not supported by DRDA. Valid values are:
- conservative** Only those objects in the SQL path that were defined before the last explicit bind time stamp are considered for resolving references to any objects that use the SQL path for object resolution. Conservative binding semantics are used. This is the default. This option is not supported for an inoperative package.
 - any** All possible matches in the SQL path are considered for resolving references to any objects that use the SQL path for object resolution. Conservative binding semantics are not used.

Usage notes

- This command uses the rebind API (sqlarbind) to attempt the re-validation of all packages in a database.
- Use of **db2rbnd** is not mandatory.
- For packages that are invalid, you can choose to allow package revalidation to occur implicitly when the package is first used. You can choose to selectively revalidate packages with either the **REBIND** or the **BIND** command.
- If the rebind of any of the packages encounters a deadlock or a lock timeout the rebind of all the packages will be rolled back.
- If you issue the **db2rbnd** command and the instance is active, you will see the SQL1026N error message.
- Every compiled SQL object has a dependent package. The package can be rebound at any time by using the REBIND_ROUTINE_PACKAGE procedure. Explicitly rebinding the dependent package does not revalidate an invalid object. Revalidate an invalid object with automatic revalidation or explicitly by using the ADMIN_REVALIDATE_DB_OBJECTS procedure. Object revalidation automatically rebinds the dependent package.

db2rc - Start Replication Center

Starts the Replication Center. The Replication Center is a graphical interface that you can use to set up and administer all replication programs for Q replication and SQL replication. This command is available only on Linux and Windows operating systems.

Authorization

sysadm

Command syntax

```
►►—db2rc [ -t ] [ -tf filename ] ►►
```

Command parameters

- t Turns on the Replication Center trace for an initialization code. On Windows operating systems, this parameter has no effect because the **db2rc** command does not have a console window
- tf *filename* Turns on the Replication Center trace for an initialization code and stores the output of the trace in the specified file. The output file is saved in the *DB2 install path\sql1ib\tools* directory on Windows operating systems and in the *user-home-dir/sql1ib/tools* directory on Linux operating systems.

Usage notes

This command is available when you install the replication tools using a typical or custom installation of the following Db2 database products on Linux and Windows operating systems:

- IBM Data Server Client
- IBM Data Server Runtime Client
- Db2 Workgroup Server Edition
- Db2 Enterprise Server Edition
- Db2 Connect Enterprise Edition

db2relocatedb - Relocate database

This command renames a database, or relocates a database or part of a database (for example, the container and the log directory) as specified in the configuration file provided by the user. This tool makes the necessary changes to the Db2 instance and database support files.

The target database must be offline before running the **db2relocatedb** command to modify the control files and metadata of the target database.

The changes that the **db2relocatedb** command makes to files and control structures of a database are not logged and are therefore not recoverable. A good practice is to make a full backup after running the command against a database, especially if the database is recoverable with log files being retained.

Authorization

None

Prerequisite

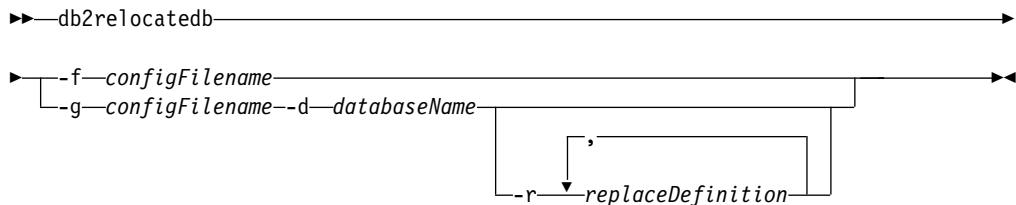
If automatic storage for the database is enabled, you must move the data from each storage path to a new location by issuing the following command:

```
$ mv old_storage_path_N/inst_name/NODE0000/X/old_storage_path_N/inst_name/NODE0000/Y
```

where *old_storage_path_N* represents the old storage path name, *inst_name* represents the instance name, X represents the old database name and Y represents the new database name.

You must perform this step to ensure that the **db2relocatedb** command executes without generating an error message.

Command syntax



Command parameters

-f configFilename

Specifies the name of the file containing the configuration information necessary for relocating the database. This can be a relative or absolute file name. The format of the configuration file is:

```
DB_NAME=oldName,newName
DB_PATH=oldPath,newPath
INSTANCE=oldInst,newInst
NODENUM=nodeNumber
LOG_DIR=oldDirPath,newDirPath
CONT_PATH=oldContPath1,newContPath1
CONT_PATH=oldContPath2,newContPath2
...
STORAGE_PATH=oldStoragePath1,newStoragePath1
STORAGE_PATH=oldStoragePath2,newStoragePath2
...
FAILARCHIVE_PATH=newDirPath
LOGARCHMETH1=newDirPath
LOGARCHMETH2=newDirPath
MIRRORLOG_PATH=newDirPath
OVERFLOWLOG_PATH=newDirPath
...
```

Where:

DB_NAME

Specifies the name of the database being relocated. If the database name is being changed, both the old name and the new name must be specified. This is a required field.

DB_PATH

Specifies the original path of the database being relocated. If the database path is changing, both the old path and new path must be specified. This is a required field.

INSTANCE

Specifies the instance where the database exists. If the database is being moved to a new instance, both the old instance and new instance must be specified. This is a required field.

NODENUM

Specifies the node number for the database node being changed. The default is 0.

LOG_DIR

Specifies a change in the location of the log path. If the log path is being changed, both the old path and new path must be specified. This specification is optional if the log path resides under the database path, in which case the path is updated automatically.

CONT_PATH

Specifies a change in the location of table space containers. Both the old and new container path must be specified. Multiple **CONT_PATH** lines can be provided if there are multiple container path changes to be made. This specification is optional if the container paths reside under the database path, in which case the paths are updated automatically. If you are making changes to more than one container where the same old path is being replaced by a common new path, a single **CONT_PATH** entry can be used. In such a case, an asterisk (*) could be used both in the old and new paths as a wildcard.

STORAGE_PATH

Specifies a change in the location of one of the storage paths for the database. Both the old storage path and the new storage path must be specified. Multiple **STORAGE_PATH** lines can be given if there are several storage path changes to be made. You can specify this parameter to modify any storage path in all storage groups. However, you cannot specify this parameter to modify the storage paths for an individual storage group.

Note: This parameter is not applicable to a database created with the AUTOMATIC STORAGE NO clause. Although, you can create a database specifying the AUTOMATIC STORAGE NO clause, the AUTOMATIC STORAGE clause is deprecated and might be removed from a future release.

FAILARCHIVE_PATH

Specifies a new location to archive log files if the database manager fails to archive the log files to either the primary or the secondary archive locations. You should only specify this field if the database being relocated has the **failarchpath** configuration parameter set.

LOGARCHMETH1

Specifies a new primary archive location. You should only specify this field if the database being relocated has the **logarchmeth1** configuration parameter set.

LOGARCHMETH2

Specifies a new secondary archive location. You should only specify this field if the database being relocated has the **logarchmeth2** configuration parameter set.

MIRRORLOG_PATH

Specifies a new location for the mirror log path. The string must

point to a path name, and it must be a fully qualified path name, not a relative path name. You should only specify this field if the database being relocated has the **mirrorlogpath** configuration parameter set.

OVERFLOWLOG_PATH

Specifies a new location to find log files required for a rollforward operation, to store active log files retrieved from the archive, and to find and store log files required by the db2ReadLog API. You should only specify this field if the database being relocated has the **overflowlogpath** configuration parameter set.

Blank lines or lines beginning with a comment character (#) are ignored.

-g configFilename

Generates a configuration file and specifies the name of the file containing the configuration information. This can be a relative or absolute file name. Without the option -r, the output looks as follows:

```
DB_NAME=oldName,oldName  
DB_PATH=oldPath,oldPath  
INSTANCE=oldInst,oldInst  
NODENUM=nodeNumber  
LOG_DIR=oldDirPath,oldDirPath  
CONT_PATH=oldContPath1,oldContPath1  
CONT_PATH=oldContPath2,oldContPath2  
...  
STORAGE_PATH=oldStoragePath1,oldStoragePath1  
STORAGE_PATH=oldStoragePath2,oldStoragePath2  
...  
FAILARCHIVE_PATH=oldDirPath  
LOGARCHMETH1=oldDirPath  
LOGARCHMETH2=oldDirPath  
MIRRORLOG_PATH=oldDirPath  
OVERFLOWLOG_PATH=oldDirPath  
...
```

-d databaseName

Specifies the database name for which the file has to be generated.

-r replaceDefinition

With this option you replace strings in the generated script. Parameter *replaceDefinition* must have the format *regularExpression=replacement*. See example below.

Examples

Example 1

To change the name of the database TESTDB to PRODDB in the instance db2inst1 that resides on the path /home/db2inst1, create the following configuration file:

```
DB_NAME=TESTDB,PRODDB  
DB_PATH=/home/db2inst1  
INSTANCE=db2inst1  
NODENUM=0
```

When the configuration file is created, you must alter any automatic storage paths to match the new database name:

```
rename /home/db2inst1/db2inst1/TESTDB /home/db2inst1/db2inst1/PRODDB
```

Save the configuration file as relocate.cfg and use the following command to make the changes to the database files:

```
db2relocatedb -f relocate.cfg
```

Example 2

To move the database DATAB1 from the instance jsmith on the path /dbpath to the instance prodinst do the following:

1. Move the files in the directory /dbpath/jsmith to /dbpath/prodinst.
2. Use the following configuration file with the **db2relocatedb** command to make the changes to the database files:

```
DB_NAME=DATAB1
DB_PATH=/dbpath
INSTANCE=jsmith,prodinst
NODENUM=0
```

Example 3

The database PRODDB exists in the instance inst1 on the path /databases/PRODDB. The location of two table space containers needs to be changed as follows:

- SMS container /data/SMS1 needs to be moved to /DATA/NewSMS1.
- DMS container /data/DMS1 needs to be moved to /DATA/DMS1.

After the physical directories and files have been moved to the new locations, the following configuration file can be used with the **db2relocatedb** command to make changes to the database files so that they recognize the new locations:

```
DB_NAME=PRODDB
DB_PATH=/databases/PRODDB
INSTANCE=inst1
NODENUM=0
CONT_PATH=/data/SMS1,/DATA/NewSMS1
CONT_PATH=/data/DMS1,/DATA/DMS1
```

Example 4

The database TESTDB exists in the instance db2inst1 and was created on the path /databases/TESTDB. Table spaces were then created with the following containers:

```
TS1
TS2_Cont0
TS2_Cont1
/databases/TESTDB/TS3_Cont0
/databases/TESTDB/TS4_Cont0
/Data/TS5_Cont0
/dev/rTS5_Cont1
```

TESTDB is to be moved to a new system. The instance on the new system will be newinst and the location of the database will be /DB2.

When moving the database, all of the files that exist in the /databases/TESTDB/db2inst1 directory must be moved to the /DB2/newinst directory. This means that the first 5 containers will be relocated as part of this move. (The first 3 are relative to the database directory and the next 2 are relative to the database path.) Since these containers are located within the database directory or database path, they do not need to be listed in the configuration file. If the 2 remaining containers are to be moved to different locations on the new system, they must be listed in the configuration file.

After the physical directories and files have been moved to their new locations, the following configuration file can be used with **db2relocatedb** to make changes to the database files so that they recognize the new locations:

```
DB_NAME=TESTDB
DB_PATH=/databases/TESTDB,/DB2
INSTANCE=db2inst1,newinst
NODENUM=0
CONT_PATH=/Data/TS5_Cont0,/DB2/TESTDB/TS5_Cont0
CONT_PATH=/dev/rTS5_Cont1,/dev/rTESTDB_TS5_Cont1
```

Example 5

The database TESTDB has two database partitions on database partition servers 10 and 20. The instance is servinst and the database path is /home/servinst on both database partition servers. The name of the database is being changed to SERVDB and the database path is being changed to /databases on both database partition servers. In addition, the log directory is being changed on database partition server 20 from /testdb_logdir to /servdb_logdir.

Since changes are being made to both database partitions, a configuration file must be created for each database partition and **db2relocatedb** must be run on each database partition server with the corresponding configuration file.

On database partition server 10, the following configuration file will be used:

```
DB_NAME=TESTDB,SERVDB
DB_PATH=/home/servinst,/databases
INSTANCE=servinst
NODENUM=10
```

On database partition server 20, the following configuration file will be used:

```
DB_NAME=TESTDB,SERVDB
DB_PATH=/home/servinst,/databases
INSTANCE=servinst
NODENUM=20
LOG_DIR=/testdb_logdir,/servdb_logdir
```

Example 6

The database MAINDB exists in the instance maininst on the path /home/maininst. The location of four table space containers needs to be changed as follows:

```
/maininst_files/allconts/C0 needs to be moved to /MAINDB/C0
/maininst_files/allconts/C1 needs to be moved to /MAINDB/C1
/maininst_files/allconts/C2 needs to be moved to /MAINDB/C2
/maininst_files/allconts/C3 needs to be moved to /MAINDB/C3
```

After the physical directories and files are moved to the new locations, the following configuration file can be used with the **db2relocatedb** command to make changes to the database files so that they recognize the new locations.

A similar change is being made to all of the containers; that is, /maininst_files/allconts/ is being replaced by /MAINDB/ so that a single entry with the wildcard character can be used:

```

DB_NAME=MAINDB
DB_PATH=/home/maininst
INSTANCE=maininst
NODENUM=0
CONT_PATH=/maininst_files/allconts/*, /MAINDB/*

```

Example 7

The database MULTIDB exists in the instance inst1 on the path /database/MULTIDB . The partitioned storage path '/home/olddbpath \$N' needs to be changed to '/home/newdbpath \$N'.

To be able to correctly move the partitioned storage path, the parameterized storage path need to be specified in the STORAGE_PATH field with double quotation mark around it. After the physical directories and files are moved to the new locations, the following configuration file can be used with the **db2relocatedb** command to make changes to the database files so that they recognize the new locations.

```

DB_NAME=MULTIDB
DB_PATH=/database/MULTIDB
INSTANCE=inst1
NODENUM=0
STORAGE_PATH="/home/olddbpath $N" , "/home/newdbpath $N"

```

Example 8

The database PRD exists in the instance db2prd on the database path /db2/PRD and storage paths /db2/PRD/sapdata1 and /db2/PRD/sapdata2. To generate an unmodified script use the following command that creates the output file relocate.cfg:

```
db2relocatedb -g relocate.cfg -d PRD
```

The contents of the output file relocate.cfg look as follows:

```

DB_NAME=PRD,PRD
DB_PATH=/db2/PRD,/db2/PRD
INSTANCE=db2prd,db2prd
NODENUM=0
STORAGE_PATH=/db2/PRD/sapdata1,/db2/PRD/sapdata1
STORAGE_PATH=/db2/PRD/sapdata2,/db2/PRD/sapdata2

```

If you want to relocate this database, to change the database name to QAS, to use the instance db2qas, and to change the autostorage paths accordingly, you can use the following command:

```
db2relocatedb -g relocate.cfg -d PRD -r PRD=QAS,db2prd=db2qas
```

The contents of the output file relocate.cfg look as follows:

```

DB_NAME=PRD,QAS
DB_PATH=/db2/PRD,/db2/QAS
INSTANCE=db2prd,db2qas
NODENUM=0
STORAGE_PATH=/db2/PRD/sapdata1,/db2/QAS/sapdata1
STORAGE_PATH=/db2/PRD/sapdata2,/db2/QAS/sapdata2

```

Usage notes

If the instance that a database belongs to is changing, the following must be done before running this command to ensure that changes to the instance and database support files are made:

- If a database is being moved to another instance, create the new instance. The new instance must be at the same release level as the instance where the database currently resides.

- If the new instance has a different owner than the current instance, grant access to the new instance owner.
- Copy the files and devices belonging to the databases being copied onto the system where the new instance resides. The path names must be changed as necessary. However, if there are already databases in the directory where the database files are moved to, you can mistakenly overwrite the existing `sqldbdir` file, thereby removing the references to the existing databases. In this scenario, the `db2relocatedb` utility cannot be used. Instead of `db2relocatedb`, an alternative is a redirected restore operation.
- Change the permission of the files/devices that were copied so that they are owned by the instance owner.

When moving a database from a database path where more than one database resides, the `sqldbdir` directory within that database path must be copied and not moved. This directory is still needed in the old location for Db2 to locate the databases that are not moving. After copying the `sqldbdir` directory to the new location, a `LIST DB DIRECTORY ON newPath` command lists databases that were not moved. These references cannot be removed and new databases with those names cannot be created on this same path. However, databases can be created with those names on a different path.

The `db2relocatedb` command cannot be used to move existing user created containers for a table space that was converted to use automatic storage using the `ALTER TABLESPACE MANAGED BY AUTOMATIC STORAGE` statement.

If the instance is changing, the command must be run by the new instance owner.

In a partitioned database environment, this tool must be run against every database partition that requires changes. A separate configuration file must be supplied for each database partition, that includes the `NODENUM` value of the database partition being changed. For example, if the name of a database is being changed, every database partition will be affected and the `db2relocatedb` command must be run with a separate configuration file on each database partition. If containers belonging to a single database partition are being moved, the `db2relocatedb` command only needs to be run once on that database partition.

You cannot use the `db2relocatedb` command to relocate a database that has a load in progress or is waiting for the completion of a `LOAD RESTART` or `LOAD TERMINATE` command.

After you run the `db2relocatedb` command, you must recycle the Db2 instance to allow the changes to take effect. To recycle the Db2 instance, perform the following steps:

1. Issue the `db2stop` command.
2. Issue the `db2start` command.

Limitation: In a partitioned database environment, you cannot relocate an entire node if that node is one of two or more logical partitions that reside on the same device.

db2rfe - Enable root features for non-root installations

Enables the supported root features, in non-root installations of Db2 database systems, according to the configuration file. The Db2 non-root instance needs to be stopped before the `db2rfe` command is executed.

Authorization

Root user authority

Required Connection

None

Command syntax

```
►—db2rfe—f—db2rfe_config_file—►
      |-----h-----|
      |-----?-----|
```

Command parameters

-f db2rfe_config_file

Specifies the configuration file to be used to enable root features.

-h | -?

Displays help information.

Usage notes

Each root feature, in the configuration file, will be in a separate section. Each section will have a start and end mark, comments describing what the section will enable, and the command to enable the root feature. The sample configuration file db2rfe.cfg will be installed to the \$DB2DIR/instance directory.

The sample configuration file will look like the following (the non-root install owner is db2inst3 in this example):

```
** =====
** 
** Sample configuration file for db2rfe of IBM Db2
** -----
** 
** To select features and settings to configure, uncomment the corresponding
** keywords and specify values for those keywords.
** 
** Comments are made by placing either an asterisk (*) or a number sign (#) at
** the start of a line
** 
** =====
```

```
INSTANCENAME=db2inst3
** This is required keyword.
```

```
** -----
** Set hard/soft data ulimit to unlimited, and hard/soft nofile ulimit to 65536.
**
** Note: This is for AIX only. On other platforms, refer to system documentation
** to set it manually.
** -----
** Valid value is NO and YES. Change to YES if you need to set the ulimit.
```

```
SET_ULIMIT=NO
```

```

** -----
** Enable Db2 High Availability (HA) feature
** -----
** Valid value is NO and YES. Change to YES if you need to enable this feature.

ENABLE_HA=NO

** -----
** ENABLE Db2 Authentication on the server using local operating system security.
** -----
** Valid value is NO and YES. Change to YES if you need to enable this feature.

ENABLE_OS_AUTHENTICATION=NO

** -----
** Reserve Db2 remote connection service entry
** -----
** Valid value is NO and YES. Change to YES if you need to enable this feature.

RESERVE_REMOTE_CONNECTION=NO

*SVCENAME=db2c_db2inst3
** char(14)

*SVCEPORT=48000
** Valid value: 1024 - 65535

** -----
** Reserve Db2 text search service entry
** -----
** Valid value is NO and YES. Change to YES if you need to enable this feature.

RESERVE_TEXT_SEARCH_CONNECTION=NO

*SVCENAME_TEXT_SEARCH=db2j_db2inst3
** char(14)

*SVCEPORT_TEXT_SEARCH=55000
** Valid value: 1024 - 65535

```

db2rfpen - Reset rollforward pending state

Puts a database in rollforward pending state. If you are using high availability disaster recovery (HADR), the database is reset to a standard database.

Authorization

None

Required connection

None

Command syntax

```
>>db2rfpen-ON [database_alias] [-path_global_log_control_files_dir] >>
```

Command parameters

database_alias

Specifies the name of the database to be placed in rollforward pending state. If you are using high availability disaster recovery (HADR), the database is reset to a standard database.

-path *global_log_control_files_dir*

Specifies the full path to the directory where the global log control files, SQLGCTL.GLFH.1 and its mirror copy SQLGCTL.GLFH.2, reside.

Usage notes

If you take file system backups of the database (for example, split mirror file system backups) the db2rfpen tool can be used to put the database into a rollforward pending state. By doing this, you can apply log files with the **ROLLFORWARD** command when you restore a file system copy.

Attention: The file system copy must be done after a clean database shutdown. A clean database shutdown means that the database is not in a crash recovery pending state.

The following steps must be completed if at some later time you need to restore a file system copy, and want to apply log files to roll forward the database:

1. Restore the file system copy of the database.
 2. Run the db2rfpen tool to put the database into a rollforward pending state.
 3. Issue the **ROLLFORWARD DATABASE** command to apply the log files.

db2rmicons - Remove Db2 tools from main menu

Removes main menu entries for Db2 tools.

On Linux operating systems, the **db2rmicons** command removes main menu entries for Db2 tools for the current user. The main menu entries for Db2 tools are removed by manually running the **db2rmicons** command, or are removed automatically when specific Db2 commands are run (for example, **db2_deinstall** or **db2idrop**.) For non-root installations, the **db2_deinstall** command removes the entries for the Db2 instance related to the non-root installation.

Authorization

None

Command syntax

►—db2rmicons—
 └--h—

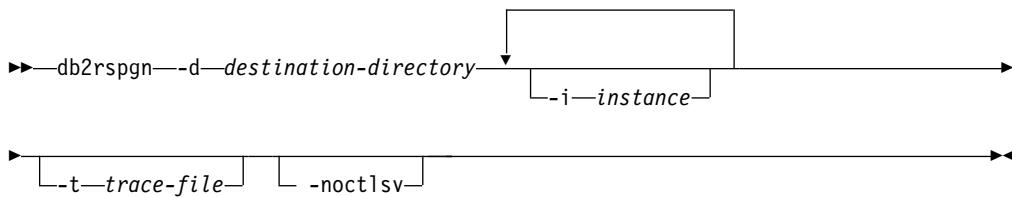
Command parameters

-h Displays usage information.

db2rspgn - Response file generator

Generates response files and instance configuration profiles for the current copy. These generated files are used to re-create an exact setup on other machines.

Command syntax



Command parameters

-d destination-directory

Specifies the full path to the output directory for generated files. If the output directory specified is an existing directory, the directory must be empty and writable. If the output directory specified does not exist, the new directory is created if the location is writable. This parameter is mandatory.

-i instance

Generates the specified instance configuration and saves this information in the generated response file and instance configuration profile. This parameter is optional. By default, all instances are selected. To specify multiple instances, specify this parameter multiple times. For example, -i db2inst1 -i db2inst3.

-t trace-file

Linux and UNIX operating systems only. Turns on the debug mode. The debug information is written to the file name specified as trace-file.

-noctlsv

Windows operating systems only. Indicates that an instance configuration profile file will not be generated for the Control Server instance. This parameter is optional.

Usage Notes

The **db2rspgn** command is not supported in a Db2 pureScale environment.

The **db2rspgn** command does not generate the **diagpath** and **svccename** parameters.

db2sampl - Create sample database

Creates a sample database named SAMPLE.

Note: On Db2 Workgroup Server Edition, the SAMPLE database includes materialized query tables (MQT), and multidimensional cluster tables (MDC) that causes a license violation. This violation can only be removed by upgrading to Db2 Enterprise Server Edition.

This database will not be automatically configured when it is first created. Users can issue the **AUTOCONFIGURE** command against the SAMPLE database at a later time.

Authorization

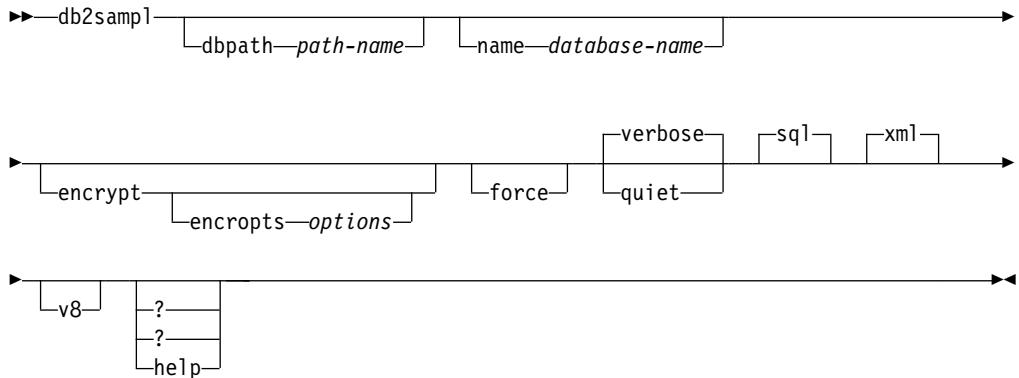
One of the following authorities:

- SYSADM
- SYSCTRL

Required Connection

None

Command syntax



Command parameters

dbpath path-name

Specifies the path on which to create the database. On Windows operating systems, specifies the letter of the drive on which to create the database.

The maximum length for *path-name* is 175 characters. By default, *path-name* is the default path specified in the database manager configuration file (**dftdbpath** parameter).

name database-name

Specifies a name for the sample database. The database name must adhere to the naming conventions for databases. By default, *database-name* is SAMPLE.

encrypt

Creates the sample database with default encryption options.

encopts options

Customizes the encryption options that are used to encrypt the sample database. The format of the *options* string is *Cipher=cipher-name:Mode=mode-name:Key Length=key-length: Master Key Label=label-name*, where:

- *Cipher* is optional. Valid values are AES and 3DES (the default is AES).
- *Mode* is optional. The default is CBC.
- *Key Length* is optional. Valid values for AES are 128, 192, and 256 (the default is 256), and the only valid value for 3DES is 168.
- *Master Key Label* uniquely identifies the master key within the keystore that is identified by the value of the *keystore_location* database manager configuration parameter. The maximum length of *label-name* is 255

bytes. If a master key label is not specified, the database manager automatically generates a master key label, and a master key is generated and inserted into the keystore.

- force** Forces the drop and recreation of any existing database in the instance with the same name as specified for the sample database.
- verbose** Prints status messages to standard output.
- quiet** Suppresses the printing of status messages to standard output.
- sql** Creates tables, triggers, functions, procedures, and populates the tables with data.
- xm1** Creates tables with columns of data type XML, creates indexes on the XML columns, registers XML schemas, and populates these tables with data including XML document values.
This option is only supported where XML is supported. If XML is not supported, this option is ignored.
- v8** Creates the Db2 Version 8 sample database, database objects and data. The Version 8 sample database is a non-unicode database named SAMPLE that is created in the default path specified in the database manager configuration file (**dftdbpath** parameter).
- ? | ? | help** Returns the **db2samp1** command syntax help.

Default behavior of db2samp1

When the **db2samp1** command is issued without any optional arguments, depending on whether the environment is partitioned or not, it behaves differently:

In non-partitioned database environments:

- Creates a database named SAMPLE with a Unicode (UTF-8) code set in the default database path.
- Creates relational database objects including tables, indexes, constraints, triggers, functions, procedures, multi-dimensional clustered tables and materialized query tables.
- Populates relational tables with data.
- Creates tables with XML data type columns.
- Creates indexes over XML data.
- Creates an XML schema repository that contains XML schema documents.
- All database object names are qualified with the value of the CURRENT_SCHEMA special register.

In partitioned database environments:

- Creates a database named SAMPLE with a Unicode (UTF-8) code set in the default database path.
- Creates relational database objects including tables, indexes, constraints, triggers, functions, procedures, multi-dimensional clustered tables and materialized query tables.
- Populates tables with data.
- All database object names are qualified with the value of the CURRENT_SCHEMA special register.

Usage notes

- The **db2samp1** command can only be issued on a computer where a Db2 database server is installed. It cannot be issued from a remote IBM Data Server Client.
- The sample database is created with the instance authentication type that is specified by the database manager configuration parameter, **authentication**.
- Db2 native encryption must be configured prior to creating an encrypted sample database. For more information, see Setting up Db2 native encryption.

Examples

- To create a sample database with the default characteristics, issue:
`db2samp1`
- On Windows operating systems, to create a sample database named mysample on the E: drive containing only SQL database objects in default schema and to view status messages, issue:
`db2samp1 -dbpath E -name mysample -sql -force -verbose`
- To create the Db2 Version 8 sample database, issue:
`db2samp1 -v8`

db2schex - Active Directory schema extension

Extends the Microsoft Active Directory schema to include the Db2 object classes and attribute definitions that you require to use the Lightweight Directory Access Protocol (LDAP) directory server feature with Windows Server 2003 and later.

You should run this command before installing Db2 products and creating databases otherwise you have to manually register the node and catalog the databases. For more information, see the "Extending the Active Directory Schema for LDAP directory services (Windows)" topic.

The **db2schex** command is included on the product DVD. The location of this command on the DVD is in the path `x:\db2\windows\utilities`, where `x:` specifies the DVD drive.

Authorization

To update the Active Directory schema, you must be a member of the Schema Administrators group or have been delegated the rights to update the schema.

Required connection

Access to a Windows Domain Controller server in the target domain.

Command syntax

```
►—db2schex— [ -b bindDN --w password ] [ -k ] [ -u ] [ -x filename ] ►
```

Command parameters

-b bindDN

Specifies the user Distinguished Name.

-w password

Specifies the bind password.

- k** Forces the uninstall to continue, ignoring errors.
- u** Uninstall the schema.
- x *filename***
 - Specify this parameter to write the changes to the Active Directory schema, performed by the utility, to a file.

Examples

To install the Db2 schema, execute the following command:
`db2schex`

To install the Db2 schema and specify a bind DN and password, execute the following command:

```
db2schex -b "cn=A_Name,dc=toronto1,dc=ibm,dc=com" -w password
```

or,

```
db2schex -b Administrator -w password
```

To uninstall the Db2 schema, execute the following command:
`db2schex -u`

To uninstall the Db2 schema and ignore errors, execute the following command:
`db2schex -u -k`

Usage notes

If *bindDN* and *password* are not specified, **db2schex** binds as the currently logged in user.

The *bindDN* parameter can be specified as a Windows username.

The Db2 schema extension command carries out the following tasks:

- Detects which server is the Schema Master
- Binds to the Domain Controller that is the Schema Master
- Ensures that the user has sufficient rights to add classes and attributes to the schema
- Ensures that the Schema Master is writable (that is, the safety interlock in the registry is removed)
- Creates all the new attributes
- Creates all the new object classes
- Detects errors and, if they occur, the program will roll back any changes to the schema.

db2set - Db2 profile registry

Displays, sets, or deletes the values of Db2 profile variables. The **db2set** command is an external environment registry command that supports local and remote administration through the Db2 administration server (DAS).

You can also use the ENV_GET_REG_VARIABLES table function to retrieve the values of the registry variables that the instance is using and the values that are stored in the registry.

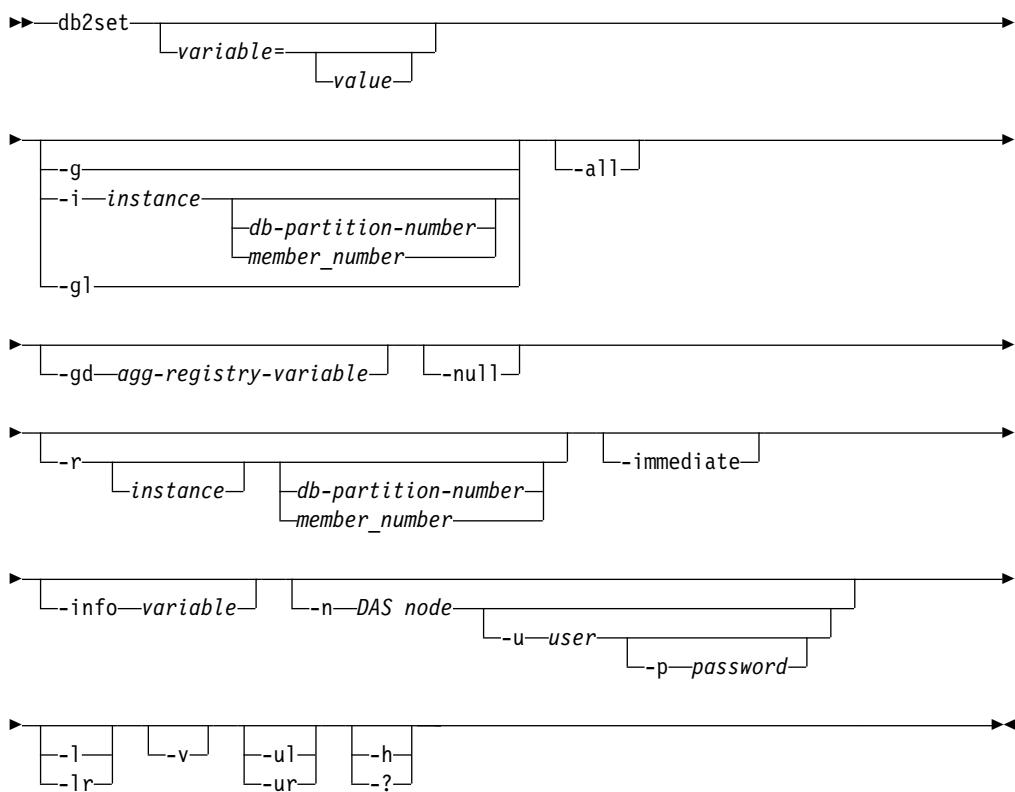
Authorization

SYSADM and, for the **-g** command parameter, root access on Linux and UNIX operating systems or Local Administrator authority on Windows operating systems.

Required connection

A local instance attachment is required when updating variables immediately, if there is no instance attachment, a local instance attachment is created. Otherwise, no connection is required. A remote attachment is not supported.

Command syntax



Command parameters

variable=

Displays the value of the specified variable.

value Sets the specified variable to the specified value. If the value has space(s), make sure to enclose the value in quotes. If you do not specify a value after the equal sign (=), the current value of the variable is deleted. There are a set of registry variables which are immediate by default and another set of registry variables that are immediate if you specify the **-immediate** parameter. Both of these sets of registry variables take effect the next time the SQL statement is compiled. Otherwise, changes take effect after you restart the instance.

- g Accesses the global profile registry variables for all instances pertaining to a particular Db2 copy. This allows you to view or change the values of these variables at this level.
- i *instance*
 - Specifies the instance profile to use. If you do not specify an instance profile, the current, or default one is used.
- db-partition-number or member-number*
 - Specifies a number in the db2nodes.cfg file.
 - If you use the **-immediate** parameter with the *member-number* option, only the specific member sees the update the next time the SQL statement is compiled.
- gl Accesses the global profile variables stored in LDAP. This parameter is effective only if you set the **DB2_ENABLE_LDAP** registry variable to YES.
- all Displays all occurrences of the local environment variables as defined in the following places:
 - The operating system environment, denoted by [e]
 - The node-level registry, denoted by [n]
 - The instance-level registry, denoted by [i]
 - The global-level registry, denoted by [g]
- gd *agg-registry-variable*
 - Displays the group definition of an aggregate registry variable. For additional information, see "Aggregate registry variables" in the *Data Servers, Databases, and Database Objects Guide*.
- null Sets the value of the variable to NULL at the registry level you specified or at the default level, which is the instance level, if you did not specify a registry level. This means that Db2 considers the variable as being not set and will not search for a value for the variable in the next available registry levels, as defined by the order of precedence of the registry levels.
- r Resets the profile registry for a particular instance.
 - instance*
 - Specifies the instance for which you want to reset the profile. If you do not specify an instance and an instance attachment exists, this option resets the profile for the current instance. If you do not specify an instance and no attachment exists, this option resets the profile for the instance that is specified by the **DB2INSTANCE** environment variable.
 - db-partition-number or member-number*
 - Specifies a number in the db2nodes.cfg file.
 - If you use the **-immediate** parameter with the *member-number* option, the value is reset only for the specified member.
- immediate | -im
 - Specifies that the update takes effect the next time an SQL statement is compiled for registry variables that support this feature.
 - Immediate changes to registry variables that affect the SQL compiler will take effect the next time that you compile an SQL statement. There are two types of SQL statements:
 - Dynamic SQL statements**
 - If a dynamic SQL statement is already present in the package

cache, the statement will not be invalidated and therefore the statement will not be recompiled with new settings. In order for the **-immediate** parameter to take effect, you must issue the FLUSH PACKAGE CACHE statement in order to remove previous statements from the package cache so that your SQL statement can be recompiled without having to restart the instance.

Static SQL statements

If a static SQL statement is already present in a package, the statement will not be invalidated and therefore the statement will not be recompiled with new settings. In order for the **-immediate** parameter to take effect, you must issue the **BIND** command or the **REBIND** command in order for the package to be recompiled without having to restart the instance

You cannot combine this parameter with either the **-g**, **-gl**, or **-n** parameters.

-info variable

Returns the properties of the specified variable. The properties state whether an immediate change is supported by the variable and whether the change is immediate by default.

-n DAS node

Specifies the remote DAS node name.

-u user

Specifies the user ID to use for the administration server attachment.

-p password

Specifies the password to use for the administration server attachment.

-l

Lists all instance profiles for the Db2 product installation.

-lr

Lists all supported registry variables.

-v

Specifies that verbose output is to be used while the command is running.

-ul

Accesses the user profile variables. This parameter is supported on Windows operating systems only.

-ur

Refreshes the user profile variables. This allows multiple users to have different variable settings under the same instance or under the same environment settings. This parameter is supported on Windows operating systems only.

-h | -?

Displays help information. If you specify this parameter, all other parameters are ignored.

Examples

The following examples show how to issue the various parameters with the **db2set** command:

- Display all defined instant profiles pertaining to a particular installation:

```
db2set -l
```

- Display all supported registry variables:

```
db2set -lr
```

- Display all defined global variables that are visible to all instances pertaining to a particular installation:

```
db2set -g
```

- Display all defined variables for the current instance:
`db2set`
- Display all defined values for the current instance:
`db2set -all`
- Display all defined values for the **DB2COMM** registry variable for the current instance:
`db2set -all DB2COMM`
- Reset all defined variables for the instance INST on member 3:
`db2set -r -i INST 3`
- Delete the value of the **DB2CHKPTR** registry variable on the remote instance RMTINST through the DAS node RMTDAS, using user ID MYID and password MYPASSWD:
`db2set -i RMTINST -n RMTDAS -u MYID -p MYPASSWD DB2CHKPTR=`
- Set the **DB2COMM** registry variable to TCPIP for all instances pertaining to a particular installation:
`db2set -g DB2COMM=TCPIP`
- Set the **DB2COMM** registry variable to TCPIP only for instance MYINST:
`db2set -i MYINST DB2COMM=TCPIP`
- Set the **DB2COMM** registry variable to null at the default level. The default level is the instance level:
`db2set -null DB2COMM`
- Delete the current value of the registry variable **DB2_ANTIJOIN** so that it takes effect the next time the SQL statement is compiled:
`db2set DB2_ANTIJOIN= -immediate`
- Set a registry variable to a value containing space(s) by enclosing the value in quotes:
`db2set DB2_LOAD_COPY_NO_OVERRIDE='COPY YES TO /var/db2/loadcopy/sales'`

Note: The above command overrides the setting of load copy specified on the LOAD command such that it is always YES, and places the copy file in the directory /var/db2/loadcopy/sales. The quotes are needed because of the space between COPY and YES and again before /var/db2/loadcopy/sales.

Usage notes

You can set a variable at one or more of four levels: operating-system environment, node instance, instance, and global. The Db2 database system uses this order of precedence to access and resolve variable settings. If you already set the value of a variable at the operating-system-environment level, an update to the value of the variable does not take effect immediately, even if you use the **-immediate** parameter, because the operating-system-environment level takes precedence over the registries.

If you do not specify a variable name, the values of all defined variables are displayed. If you specify a variable name, the value of only that variable is displayed. To display all the defined values of a variable, specify the *variable* and **-all** parameters. To display the values of all the defined variables in all registries, specify the **-all** parameter.

To make registry variable changes for remote registries on Windows operating systems, issue the **db2_all** or **rah** command with the **db2set** command.

Although the command behaves the same way for root and for non-root installations of the Db2 product, not all parameters are available, such as the **-n** parameter, which specifies the DAS node name.

The **db2set** command must not be run concurrently or continuously in a script.

db2setup - Install Db2 database products

Installs Db2 database products. **DB2setup** is only available on Linux and UNIX operating systems. Instead of **db2setup**, the command for Windows operating systems is **setup**.

This utility is located on the Db2 database installation media. It launches the Db2 Setup wizard to define the installation and install Db2 database products. If invoked with the **-r** option, it performs an installation without further input, taking installation configuration information from a response file.

Authorization

Root authority. On Linux and UNIX operating systems, root installations require root user authority. For non-root installations, you must log on with the user ID that owns the non-root installation.

Command syntax

```
►►—db2setup— [—i—language—] [—l—log_file—] [—t—trace_file—]  
► [—r—response_file—] [—c—] [—f—nobackup—] [—?—]  
                                                                          [—h—]
```

Command parameters

-i language

Two-letter language code of the language in which to perform the installation.

-l log_file

Writes the log to the file name specified. For root installations, `/tmp/db2setup.log` is created as a soft link to the latest log file. For non-root installations, the default log file is `/tmp/db2setup(userID).log`, where `userID` represents the user ID that owns the non-root installation. If the IBM Tivoli System Automation for Multiplatforms (SA MP) is being installed with **db2setup**, the install log file for SA MP will be located in the same directory as the Db2 database log files.

-t trace_file

Generates a file with install trace information.

-r response_file

Full path and file name of the response file to use. This parameter is mandatory when the **-c** parameter is specified.

-c

Validates the contents of the response file without performing the installation. The validation results are printed to the log file. The location of the log file is printed in the resulting message. When this parameter is specified, you must also specify the **-r** parameter.

-f nobackup

This applies to the non-root upgrade only. Force **db2setup** to not backup installation files when the components are updated. If you choose not to backup the files, the space requirement of the installation directory is reduced. However, choosing not to backup the files also means that if any errors occur, the Db2 installer will not be able to perform a rollback operation. In this case, you will need to manually clean up the files and reinstall the product.

-? | -h

Generates usage information.

Usage notes

You must log on with the ID that has proper authority or use **su** with the **"-** flag (**su -**) to set the process environment as if you had logged in with the ID that has proper authority. If the process environment is not set with the ID that has proper authority, the installation process finishes without errors but you will encounter errors when you run the Db2 copy.

db2snapcore - Db2 snapcore for Unix and Linux command

On Unix and Linux operating systems, the command extracts the shared objects list section from the EDU trap file or pmap file, combines the section together with a core file and compresses the output into an archive which can be sent to IBM Support for analysis. **db2snapcore** command can now work on the AIX platform, which means it supports all Unix and Linux platforms. The usage on AIX is the same as Linux.

Authorization

One of the following authorities:

- Instance owners
 - DBADM authority

Command syntax

```
►►--db2snapcore--c--corefile--t--trapfile--e--executable_path--►  
                                  └--m--pmapfile  
  
►--o--output_directory--►    └--v--►  
                                  └--p--pax--tar--►
```

Command parameters

-c corefile | -corefile corefile

Specifies a relative or absolute path to the core file.

-t trapfile | -trapfile trapfile

Specifies a relative or absolute path to the trap file.

-m *pmapfile* | -mapfile *pmapfile*

Specifies a relative or absolute path to the pmap file.

-e *executable_path* | -executable *executable_path*

Specifies a relative or absolute path to the executable file. This file is either provided by IBM Support or obtained from the trap file under the guidance of IBM Support.

-o *output_directory* | -outdir *output_directory*

Specifies an output directory for the compressed output file. The specified output directory must exist.

-p | -packCommand

Compresses all files into an archive. On Linux operating systems, files are compressed into a pax archive by default.

pax

Specifies that the files are compressed using the **pax** (portable archive exchange) command.

tar

Specifies that the files are compressed using the **tar** (tape archive) command. Requires the **tar** command to be installed on the system.

-v | -verbose

Enables verbose mode.

Example

To archive the extracted shared objects list section from an EDU trap file or pmap file and a core file, issue a command like the following, replacing core and trap file names as required:

Linux and AIX

```
db2snapcore -corefile db2sysc.6270.98042.core  
-trapfile 28930.16.000.trap.txt -e ~/sql1lib/adm/db2sysc
```

Depending on which archiving method is used (**pax** command or **tar** command), the file name for the resulting archive is either **db2snapcore.pax.gz** or **db2snapcore.tar.gz**.

db2start - Start Db2

Starts the database manager on the target member or all members. In a Db2 pureScale environment, it may also be used to start the cluster caching facility (CF).

db2start can be executed as a system command or a CLP command.

Start Db2 at the server before connecting to a database, precompiling an application, or binding a package to a database.

The **db2start** command launches the Db2 database product installation as a Windows service. The Db2 database product installation on Windows can still be run as a process by specifying the **/D** switch when invoking **db2start**. The Db2 database product installation can also be started as a service using the Control Panel or the **NET START** command.

Since **db2start** launches a Windows service, you must meet Windows requirements for starting a service. If Extended Security is disabled, you must be a member of the Administrators, Server Operators or Power Users group. If Extended Security is enabled, you must be a member of either the Administrators group or the DB2ADMNS group to start the database.

If a **db2start** operation in a multi-partition database is not completed within the value specified by the **start_stop_time** database manager configuration parameter, the database partitions that have timed out will not have the database manager instance background processes started (all resources associated with the database partition will be removed). Environments with many database partitions with a low value for **start_stop_timeout** might experience this behavior. To resolve this behavior, increase the value of **start_stop_time** database manager configuration parameter.

For root-install Db2 copies on Linux and UNIX operating systems, the **db2start** command sets the ulimit value required by the database manager without changing the permanent setting of ulimit for the instance owner ID.

For non-root install, you should set the ulimit for 'data' to 'unlimited' and 'nofiles' to 'unlimited' or the maximum value allowed on the system.

db2stat - Db2 process status for Windows

On Windows systems, all Db2 processes running under all instances can be displayed using the **db2stat** command.

Authorization

None

Required connection

None

Command syntax

►►db2stat—————►►

Command parameters

db2stat

Outputs all active Db2 processes.

Examples

C:\Program Files\IBM\SQLLIB\BIN>db2stat

Environment Strings

```
--> DB2CLP=DB20FADE  
--> DB2INSTANCE=DB2  
--> DB2PATH=C:\Program Files\IBM\SQLLIB
```

Db2 Processes

| | | |
|------------|------|------|
| DB2DASRRM | 1960 | x7A8 |
| DB2MGMTSVC | 2012 | x7DC |
| DB2RCMD | 1212 | x4BC |
| DB2DASSTM | 2044 | x7FC |
| DB2SYSTRAY | 724 | x2D4 |
| DB2 | 3100 | xC1C |
| DB2BP | 3180 | xC6C |
| DB2SYSICS | 1592 | x638 |
| DB2FMP | 3468 | xD8C |
| DB2STAT | 1748 | x6D4 |

Usage notes

One thing to note in the Windows case is that because Db2 is thread-based, not process-based, you will only see one process (DB2SYSCS) for all of an instance's EDUs. It is obvious that the same degree of information is not returned in Windows as is returned in Linux/UNIX systems, but it is still useful, at times, to know the process IDs for all running instances. For example, you can use the Windows Task Manager utility to determine the CPU and memory usage for a given process ID.

db2stop - Stop Db2

Stops the database manager on the target member or all members. In a Db2 pureScale environment, it may also be used to stop the cluster caching facility (CF).

db2stop can be executed as a system command or a CLP command.

If a **db2stop** operation in a multi-partition database is not completed within the value specified by the **start_stop_time** database manager configuration parameter, the database partitions that have timed out will be killed internally (all resources associated with the database partition will be removed). Environments with many database partitions with a low value for **start_stop_time** might experience this behavior. To resolve this behavior, increase the value of **start_stop_time**.

db2support - Problem analysis and environment collection tool

Collects environment data about either a client or server machine and places the files that contain system data into a compressed file archive.

The **db2support** command that is included with Db2 installation images supports only a subset of the command parameters that are available after you install the Db2 product. Until you install the Db2 product, the only **db2support** command parameters that you can use are the **-install** and **-host** parameters.

This tool can also collect basic data about the nature of a problem through an interactive question and answer process with the user.

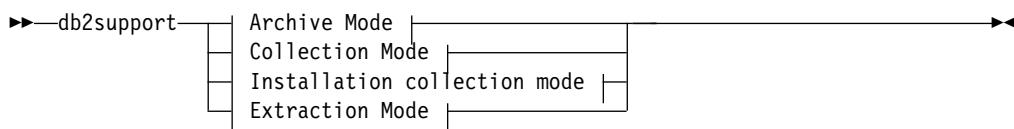
Authorization

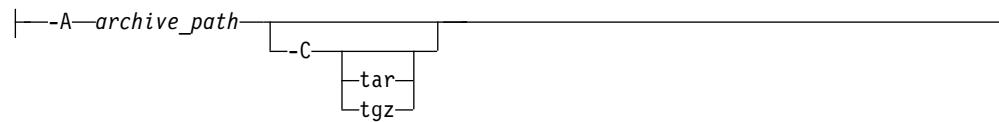
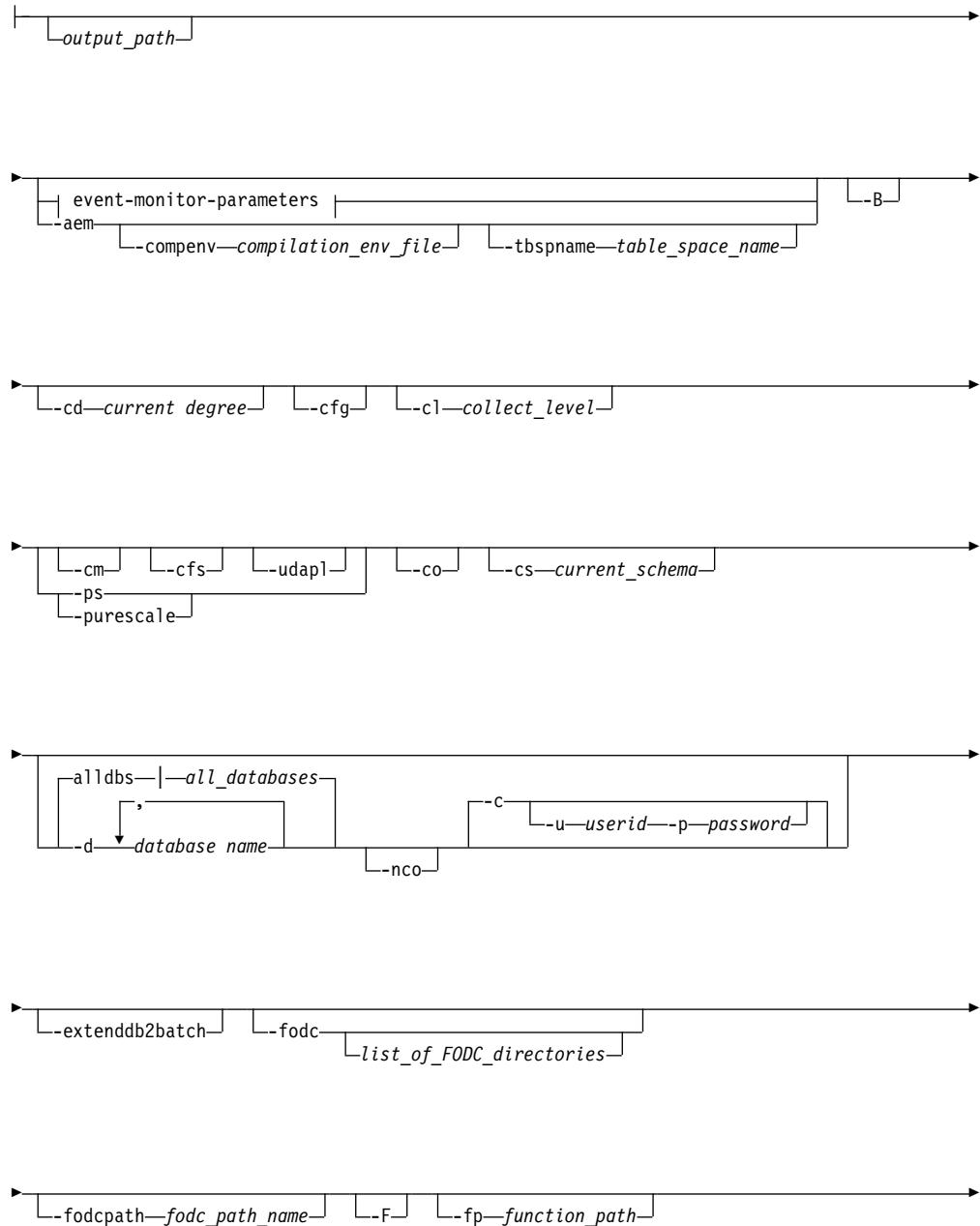
For the most complete output, run this command with SYSADM authority, such as an instance owner. If you do not have SYSADM authority, some of the data collection actions result in reduced reporting and reduced output.

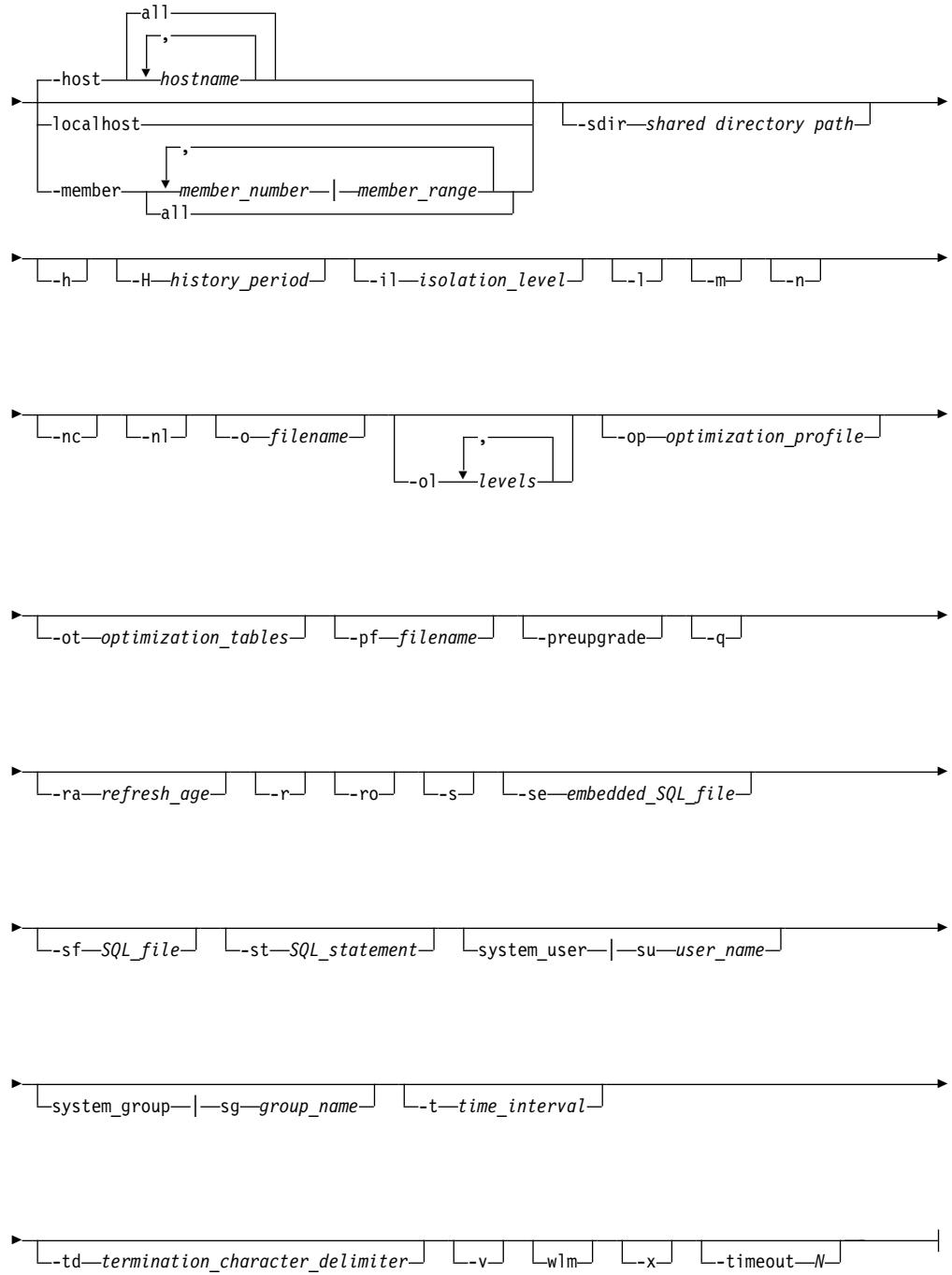
Required connection

None

Command syntax



Archive Mode:**Collection Mode:**



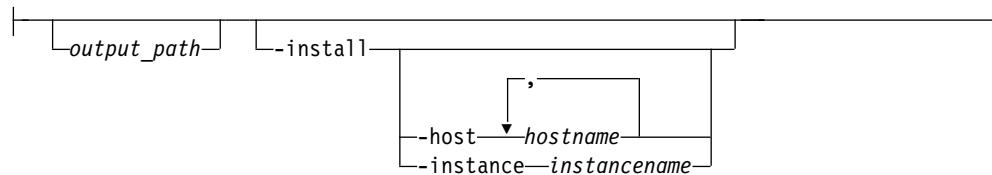
event-monitor-parameters:

```

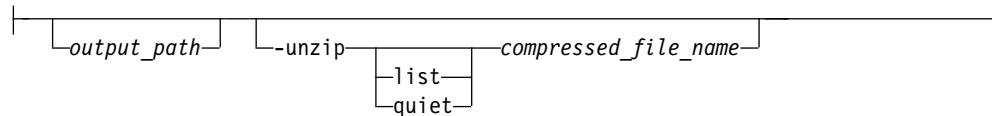
|---actevm<br>event monitor name---appid<br>application id---uowid<br>uow id--->
|---actid<br>activity id--->

```

Installation collection mode:



Extraction Mode:



Command parameters

output_path

Specifies the path where the compressed archive file is to be created or extracted. This path is the directory where user-created files must be placed for inclusion in the archive, or the directory where files are extracted to when the **-unzip** parameter is specified. The current directory is used when this parameter is not specified.

-A *archive_path* | -archive *archive_path*

This parameter archives all the data from the directory specified in the **diagpath** configuration parameter into the specified archive path. A new directory will be created in the specified archive path with the name DB2DUMP with the system host name and timestamp appended, for example, DB2DUMP_systemhostname_2009-01-12-12.01.01.

This parameter also archives all the data from the directory specified in the **alt_diagpath** configuration parameter into the specified archive path. The name of this directory is ALT_DB2DUMP. Also, files from the events/ subdirectory are archived into the ALT_EVENTS directory, and files from the stmmlog/ subdirectory are archived into the ALT_STMM directory.

This parameter is not available on Windows operating systems.

-aem

Specifies that **db2caem** command information is collected for the SQL statement that you specify by using the **-st** or **-sf** parameter. If you specify this parameter, the **db2caem** command creates an activity event monitor to collect the requested information. By default, the **db2support** command does not collect **db2caem** command information. The activity event monitor and other created tables are cleaned up from the system. The activity event monitor and other created tables are cleaned up from the system.

The **db2caem** command ignores the **db2support** command special register options. To specify the compilation environment for the **db2caem** command, you should use the **-compenv** parameter. The **db2caem** command executes the specified SQL statement.

The **-aem** parameter does not support the **-se** parameter.

-all dbs | -all databases

Specifies that the command collects the database-related information of all databases in the database directory. The command collects database

information for a maximum of 100 databases. You cannot use the **-all dbs** parameter in optimizer mode or with the **-preupgrade** parameter. The **-all dbs** parameter and the **-d** parameter are mutually exclusive.

-nco | -noconnect

Specifies that no attempt to connect to the specified database is made.

-c | -connect

Specifies that an attempt to connect to the specified database is made. This command parameter is included by default if you specify a database.

-B | -basic

Restricts the collection to only optimizer information. No other information is collected except information for the db2supp_opt.zip file. The **-basic** parameter must be used with the **-st**, **-sf**, or **-se** parameters or a syntax error is returned.

-c | -connect

Specifies to connect to the specified database.

-cd | -curdegree

Specifies the value of the current degree special register to use. The default is the value of the **dft_degree** database configuration parameter.

-cfg

Collect configuration information and exclude all other support-related data.

This parameter can be combined with the only following parameters: **-c**,

-connect, **-d**, **-database**, **-m**, **-html**, **-n**, **-number**, **-o**, **-output**, **-p**, **-password**, **-u**, **-user**, **-v**, **-verbose**.

-cfs

Specifies that additional diagnostic data for cluster file system is packaged into the generated .zip file. This parameter collects only additional cluster file system data that is space intensive or takes a long time to get collected.

-cl | -collect

Specifies the level of performance information to be returned. Valid values are:

0 = collect only catalogs, **db2look**, **dbcfg**, **dbmcfg**, **db2set**

1 = collect 0 plus exfmt

2 = collect 1 plus .db2service (this is the default)

3 = collect 2 plus **db2batch**

Note: If you specify an event monitor parameter (**-actevm**, **-appid**, **-uowid**, **-actid**) without **-st**, **-sf**, or **-se**, the effective collection level is 1 with only **db2caem** information collected (no **db2exfmt** collection).

-cm

Specifies that additional diagnostic data for cluster manager is packaged into the generated .zip file. This parameter collects only additional cluster manager data that is space intensive or takes a long time to get collected.

-co

Collect catalogs for all tables in the database. The default is to collect catalog information only for the tables used in a query that has a problem.

-compenv compilation-environment-file

Specifies the name of the file containing the name of the compilation environment that is used when the **db2caem** command is executed. The compilation environment (comp_env_desc) is in BLOB data type and is specified through a file as an input. If the parameter is not provided, the default compilation environment is used when executing **db2caem**.

-cs | -curschema

Specifies the current schema to use to qualify any unqualified table names in the statement. The default value is the authorization ID of the current session user.

-C | -compress

Enables archive compression. By default, the archive data is compressed into a single file. Archive compression is available only in archive mode, so you must also specify the **-A** parameter; otherwise, a syntax error is returned.

tar

Specifies that the files are archived using the **tar** (tape archive) command. The **tar** parameter is supported on UNIX and Linux operating systems.

tgz

Specifies that files are archived using the **tar** command and compressed using the **gzip** command. The **tgz** parameter is supported on UNIX and Linux operating systems.

-d database_names | -database database_names

Specifies the name of the database for which data is being collected. You can specify multiple database names for collection of data from more than one database. You can specify a maximum of 100 database names for data collection.

By default, an attempt is made to connect to the specified database. To override this behavior, specify the **-noconnect** or **-nco** parameter.

If you specify multiple databases, you cannot run the **db2support** command in optimizer mode or with the **-preupgrade** parameter.

-nco | -noconnect

Specifies that no attempt to connect to the specified database is to be made.

-c | -connect

Specifies that an attempt to connect to the specified database is to be made.

Specifies that an attempt to connect to the specified database is made. This command parameter is included by default when you specify a database.

event-monitor-parameters

The following parameters uniquely identify the SQL statement for which the activity event monitor data is collected. You must specify them together.

-actevm activity_event_monitor_name

Specifies the name of the existing activities event monitor whose activitystmt logical grouping contains the data to be collected.

-appid application_id

Specifies the application identifier (**app1_id** monitor element) uniquely identifying the application that issued the activities to be collected.

-uowid uow_id

Specifies the ID of the unit of work (**uow_id** monitor element) whose data is to be collected. The unit of work ID is unique only within a specific application.

-actid activity-id

Specifies the activity ID (**activity_id** monitor element) whose data is to be collected. The activity ID is unique only within a given unit of work.

-extenddb2batch

Specifies that **db2batch** command information for all the optimization levels that you specify by using the **-o1** or **-optlevel** parameter is to be captured. You must specify at least one value for the **-o1** parameter and a **-c1** parameter value of 3 if you specify the **-extenddb2batch** parameter. Otherwise, the **db2support** command returns a syntax error.

-fodc

Specifies that only the FODC directories and the **db2diag** log files are collected. If you do not specify directories, the **db2support** command shows a list of all the FODC directories for you to choose from. The directories are listed in ascending chronological order, based on usage time stamps, making the most recently used directories most visible.

The **db2support** command can only collect the FODC directories on the physical database host from where the command was run. The **-host** or **-member** parameters can also be used to collect FODC directories remotely. However, since the FODC directory could contain large files, like core files, it is recommended that the **-fodc** parameter is run on the host where FODC directories reside.

You can specify the time interval (**-t** or **-time**) or history (**-H** or **-history**) parameters, but if a specified FODC directory is outside the specified timeframe, **db2support** will not collect the specified FODC directory. If the **-t** or **-H** parameters are not specified, the **-fodc** parameter will collect FODC directories within 14 days.

You cannot specify the archive (**-A** or **-archive**) or basic (**-B** or **-basic**) parameter when using the **-fodc** parameter.

Trap | Panic | BadPage | Hang | IndexError | Perf | DBMarkedBad
Specifies the category of FODC directories to collect.

list_of_FODC_directories

A comma-separated list of existing FODC directories. To show all FODC directories in multiple-host environment, specify **-host all** option.

-fodcpath fodc_path_name

Specifies the name of a full path to an existing directory where the **db2support** command can search for FODC packages. The **db2support** command searches the following paths to collect FODC packages:

- The diagnostic data directory as specified by the **diagpath** and **alt_diagpath** database manager configuration parameters
- The instance-level **FODCPATH** parameter settings in the **DB2FODC** registry variable
- The FODCPATH settings for each member in that machine
- The **db2pdcfg** command setting in memory
- The *fodc_path_name* variable value that you specify by using the **-fodcpath** parameter

-F | -full

Specifies that all **db2support** information and optimizer-specific information are to be captured with nothing excluded.

-fp | -funcpath

Specifies the value of the function path special register to use to resolve unqualified user-defined functions and types. The default value is "SYSIBM", "SYSFUN", "SYSPROC", X, where X is the value of the USER special register, delimited by double quotation marks.

-h | -help

Displays help information. When this parameter is specified, all other parameters are ignored, and only the help information is displayed.

-H *history_period* | -history *history_period*

Limits the data that is collected to a particular interval of time. You can specify the *history_period* variable with a number and time type. The available types are as follows:

- d** Days.
- h** Hours.
- m** Minutes.
- s** Seconds.

Optionally, you can specify a beginning time value that is separated by a colon. You specify the beginning of time value in time stamp format. The time stamp format is *YYYY-MM-DD-hh.mm.ss.nnnnnn*

where:

- YYYY** Specifies the year.
 - MM** Specifies the month (01 - 12).
 - DD** Specifies the day (01 - 31).
 - hh** Specifies the hours (00 - 23).
 - mm** Specifies the minutes (00 - 59).
 - ss** Specifies the seconds (00 - 59).
- nnnnnn**
Specifies the microseconds on UNIX operating systems or milliseconds on Windows operating systems.

You can omit some or all of the fields that follow the year field. If you omit fields, the default values are used. The default values are 1 for the month and day and 0 for all other fields.

The number and time type can be positive or negative, which you specify with the plus sign (+) or minus sign (-). If you specify only a number and time type, the default is negative. If you specify a number, a time type, and a beginning time value, the default is positive. For example, **-history 6d** collects data for the past six days, and **-history 6d:2013** collects data for the first six days of 2013.

This parameter cannot be used with the **-time** or **-t** parameter. The default value is 14 days if the **-H** or **-t** parameters are not specified.

-host

Specifies the host or hosts on which the command is issued. If this parameter is not specified, the command is issued on all hosts by default with the exception of the **-fodc** parameter.

a11

Specifies that the command is issued on all hosts. This setting is the default behavior of the **db2support** command, but does not apply to the **-fodc** parameter.

hostname

Specifies the host or hosts on which the command is issued. If this option

is not specified, the command is issued on all hosts. If multiple hosts are specified, all host names must be valid for the command to complete.

If you specify the **-host** option in an environment that is not a Db2 pureScale environment or a partitioned database environment, **db2support** returns an error.

-il | -isolation

Specifies the isolation level to use to determine how data is locked and isolated from other processes while the data is being accessed. By default, the CURRENT ISOLATION special register is set to blanks.

-install

Collects the diagnostic data that is required to troubleshoot a problem with the Db2 installation process or with the creation of an instance. The diagnostic data is stored in the db2support.zip file. Copy the db2support.exe file to your local system; this ensures that when you issue the **db2support** command the db2support.zip file is placed into whichever directory that you copied db2support.exe to. For the most complete collection of diagnostic data, issue the command with root authority. Also, another recommendation is to indicate an output path for the db2support.zip file by specifying the *output_path* variable with the **-install** parameter.

-host hostname | -host hostname_list

Specifies the host or hosts where diagnostic data is collected. For data collection on remote hosts, an SSH connection is required. If you do not specify a host name, diagnostic data is collected on the local host.

To collect diagnostic data on multiple hosts specify the **-host** parameter followed by *hostname_list*, where *hostname_list* is a comma-separated list of hosts for which you want to collect diagnostic data.

-instance instancename

Specifies the instance name for which the diagnostic data is being collected. If you do not specify this parameter, diagnostic data by default is collected on the instance defined in the **DB2INSTANCE** environment variable.

To collect diagnostic data on a particular instance, specify the **-instance** parameter followed by *instancename*, where *instancename* is the name of the instance for which you want to collect diagnostic data.

-l | -logs

Specifies that active logs are to be captured.

-localhost

Specifies that the command is issued on the local host. If this option is not specified, the command is issued on all hosts.

-m | -html

Specifies that all system output is dumped into HTML formatted files. By default, all system-related information is dumped into flat text files if this parameter is not used.

-member member_number | member_range

Specifies the member or members on which the command is issued. If this parameter is not specified, the command is issued on the current member. Multiple members can be specified as a comma-separated list of *member_number* (member1, member2), or using *member_range*, where *member_range* is a range of members (member1-member3), or using any combination of the first two methods.

all

Specifies that the command is issued on all members defined in db2nodes.cfg.

The **db2support** tool runs per host. If multiple members reside on one host, **db2support** runs only once on the host. If you specify the members on which the command is issued, the member numbers you provide are used only to determine the hosts on which **db2support** runs.

If you specify the **-member** option in an environment that is not a Db2 pureScale environment or a partitioned database environment, **db2support** returns an error.

-n | -number

Specifies the problem management report (PMR) number or identifier for the current problem.

-nc | -nocatalog

Specifies that catalog information is not to be collected. By default, catalog information is collected.

-n1 | -nodb2look

Specifies that **db2look** command information is not to be collected. By default, **db2look** command information is collected.

-o filename

Specifies a name for the compressed file that is generated after you issue the **db2support** command. You can specify an absolute or relative path. The path must exist and be accessible before you specify the parameter; otherwise, an error occurs.

If you do not specify this parameter, the name of the compressed file is **db2support.zip**.

If you use this parameter with the *output_path* parameter, the path that you specify for the *output_path* parameter is ignored, and the path that you specify for the **-o** parameter is used.

-ol levels | -optlevel levels

Specifies the value of the optimization level special register to use. The default is the value of the **dft_queryopt** database configuration parameter. The optimization level value can be specified as a single value or multiple values separated by a comma.

If multiple values are specified, all optimization information is collected for the first value. For each additional optimization level value specified, the explain plans are collected and stored in a separate file along with the initial and end times of the collection for each level.

-op | -optprofile

Specifies the value of the optimization profile special register to use. This value is needed only if there was an optimization profile in effect when the statement was bound. The default is "" (an empty string).

-ot | -opttables

Specifies the value of the CURRENT MAINTAINED TABLE TYPES FOR OPTIMIZATION special register, which identifies the types of tables that can be considered when optimizing the processing of dynamic SQL queries. The initial value of the special register is SYSTEM.

-p password | -password password

Specifies the password for the user ID.

-ps | -purescale

Specifies that additional Db2 diagnostic data and additional diagnostic data for cluster file system, cluster manager, and uDAPL is to be collected. This parameter collects only additional diagnostic data that is space intensive or takes a longer time to get collected. Specifying this parameter is equivalent to specifying the **-cm**, **-cfs**, and **-udapl** parameters.

-pf *filename* | -profile *filename*

Specifies an alternative profile file. You must specify an absolute path for the file.

The default profile is the db2support.profile file, and the default directory for the file is the sql1ib/adm directory. On Windows operating systems, if the sql1ib/adm directory does not exist, you must create it before issuing the **db2support** command.

This profile file is used to collect information that is not included in the standard **db2support** command execution. The possible templates for the profile file are as follows. You can use any combination and number of template 1 and template 2.

Template 1

```
<COLLECTION>
<NAME>...</NAME>
<CMD>...</CMD>
<OUTFILE>...</OUTFILE>
<TIMEOUT>...</TIMEOUT>
</COLLECTION>
```

Template 2

```
<COLLECTION>
<NAME>...</NAME>
<FILE>...</FILE>
<OUTFILE>...</OUTFILE>
<TIMEOUT>...</TIMEOUT>
</COLLECTION>
```

Each collection item is described by a name, a command or file name, an output file name, and a timeout value. This information is used to collect the additional information.

NAME

The name of the data that is being collected.

CMD

The command that is used on the command line to gather the additional information. You must specify either this value or the **FILE** value, never both.

FILE

The name of the file to collect. You must specify either this value or the **CMD** value, never both.

OUTFILE

The name of the output file where the collected information is stored. This is a mandatory value.

TIMEOUT

The amount of time in seconds that the command-line execution must not exceed. The default value is 180 seconds.

The **db2support** command skips all blank lines when it parses the file.

If the **OUTFILE** and either the **CMD** or **FILE** values are missing, a parse error occurs when the command parses the file. If this occurs, the **db2support** command skips this collection. After the profile file is parsed, the collected information is stored in the db2supp_system.zip file in the USERCOLLECTION/OUTFILE directory.

-preupgrade

Collects environment and configuration data before a critical upgrade or update such as upgrading an instance or updating to the next fix pack. This parameter helps with troubleshooting any problems that might occur after the upgrade or update. This parameter can be used with only the **-d**, **-o**, **-fodcpath**, **-n1**, **-member**, and **-host** parameters.

After the collection of data is completed, the results are compressed into a file named db2support_preupgrade.zip.

-q | -question_response

Specifies that interactive problem analysis mode is to be used.

-ra | -refreshage

Specifies the value of the refresh age special register. This value applies only if there are materialized query tables (MQTs) that reference tables in the statement. The default value of the CURRENT REFRESH AGE is zero.

-r | -redistribute

Specifies that diagnostic data that is related to data redistribution is captured.

-ro | -reopt

Specifies that EXPLAIN with the REOPT ONCE option is used when explaining the query. The default is to ignore the REOPT ONCE option.

-s | -system_detail

Specifies that detailed hardware and operating system information is to be gathered.

-se embedded SQL file | -sqlembedded embedded SQL file

Specifies the path of the embedded SQL file containing the SQL statement for which data is being collected.

-sdir shared directory path | -S shared directory path

Specifies the shared directory that is used for temporary storage while the **db2support** command is collecting data. If you do not specify this parameter, the default shared directory is used to store data temporarily. The default shared directory is *db2_instance_shared_directory/sql1ib_shared* in Db2 pureScale environments and *path/sql1ib* in partitioned database environments. The data that is temporarily stored is deleted when the execution of the **db2support** command is complete.

Important: Because the sql1ib_shared directory is used as the default shared directory in Db2 pureScale environments, ensure that there is enough space in the sql1ib_shared directory to store the data that the **db2support** command collects. You can use the following formula to calculate the minimum disk space that is required for the sql1ib_shared directory:

10 GB + number of member/CF host x 2 GB

-sf SQL file | -sqlfile SQL file

Specifies the file path containing the SQL statement for which data is being collected.

In Db2 pureScale and partitioned database environments, you must specify the absolute file path and ensure that the SQL file is stored in a directory that is

accessible by all host. However, for optimizer collections in these multiple host environments it is recommended that you use the `-localhost` option to collect data on a single host. For example, to collect data on a single host you might run the following command:

```
db2support -d <database_name> -sf <filepath> -localhost
```

Where `filepath` is the absolute path of the SQL file. When you use the `-localhost` option, as shown in the preceding example, the file name can be used in place of the absolute path if the file is stored in the current directory.

-st *SQL statement* | -sqlstmt *SQL statement*

Specifies the SQL statement for which data is being collected.

-su *user_name* | -system_user *user_name*

Specifies the system user name for which data is being collected.

-t *time_interval* | -time *time_interval*

Limits the data that is collected to a particular time interval. You can specify the time interval as a start time, end time, or both, in time stamp format separated by a colon. The time stamp format is `YYYY-MM-DD-hh.mm.ss.nnnnnn`

where:

`YYYY` Specifies the year.

`MM` Specifies the month (01 - 12).

`DD` Specifies the day (01 - 31).

`hh` Specifies the hours (00 - 23).

`mm` Specifies the minutes (00 - 59).

`ss` Specifies the seconds (00 - 59).

`nnnnnn`

Specifies the microseconds on UNIX operating systems or milliseconds on Windows operating systems.

You can omit some or all of the fields that follow the year field. If you omit fields, the default values are used. The default values are 1 for the month and day and 0 for all other fields.

If you specify only a start time (for example, `-t 2012`), the **db2support** command collects files that were modified after the start time. If you specify only an end time (for example, `-t :2012`), the **db2support** command collects files that were modified before the end time. If you specify both times (for example, `-t 2012:2013`), the **db2support** command collects files that were modified between the start time and end time. There is no default value for this parameter. You must specify at least one of the time stamps.

You cannot use this parameter with the `-history` or `-H` parameter.

The default value is 14 days if the `-H` or `-t` parameters are not specified.

-tbspname *table_space_name*

Specifies the table space name in which the **db2caem** command creates the activity event monitor. For a partitioned database environment, the table space must exist on all the database partitions where the SQL statement of interest is to be run. If the option is not provided, the default table space is used by the **db2caem** command when creating the activity event monitor.

-td | -delimiter

Specifies the statement termination character. This command parameter works

in the same way as the **-td** parameter of the **db2** command. The default statement termination character is a semicolon.

-timeout *N*

Specifies the timeout period in seconds after which the **db2support** tool stops its execution. The *N* variable must be specified in seconds. **timeout** specifies the total run time since the start of the execution and not the timeout for each specific collection. If a timeout occurs, the **db2support.zip** file is created and the error messages are written to the screen and to the **db2support.log** file.

This parameter can be used with all other parameters.

-u *userid* | -user *userid*

Specifies the user ID to use to connect to the database.

-udapl

Specifies that diagnostic data for uDAPL is packaged into the generated **.zip** file. This parameter collects only additional uDAPL data that is space intensive or takes a long time to collect.

-unzip *compressed_file_name*

Extracts the contents from the specified compressed file. You must specify an absolute or relative path for the file. Also, the **db2support -unzip** command recognizes the file name that you specify for the *compressed_file_name* parameter only if the file has a **.ZIP** or **.zip** file extension.

This parameter can extract the **db2support.zip** file on the system file where extraction utilities are not available.

You cannot combine the **-unzip** parameter with parameters from other **db2support** command modes.

If you specify the *output_path* parameter with the **-unzip** parameter, the extracted files are placed in the *output_path* directory. If you do not specify the *output_path* parameter with the **-unzip** parameter, a new directory that is named *compressed_file_name* is created in the current directory, and the extracted files are placed inside the *compressed_file_name* directory.

list

Specifies that the contents of the compressed file are listed in standard output but not extracted. The file name, size, and date are shown. This parameter can be useful when the **db2support.zip** file is large and little space is available on the system.

quiet

Prevents the **db2support** command from prompting you for input regarding extracted files that are already in the *output_path* directory or in the current directory if *output_path* was not issued. If you do not issue the **quiet** parameter, you are prompted with a message asking you whether you want the specified file to be overwritten. If you specify this parameter, it overwrites all the existing files without prompts.

-v | -verbose

Specifies that verbose output is to be used while this tool is running.

-wlm

Specifies that additional data related to Db2 Workload Manager issues is being collected. The data is collected as part of optimizer mode under the collection level 0 (**-c1 0**) and above.

-x | -xml_generate

Specifies that an XML document containing the entire decision tree logic that is used during the interactive problem analysis mode (**-q** mode) is to be generated.

Examples

Example 1

The following examples show different ways to invoke the **db2support** command in optimizer mode:

- As an SQL statement from a command line:

```
db2support output_directory -d database_name -st sql_statement
```

The **db2support** command stores the query in the optimizer directory by copying the query into the `bad_query.sql` file.

- As an SQL statement that is stored in a file:

```
db2support output_directory -d database_name -sf sql_file
```

The command copies the file containing the query into the optimizer directory.

- As a file containing an embedded static SQL statement with the query that has the problem:

```
db2support output_directory -d database_name -se embedded_sql_file
```

The command copies the file containing the query into the optimizer directory. The file does not need to be in the current directory but must be readable by an invoking user ID.

- While returning different levels of performance information:

```
db2support output_directory -d database_name -collect 0
```

The **db2support** command collects different levels of performance information based on the level of detail that you request. The values 0 - 3 collect increasing amounts of detail. If you use the 0 option, catalog information and table definitions are collected, which you can use to reproduce the database objects for a production database.

Example 2

The following command collects information to diagnose a slow query by using optimizer-related special registers that were set by default:

```
db2support . -d sample -st "SELECT * FROM EMPLOYEE"
```

In this example, the command returns all the data to the `db2support.zip` file. Diagnostic files are created in the current directory and its subdirectories, because `.` is specified as the output path. The system information, optimizer information, and diagnostic files are collected as well.

Example 3

To collect the same information shown in the previous example but with the user-specified values for the optimizer-related special registers, use:

```
db2support . -d sample -st "SELECT * FROM EMPLOYEE" -cs db2usr -cd 3  
-ol 5 -ra ANY -fp MYSHEMA -op MYPROFSHEMA.MYPROFILE -ot ALL -il CS
```

Example 4

The following command collects the same information that is shown in the previous example but with multiple user-specified values for the

optimizer-related special registers. The command also collects **db2batch** command information for each optimizer special register value.

```
db2support . -d sample -st "SELECT * FROM EMPLOYEE" -cs db2usr -cd 3  
-ol 3,5,7 -cl 3 -extenddb2batch -ra ANY -fp MYSCHHEMA -op MYPROFSCHHEMA.MYPROFILE -ot ALL -il CS
```

This example sets special registers as follows:

- Sets the current schema to db2usr
- Sets the current degree to 3
- Sets the optimization level to 5
- Sets the refresh age to ANY
- Sets the function path to schema MYSCHHEMA
- Sets the optimization profile to MYPROFSCHHEMA.MYPROFILE
- Sets the current maintained table types to ALL
- Sets the isolation level to CS

These values are set only for the connection that the **db2support** command establishes to the specified database. The entire environment is not affected. Providing the same special registry variables that were used when the query was run is important when correcting diagnostics.

Example 5

To limit the data collection to files modified in the last three days before the current time, use:

```
db2support -H 3d
```

Example 6

To limit the data collection to files modified in the first three days of 2009 (time period 2009-01-01-00.00.00.000000 through 2009-01-04-00.00.00.000000), use:

```
db2support -H 3d:2009
```

Example 7

To limit the data collection to files modified in time period 2008-01-01-00.00.00.000000 through the current time.

```
db2support -t 2008
```

Example 8

To limit the data collection to files modified in the time period of 2009-01-01-00.00.00.000000 through 2009-03-01-00.00.00.000000, use:

```
db2support -t 2009-01:2009-03
```

Example 9

The following section is an example profile file:

```
<COLLECTION>  
<NAME>List</NAME>  
<CMD>ls -la $HOME</CMD>  
<OUTFILE>list.out</OUTFILE>  
</COLLECTION>
```

With this profile file, **db2support** collects the information from the `ls -la` `$HOME` command and the results are stored in `USERCOLLECTION/list.out` in the `db2supp_system.zip` file. The timeout value is not specified because it is not mandatory. In this case, the default timeout value of 180 seconds is used.

Example 10

To extract the contents from the `db2support_hostname1.zip` file:

```
db2support -unzip db2support_hostname1.zip
```

This command creates a directory named db2support_hostname1 under the current directory, and the extracted files from the db2support_hostname1.zip file is placed in the db2support_hostname1 directory.

To extract db2support.zip from the current directory and place it in the temp directory:

```
db2support temp -unzip db2support.zip
```

If some or all of the files that are being extracted exist in the destination directory, you are prompted to choose if you want to overwrite a particular file. If you want to avoid the prompts, issue the **quiet** parameter along with the **-unzip** parameter:

```
db2support temp -unzip quiet db2support.zip
```

Example 11

The following are examples of the **-install** and **-host** parameters:

To create the db2support.zip file in the current directory:

```
db2support -install
```

To specify an output path temp for the db2support.zip file:

```
db2support temp -install
```

To specify a single host on which the diagnostic data is collected:

```
db2support -install -host myhost1
```

To specify multiple hosts on which the diagnostic data is collected:

```
db2support -install -host myhost1,myhost2
```

Example 12

To specify timeout for the total **db2support** collection.

```
db2support -d sample -timeout 3
```

Example 13

To specify timeout for collection of hardware and operating system information.

```
db2support -d sample -c -s -timeout 15
```

Example 14

To specify timeout for the optimizer **db2support** collection.

```
db2support -d sample -c -timeout 7 -st "select * from staff"
```

Example 15

To specify data collection on all databases that are found in the database directory, use:

```
db2support -alldbs
```

Example 16

To specify data collection as user *guest1* on all databases that are found in the database directory, use:

```
db2support -alldbs -u guest1 -p password
```

Example 17

To collect configuration information, including database configuration information for all databases that are found in the database directory, use:
`db2support -all dbs -cfg`

Example 18

To specify data collection on databases *mydb1*, *mydb2*, and *mydb3*, use:
`db2support -d mydb1, mydb2, mydb3`

Example 19

To specify system information collection for user name *myuser*, use:
`db2support -su myuser`

Example 20

To specify system information collection for group name *mygroup*, use:
`db2support -sg mygroup`

Example 21

To specify system information collection for user name *myuser* and group name *mygroup*, use:
`db2support -su myuser -sg mygroup`

Using db2support to collect activity event monitor data for the SQL statement:

For example:

- `db2support -d sample -st "select * from staff" -aem`

In addition to current collection at **-c1 2**, this command starts the **db2caem** command, which creates the activity event monitor and capture information of details, section, values, and actuals for the SQL statement "select * from staff". The **db2support** command collects all the **db2caem** output.

- `db2support -d sample -sf badquery.sql -aem`

In addition to current collection at **-c1 2**, this command invokes **db2caem**, which creates the activity event monitor and capture information of details, section, values, and actuals for the SQL statement specified in the file *badquery.sql*. The **db2support** command collects all the **db2caem** output.

- `db2support -d sample -actevm mymon -appid *LOCAL.amytang.100203234904 -uowid 44 -actid 1`

In addition to current collection at **-c1 0**, this command starts the **db2caem** command, which captures the activity event monitor information of details, section, values, and actuals for the SQL statement identified by the event monitor options from the existing activity event monitor. The **db2caem** command does not create an activity event monitor in this case. The **db2support** command collects all the **db2caem** output.

Using db2support to collect data that is related to WLM:

For example:

- `db2support -d sample -c1 0 -wlm`

In addition to the current optimizer collection, this command collects additional WLM information for optimizer mode under the collection level 0.

- `db2support -d sample -st "select count (*) from syscat.tables" -wlm`

In addition to the current optimizer collection, this command collects WLM information for optimizer mode for the specified SQL statement.

- `db2support -d sample -sf badquery.sql -wlm`

In addition to the current optimizer collection, this command collects additional WLM information for optimizer mode for the specified SQL file.

db2support examples for collections specific to Db2 pureScale environments

Example 1

On the host run:

```
host:~$ db2support
```

- This command creates a `db2support.zip` file in the current folder. This file contains the Db2 diagnostic data and additional diagnostic data specific to Db2 pureScale components, such as cluster manager, cluster file system and uDAPL, that is collected from all hosts.
- The `db2support.zip` file contains a folder called `PURESCALE`. The `PURESCALE` folder has three additional subfolders called `CFS`, `CM`, and `UDAPL`, with the corresponding information files inside.
- You can specify additional parameters to this command to collect more diagnostic data.

Example 2: Running db2support with -cm option

On the host run:

```
host:~$ db2support -cm
```

- This command creates a `db2support.zip` file by default and also collects additional cluster manager data that is space intensive or takes a long time to get collected. The additional cluster manager data that is collected by the `-cm` option is stored in the `CM` folder that is located inside the `PURESCALE` folder of the `db2support.zip` file.

Example 3: Running db2support with -purescale option

On the host run:

```
host:~$ db2support -purescale
```

- This command creates a `db2support.zip` file by default. This command also collects additional diagnostic data that is specific to Db2 pureScale components, such as cluster manager, cluster file system and uDAPL, and takes a long time to get collected or is space intensive. The additional diagnostic data is stored in the corresponding `PURESCALE`, `CFS`, `CM`, and `UDAPL` folders located in the `db2support.zip` file.
- This command collects diagnostic data that is similar to what is collected by the following command but this command also collects additional diagnostic data that is specific to Db2 pureScale environments:

```
host:~$ db2support -cm -cfs -udapl
```

Usage notes

The `db2support` command collects bad query-related information only if you specify the `-st`, `-sf`, or `-se` parameter. If there is an error or trap during optimization, use the `-cl 0` (collection level zero) parameter to collect all catalog tables and `db2look` table definitions without trying to explain a bad query. To collect information that is related to an activity event monitor as part of optimizer collection, you can specify the `-aem` parameter (with the `-st` or `-sf` parameter) or event monitor options. You must specify one of these options to work with optimizer problems.

If you specify any of the options for optimizer collection, you must also specify the **-d** parameter.

If you do not specify the **-F** or **-full** parameter, only the db2diag.log file from the last three days are collected for the optimizer collection. If you want to collect all files in **diagpath**, including the full db2diag.log file for the optimizer collections, you must specify the **-F** or **-full** parameter.

If you set special registers to values other than the default values during statement execution, pass these values to the **db2support** command to help ensure correct problem analysis. The special register options are ignored by **db2caem** command collection.

The **-global** parameter is discontinued. The **-host all** parameter is the default behavior of the **db2support** command; thus, information from all hosts is collected by default.

The **db2support** command takes a long time to run because it collects most diagnostic data that is specific to Db2 pureScale components by default. If you specify the **-purescale**, **-cm**, **-cfs**, or **-udapl** parameter, the **db2support** command collects additional diagnostic data that is space intensive or takes a longer time to collect. However, this information can help speed up the problem determination process in Db2 pureScale environments.

To protect the security of business data, this command does not collect table data, schema (DDL statements), or logs. Some of the parameters do allow for the inclusion of some aspects of schema and data, such as archived logs. Carefully use parameters that expose database schema or data. When you issue the command, a message is displayed that indicates how sensitive data is dealt with.

The **db2support** command collects data from the machine where the command runs. In a client-server environment, database-related information is from the machine where the database is located, through an instance attachment or connection to the database. For example, operating system or hardware information (**-s** parameter) and files from the diagnostic directories (**diagpath** and **alt_diagpath**) are from the local machine where the **db2support** command runs. Data such as buffer pool information, database configuration information, and table space information is from the machine where the database is physically located.

The limitations on the type of queries that the **db2support** command accepts are as follows:

- Multiple queries are not supported. If you place several queries in a file, the command gathers all the objects that are necessary for each of the queries. However, only the last query is explained. This situation is also true for files that contain embedded static SQL statements.
- The command does not run customer applications. However, you can run the application at the same time that you are running the **db2support** command if you use one of the three methods to evaluate a particular bad or slow query.
- Stored procedures are not supported.

The **db2support** command does not collect explain data for dynamic SQL.

If an FODC package is stored in a directory path that is different from the default diagnostic path or is not in a path that is specified by an FODCPATH setting, you

must indicate the FODC path to the **db2support** command by using the **-fodcpath** parameter. The FODC package is then included in the db2support.zip file.

db2swtch - Switch default Db2 copy and database client interface copy

Switches both the default Db2 copy and the default database client interface copy.

The default Db2 copy is the copy that is used by applications that are not targeted at a specific Db2 copy. Issuing **db2swtch** launches the Default Db2 and IBM Database Client Interface Selection wizard which you can follow to set a new default Db2 Copy and set the default database client interface copy. This command is only available on Windows operating systems.

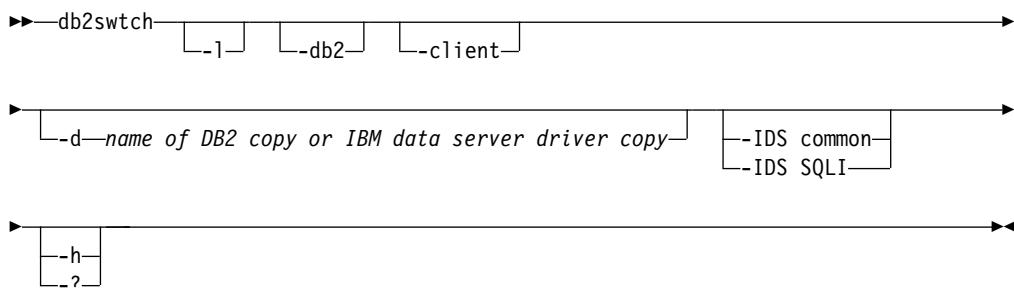
Authorization

Local Administrator authority.

Required connection

None

Command syntax



Command parameters

no arguments

Launches the utility in graphical mode.

-l Displays a list of Db2 copies and IBM data server driver copies on the system.

-db2 -d DB2_copy_name

Switch the default Db2 copy to the name specified.

`db2swtch -db2 -d DB2_copy_name`

-client -d name of Db2 copy or IBM data server driver copy

Switch the default client interface copy to the name specified.

`db2swtch -client -d name of DB2 copy or IBM data server driver copy`

-d DB2_copy_name

Switches both default Db2 copy and client interface copy to the name specified.

`db2swtch -d DB2_copy_name`

-IDS

common

Redirects the IDS .NET data provider reference in `machine.config` to common IDS .NET data provider.

SQLI Redirects the IDS .NET data provider reference in `machine.config` to SQLI IDS .NET data provider.

-h | -? Displays help information.

db2sync - Start Db2 synchronizer

Facilitates the initial configuration of a satellite as well as changes to the configuration. This command can also be used to start, stop and monitor the progress of a synchronization session and to upload a satellite's configuration information (for example, communications parameters) to its control server.

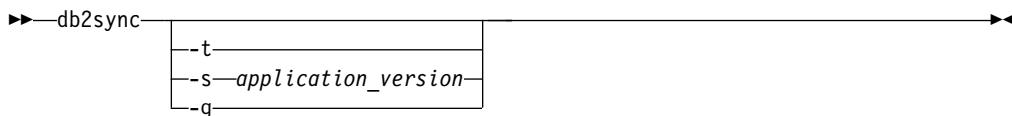
Authorization

None

Required connection

None

Command syntax



Command parameters

-t Displays a graphical user interface that allows an administrator to change either the application version or synchronization credentials for a satellite.

-s application_version
Sets the application version on the satellite.

-g Displays the application version currently set on the satellite.

db2systray - Start Db2 system tray

Starts the Db2 system tray tool.

It is a Windows operating system notify icon which monitors the status of a Db2 database service on Windows operating systems. **db2systray** provides a visual indication of when the service is started and stopped, as well as the ability to start and stop the service.

The **db2systray** icon has two modes, started and stopped. When the monitored instance is stopped, the icon contains an overlay with a red square. When the instance is started, the red square disappears.

In partitioned database environments, the **db2systray** icon will be in started mode only when all partitions are started. If one or more partitions are stopped, the **db2systray** icon will be in stopped mode.

When multiple Db2 copies are installed on a single Windows operating system, **db2systray** can monitor Db2 instances for each Db2 copy that is installed. To monitor a non-default Db2 copy, you can execute the **db2systray.exe** application from the SQLLIB/bin of the database copy you want to monitor.

You can monitor a single Db2 instance or multiple instances at the same time. Multiple instances can be monitored using multiple **db2systray** processes. A separate icon will appear in the system tray for each instance monitored by **db2systray**. Hovering over each icon with your mouse will display the name of the Db2 copy that is being monitored followed by the Db2 instance name monitored by that **db2systray** icon.

The **db2systray** icon can be launched manually from the Db2 command window by issuing the **db2systray** command, or automatically when the Windows operating system starts. **db2systray** is configured to start automatically when you install the Db2 database. However, having **db2systray** configured to start automatically when the system starts, does not mean that it will attempt to start the Db2 service as well. All it means is that it will start monitoring the status of the Db2 database automatically.

Issuing the **db2idrop** command against an instance monitored by a running **db2systray** process will force the **db2systray** application to clean up its registry entries and exit.

db2systray is only available on Windows operating systems.

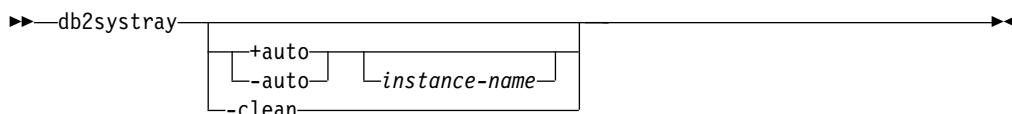
Authorization

No special authority is required for starting **db2systray**. Appropriate authority is required for taking actions.

Required connection

None

Command syntax



Command parameters

- +auto** Start **db2systray** automatically for the specified instance when the Windows operating system starts. **db2systray** can also be configured to launch automatically by enabling the **Launch Tool at Startup db2systray** menu option.
- auto** Disable **db2systray** from starting automatically for the specified instance when the Windows operating system starts.

instance-name

Name of the Db2 instance to be monitored. If no instance name is specified, **db2systray** will monitor the default local Db2 instance. If no instance exists, or the specified instance is not found, **db2systray** will exit quietly.

-clean Clean up all registry entries for all Db2 instances monitored by **db2systray** and stop all running **db2systray.exe** processes.

Examples

1. C:\SQLLIB\bin> db2systray
Starts **db2systray** for the default Db2 instance specified by the **DB2INSTANCE** environment variable.
 2. C:\SQLLIB\bin> db2systray DB2INST1
Starts **db2systray** for the instance named DB2INST1.
 3. C:\SQLLIB\bin> db2systray +auto
Starts **db2systray** for the default Db2 instance, and configures **db2systray** to start monitoring this instance automatically when the Windows operating system starts.
 4. C:\SQLLIB\bin> db2systray +auto DB2INST1
Starts **db2systray** for the instance named DB2INST1, and configures **db2systray** to start monitoring this instance automatically when the Windows operating system starts.
 5. C:\SQLLIB\bin> db2systray -auto
Disables the auto start option for the default instance defined by the **DB2INSTANCE** environment variable.
 6. C:\SQLLIB\bin> db2systray -auto DB2INST1
Disables the auto start option for instance DB2INST1.
 7. C:\SQLLIB\bin> db2systray -clean
Removes all registry entries created by **db2systray** and stops all running **db2systray.exe** processes. If **db2systray.exe** processes are running for other installed Db2 copies, they will not be cleaned up. You must execute db2systray -clean from the SQLLIB/bin for each Db2 copy you want to clean up.

db2tapemgr - Manage log files on tape

Important: The `db2tapemgr` command has been deprecated and might not appear in future releases.

Allows the storage and retrieval of Db2 log files to and from tape. The **db2tapemgr** command reads the **logarchmeth1** value and copies these log files from disk to the specified tape device, then it updates the recovery history file with the new location of the copied log files.

Note: This command is not supported in Db2 pureScale environments.

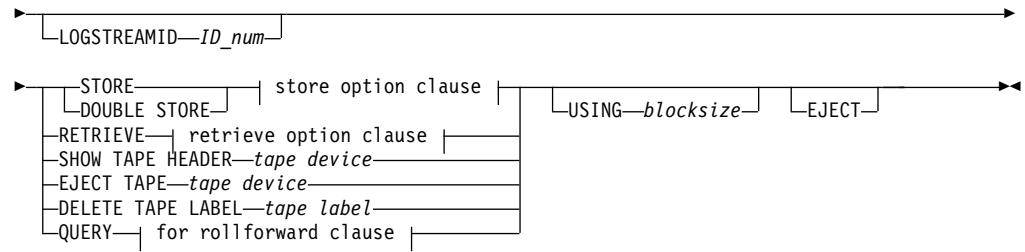
Authorization

One of the following authorities:

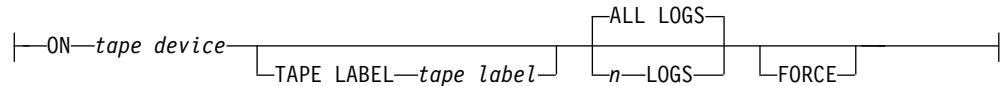
- SYSADM
 - SYSCTRL
 - SYSMAINT

Command syntax

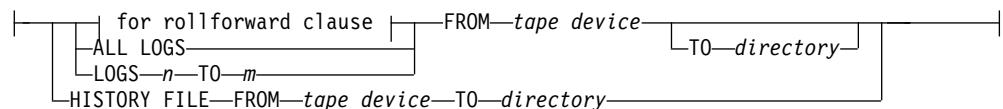
```
►->db2tapmgr [ DATABASE source-database-alias ] [ ON DBPARTITIONNUM-n ]
```



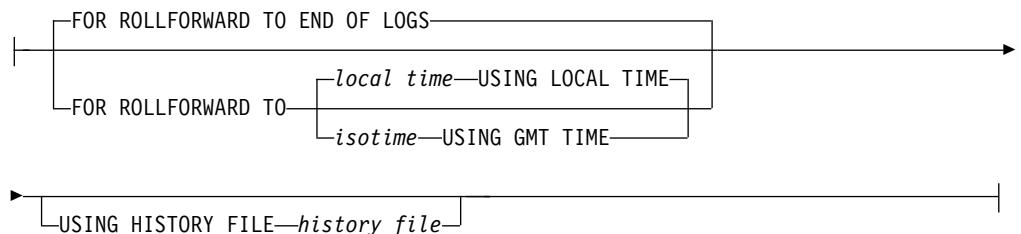
store option clause:



retrieve option clause:



for rollforward clause:



Command parameters

DATABASE *source-database-alias*

Specifies the name of the database. If no value is specified, **DB2DBDFT** will be used. If no value is specified, and **DB2DBDFT** is not set, the operation fails.

ON DBPARTITIONNUM n

Specifies the database partition number to work on. If no value is specified, **DB2NODE** is used.

LOGSTREAMID *ID num*

Specifies the log stream ID to work on. If no value is specified, all log streams will be used.

STORE ON *tape device*

Stores log file to tape and deletes it.

DOUBLE STORE ON *tape device*

DELETE LOG FILES
Stores all log files that have been stored only once and those log files never stored. Deletes only the log files that have been stored twice to tape; others are kept on disk.

TAPE LABEL

Specifies a label to be applied to the tape. If **tape label** is not specified, one will be generated automatically in the following format:
databasealias|timestamp (up to 22 characters, up to 8 characters for the database alias and 14 characters for the time stamp in seconds).

ALL LOGS or *n* LOGS

Specifies that the command applies to all logs or a specified number of logs.

FORCE

Specifies that if the tape has not expired, then over write it.

USING *blocksize*

Specifies the block size for tape access. The default size is 5120, and it must be a multiple of 512. The minimum is 512.

EJECT Specifies that the tape is to be ejected after the operation completes.**RETRIEVE FOR ROLLFORWARD TO**

Specifies that the utility will interactively prompt for all logs that are required for the specified rollforward and retrieve them from tape. If a directory is not specified, the path specified by the **overflowlogpath** configuration parameter is used. If a directory is not specified and **overflowlogpath** is not set, the operation fails.

END OF LOGS

Specifies that log files up to the end of the log will be retrieved.

***isotime* USING GMT TIME**

Specifies that log files up to the time specified will be retrieved.

***local time* USING LOCAL TIME**

Specifies that log files up to the time specified will be retrieved.

USING HISTORY FILE *history file*

Specifies an alternate history file to be used.

FROM *tape device*

Specifies the tape device to retrieve log files from.

TO *directory*

Specifies a directory to copy retrieved log files to.

RETRIEVE ALL LOGS or LOGS *n* TO *m*

Specifies that the command applies to all logs or a specified number of logs on a tape.

FROM *tape device*

Specifies the tape device to retrieve log files from.

TO *directory*

Specifies a directory to copy retrieved log files to.

RETRIEVE HISTORY FILE

Retrieves the history file

FROM *tape device*

Specifies the tape device to retrieve log files from.

TO *directory*

Specifies a directory to copy retrieved log files to.

SHOW TAPE HEADER *tape device*

Shows the content of the tape header file DB2TAPEMGR.HEADER

EJECT TAPE *tape device*

Ejects the tape.

DELETE TAPE LABEL *tape label*

Deletes all locations from the history file that refer to the specified tape label.

QUERY FOR ROLLFORWARD TO

Displays the location of the log files that are required for rollforward.

END OF LOGS***isotime* USING GMT TIME**

Specifies that the operation should query the logs up to the time specified.

***local time* USING LOCAL TIME**

Specifies that the operation should query the logs up to the time specified.

USING HISTORY FILE *history file*

Specifies an alternate history file to be used.

db2tbst - Get table space state

Accepts a hexadecimal table space state value, and returns the state. The state value is part of the output from **LIST TABLESPACES** or the MON_GET_TABLESPACE table function.

Authorization

None

Required connection

None

Command syntax

►—db2tbst—*tablespace-state*—————►

Command parameters

tablespace-state

A hexadecimal table space state value.

Examples

The request db2tbst 0x0000 produces the following output:

State = Normal

db2tdbmgr - Migrate tools catalog database

The **db2tdbmgr** command migrates specific tools catalog database objects after running the **UPGRADE DATABASE** command on the tools catalog database.

Authorization

sysadm

Required connection

This command establishes a database connection.

Command syntax

```
►►—db2tdbmgr—d—db_name—s—schema_name——u—user_name—►  
►——p—password—►
```

Command parameters

-d db_name

Tools catalog database name.

-s schema_name

Tools catalog schema name.

-u user_name

User name used to connect the tools catalog database.

-p password

Password used to connect the tools catalog database.

-e enc

Upgrade the TOOLSDB encrypted passwords to new standards. To be used when, you upgrade to Db2 Cancun Release 10.5.0.4 or later.

Note: Back up the TOOLSDB before you use this option. This option must be used only one time.

-e dec

Set the TOOLSDB encrypted passwords to old standards. To be used when, you roll back to Fix Packs older than Db2 Cancun Release 10.5.0.4.

Note: Back up the TOOLSDB before you use this option. This option must be used only one time.

Examples

1. The following example migrates the tools catalog tables, under the database alias toolsdb and schema systools:

```
db2tdbmgr -d toolsdb -s systools -u db2inst1 -p *****
```

2. The following example migrates the tools catalog tables, under the database alias toolsdb and schema systools. The example specifies that the database encrypts passwords with new standards that are introduced in Db2 Cancun Release 10.5.0.4.

```
db2tdbmgr -d toolsdb -s systools -u db2inst1 -p ***** -e enc
```

Usage notes

This command will only migrate tools catalog tables to a newer version, and cannot be used to convert migrated tools catalog tables to its previous version.

The database must be cataloged before migration. Most of the time, a migration error message is self explanatory, clearly stating the location of the error. If the

error message complains about any of the objects such as tables or column names, then the reported objects might be corrupted or missing under the database name submitted for migration.

db2top - Db2 monitoring tool

Important: The **db2top** command has been deprecated and might not appear in future releases.

The **db2top** command provides a unified, single-system view of a multi-partition database or single-partition database on the AIX, Linux, HP-UX, and Solaris operating systems.

Quickly identifies global problems, or specific database partition problems in the system. By combining snapshot information from each database partition, a dynamic realtime view of a running Db2 system is provided.

Scope

db2top can be run in interactive mode or in batch mode.

Authorization

One of the following authorities:

- sysadm
- sysctrl
- sysmaint
- sysmon

Required connection

Instance. A connection is not required in replay or client mode.

Command syntax

►►db2top	-A	►►
	-a	
	-B	
	-b <i>suboption</i>	
	-C <i>suboption</i>	
	-D <i>delimiter</i>	
	-d <i>database name</i>	
	-f <i>file </HH:MM:SS><+offset></i>	
	-h	
	-i <i>interval in seconds</i>	
	-k	
	-L	
	-m <i>duration in minutes</i>	
	-n <i>node name</i>	
	-o <i>outfile</i>	
	-P <i>member number</i>	
	-p <i>password</i>	
	-R	
	-s <i>number</i>	
	-u <i>username</i>	
	-V <i>schema</i>	
	-x	

Command parameters

- A** Enables automatic performance analysis. The **db2top** command produces a top five performance report. Use this option in replay and background mode (**-b** parameter). Typical usage includes:

Running **db2top** in collection mode for a long period (for example, 4 hours):

```
db2top -f collect.file -C -m 240
```

Running **db2top** in replay mode with automatic performance analysis. Automatic performance analysis is available for any functions supported in background mode and is based on the default sort criteria specified in the .db2toprc configuration file for the selected suboption (automatic performance analysis is also available in background mode, even when not replaying). As an example, to analyze the most active sessions, issue the following command:

```
db2top -f collect.file -b 1 -A
```

Running **db2top** in replay mode, jumping to the required point in time to analyze further:

```
db2top -f collect.file /HH:MM:SS
```

- a** Specifies that only active objects are displayed.
- B** Displays active objects in bold (reverse) color. This is helpful when the screen does not support colors and colors are set to off in the .db2toprc configuration file.

-b *suboption*

Runs **db2top** in background mode. When using the **-b** parameter, the **db2top** command displays information in CSV format. **db2top** can be run in background mode in combination with reading snapshot data from a

collection file using the **-f** *file* parameter. Issuing multiple sub-options for background mode (-b) is not supported. The **-b** parameter takes one of the following sub-option values:

- d** database
- l** sessions
- t** tablespaces
- b** bufferpools
- T** tables
- D** Dynamic SQL
- s** Statements
- U** Locks
- u** Utilities
- F** Federation
- m** Memory pools

The following parameters can only be used with the **-b** parameter: **-X**, **-L**, **-A**, **-s**, **-D**, **-o**.

-C Runs **db2top** in snapshot collector mode. Raw snapshot data is saved in <db2snap-<dbname>-<Machine><bits><.bin> by default (unless **-f** is specified). Pipe can also be specified for output instead of file. Specifying multiple sub-options for collector mode (-C) are supported. To include locks information in the collection file, use **-x** along with **-C**. The **-c** parameter takes one of the following sub-option values:

- b : buffer pools
- D : Dynamic SQL
- d : database
- F : Federation
- l : sessions
- s : Statements
- T : Tables
- t : tablespaces
- U : Locks

The **db2top** command runs in replay mode if the **-C** command parameter is not specified.

-D delimiter

Specifies the field delimiter (single character). Use in background mode (**-b** parameter).

-d database name

Specifies the database to monitor.

-f file </HH:MM:SS><+offset>

- If the **-f** parameter is not specified, **db2top** is run in replay mode. If the **-f** parameter is specified, it indicates output filename. The database name specified with the **-d** parameter does not need to exist. It is only referenced if you want to issue explains or Dump DB Struct.

In replay mode (-**C** parameter is not used), if snapshot data has been previously collected in *file*, offset jumps to a certain point in time in the file. It can be expressed in seconds (+10s), minutes (+10m) or hours (+10h). */HH:MM:SS* skips entries until the specified point in time.

- In the collector mode (-**C** parameter is used), you can specify the output filename. </HH:MM:SS><+offset> will be ignored if you are in collector mode

-h Displays usage information for the **db2top** command.

-i interval in seconds

Specifies the delay between screen updates. The delay time cannot be less than one second.

-k Displays actual or delta values. For all functions in delta mode, delta values are computed and displayed on a per second basis regardless of the specified refresh interval.

-L

Specifies that statements that are currently executing or most recent statements from current sessions are captured at each reporting interval specified by the **-i** parameter. If an SQL statement starts and finishes between an interval, it will not be included.

In the background mode, use **-b 1 -L** parameters to catch SQL statements executed in a session and output them to the **ALL.sql** file in the current working directory.

Currently executing or the most recent SQL statement for a connected session are captured at each interval (as specified by **-i** parameter). If a SQL statement starts and finishes between an interval, it will not be caught.

-m duration in minutes

Limits the duration of **db2top** in minutes for **-b** and **-C** parameters.

-n node name

Specifies the node to attach to.

-o Specifies the output file name. Used in background mode (**-b** parameter).

-P dbpartition number

Specifies the database partition number on which the snapshot will be issued. If the **-P** parameter is specified and the *dbpartition number* is not specified, **db2top** attaches to the default database partition.

-p Specifies the password used to access the database. If omitted and the **-u** parameter has been specified, the user is prompted for the password

-R Resets snapshot at startup.

-s number

Specifies how many samples will be displayed. Only supported in background mode (**-b** parameter).

-u Specifies the username used to access the database.

-V schema

Specifies the default schema used in explains.

-x Specifies whether to display additional counters on session and application screens (might run slower on session).

- X** Specifies format of output is XML. Use in background mode in conjunction with the **-b** parameter.

Snapshot data collector

The **db2top** monitoring utility can be run in replay mode, which means it can run against a saved copy of the raw binary snapshot data. To run in replay mode, **db2top** must be first run in data collector mode, either in batch mode by running **db2top** from the command line with the **-C** parameter, or by activating or deactivating data collection from an interactive session by pressing C. This will create a file <db2snap->*hostname*.bin> in the current directory. Then, the **db2top** utility can be run against <db2snap-><dbname>-<Machine><bits>.bin> using the **-f** arguments. The **db2top** monitoring utility does not need to attach to the Db2 instance in replay mode, which is convenient for remote monitoring. It is possible to limit the content and size of the stream file by specifying any of the sub-options available to the **-C** parameter.

Examples (batch mode)

The command parameters are as below:

```
-b 1          --> Run in background mode, while catching the "sessions" related
                  info in db2top
-C            --> run db2top in snapshot collector mode
-d CUST       --> database
-i 3          --> 3 second interval
-m 60         --> limit duration of db2top to 60 minutes
-n node       --> node
-o db2top.xml --> output file db2top.xml
-p password   --> password
-s 10000      --> collect 10000 samples
-u userid     --> userid
-V sv9        --> Schema
-x            --> display additional counters on session
```

The following example commands monitor a database called "CUST" on a node called "node" with a schema called "sv9". The user ID for the database is "userid", and the password is "password":

- The following example command, monitors the database in background mode in three second intervals for sixty minutes and outputs session information in XML format into a file called db2top.xml:

```
db2top -d CUST -n node -u userid -p password -V sv9 -i 3 -b 1
-X -o db2top.xml -m 60
```

- The following example command, monitors the database in background and snapshot collection mode, collecting 10000 samples of session information in XML format. The output binary file is db2snap-CUST-AIX64.bin:

```
db2top -d CUST -n node -u userid -p password -V sv9 -b 1
-x -s 10000 -X -f db2snap-CUST-AIX64.bin
```

- The following example command replays the output capture in the previous example command:

```
db2top -d CUST -f db2snap-CUST-AIX64.bin
```

For more information, refer to the Db2 problem determination using db2top utility at <http://www.ibm.com/developerworks/data/library/techarticle/dm-0812wang/>

db2trc - Trace

The **db2trc** command controls the trace facility of a Db2 instance or the Db2 Administration Server (DAS). When the **db2trc** command runs, the trace facility records information about operations and formats this information into readable form.

Enabling the trace facility, which is OFF by default, might impact the performance of your system. As a result, only use the trace facility when directed by a Db2 technical support representative.

Db2 traces can be especially useful when analyzing recurring and reproducible problems.

When using Db2 database systems, you might on occasion encounter an error message that directs you to "get a trace and call IBM Software Support", "turn on trace and examine the trace record", or to "contact your technical support representative with the following information: problem description, SQLCODE, SQLCA contents (if possible), and trace file (if possible)". Or, when you report a problem to IBM Software Support, you might be asked to perform a trace to capture detailed information about your environment.

Authorization

To trace a Db2 instance on a UNIX operating system, you must possess one of the following authorizations:

- SYSADM
- SYSCTRL
- SYSMAINT

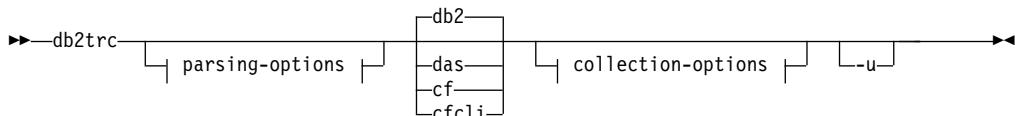
To trace the Db2 Administration Server on a UNIX operating system:

- DASADM

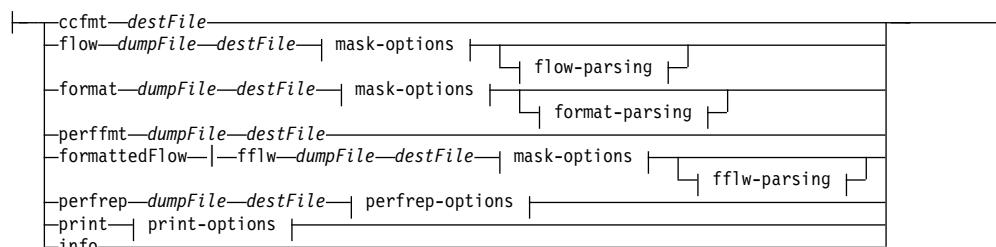
Required connection

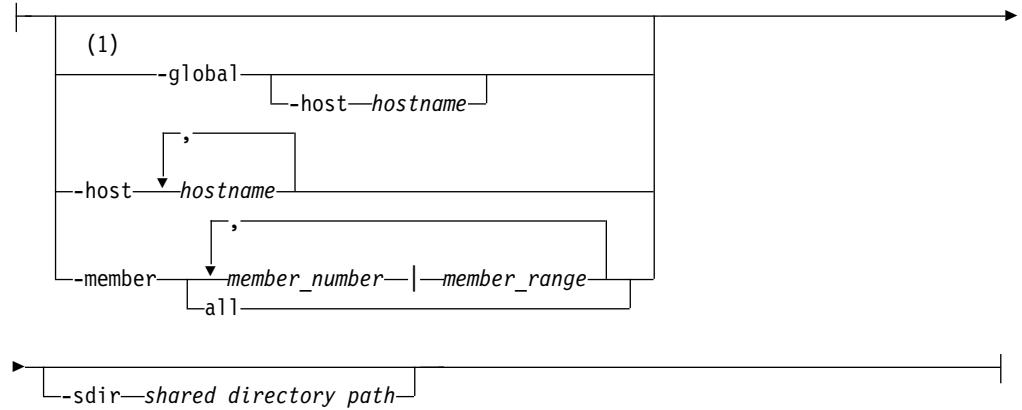
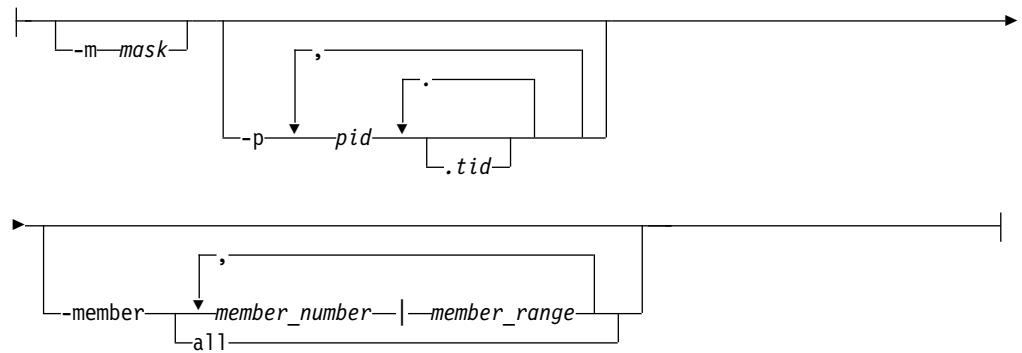
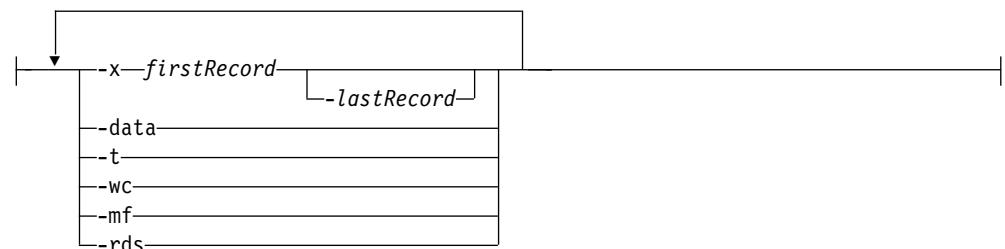
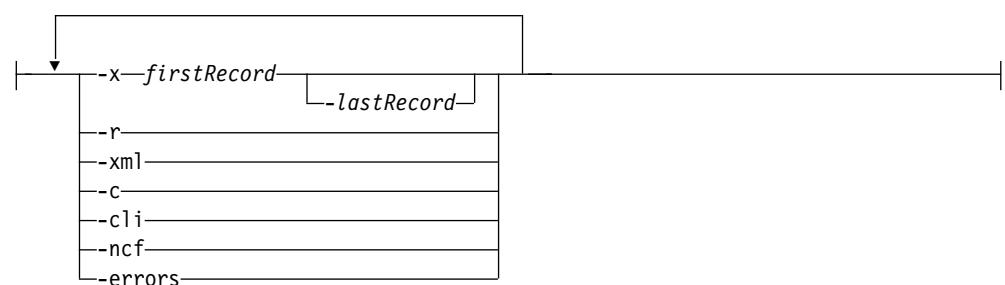
None

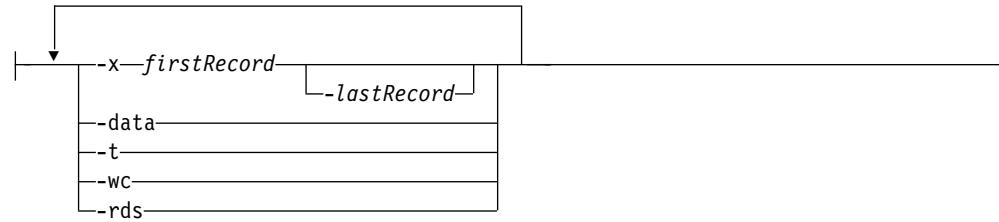
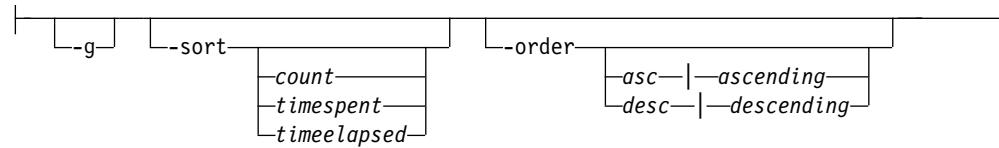
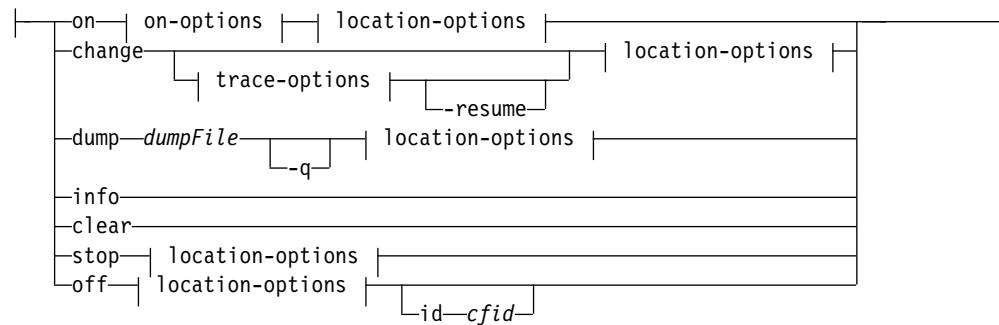
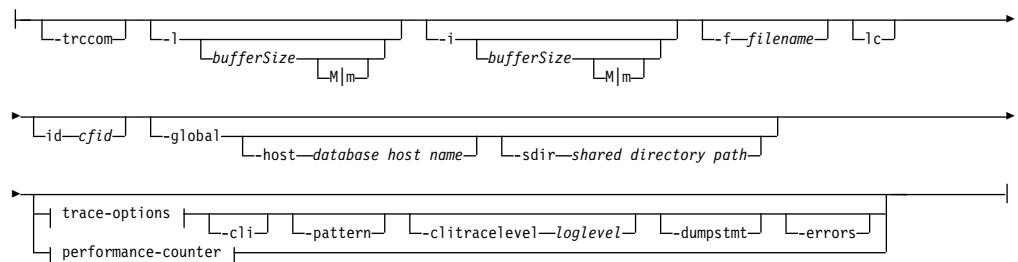
Command syntax

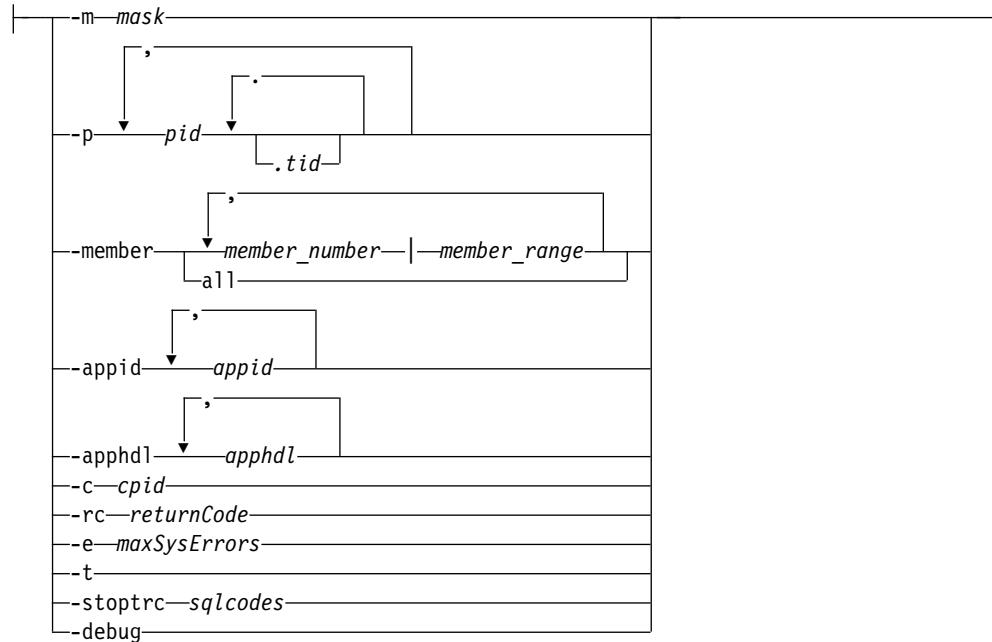


parsing-options:



location-options:**mask-options:****flow-parsing:****format-parsing:**

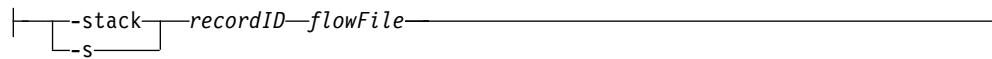
fflw-parsing:**perfrep-options:****collection-options:****on-options:****trace-options:**



performance-counter:



print-options:



Notes:

- 1 The `-global` parameter has been deprecated. You can use the `-member all` parameter options to obtain information globally.

Command parameters

-appid Specifies which application IDs to trace. The `-appid` option works with the `on` and `change` options. `-appid` does not work with the `-perfcount` option.

-apphdl

Specifies which application handles to trace. The `-apphdl` option works with the `on` and `change` options. `-apphdl` does not work with the `-perfcount` option.

-member member_number | member_range

Specifies which database members (or partitions) to trace. If this option is not specified, the command is executed for all logical members on the host where the `db2trc` command is issued. Multiple members can be specified as a comma separated list of `member_number` (member1, member2), or using `member_range`, where `member_range` is a range of members (member1-member3), or using any combination of the first two methods.

all Specifies that the command is issued on all members defined in `db2nodes.cfg`.

The **-member** option works with the **on**, **change**, **format** (both **flow** and **format** options), **stop**, and **off** options. See the following examples 2 and 3 for further details. The **-member** option does not work with the **-perfcount** option.

- db2** Specifies that all trace operations are performed on the Db2 instance. This is the default.
- das** Specifies that all trace operations are performed on the Db2 Administration Server instance.
- cf** Specifies that all trace operations are performed on the CF server. The **-change**, **-clear** and **-stop** options does not work with this option.
- fccli** Specifies that all trace operations are performed on the members.

Note: To enable CF client trace, the environment variable **CA_TRACE_KEY_FILE** must be set to an existing file. This file is used by the CF client library to create a SHARED MEMORY set. This set is used collect the trace data. Additionally the permission and owner information for this file is used to set the permission and ownership of the created SHARED MEMORY. Any process that starts with this environment variable set to the same value will use the same SHARED MEMORY segment. The default name used by Db2 is \${INSTHOME}/sql1ib/tmp/.CF_DB2TRACE.key. This environment variable is set automatically in the db2profile and db2cshrc files. However, if these are not being sourced then you must manually set this value.

Note: The CF client trace buffer cannot exceed 10 MB.

- on** Use this parameter to start the trace facility. See the following *Shared trace-options* section for a list of parameters.

-l [bufferSize]

This option specifies the size and behavior of the trace buffer. **-l** specifies that the last trace records are retained (that is, the first records are overwritten when the buffer is full). The buffer size can be specified in either bytes or megabytes. To specify the buffer size in megabytes, add the character M | m to the buffer size. For example, to start **db2trc** with a 4 MB buffer:

```
db2trc on -l 4m
```

The default and maximum trace buffer sizes vary by operating system. The minimum buffer size is 1 MB. The buffer size must be a power of 2.

-i [bufferSize]

This option specifies the size and behavior of the trace buffer. **-i** specifies that the initial trace records are retained (that is, no more records are written to the buffer once it is full). The buffer size can be specified in either bytes or megabytes. To specify the buffer size in megabytes, add the character M | m to the buffer size.

-f filename

When tracing to a file, you must specify a fully-qualified file name, and if **-l** or **-i** is used with **-f** option, their *buffersize* values limit the size of the file on disk. **-l** preserves the last trace records and is allowed to wrap within the file. **-i** preserves the initial trace records and stops tracing when the file size limit is reached. To

specify the file size in megabytes, add the character M | m, and for gigabytes, add the character G | g after the value specified for **-i** and/or **-l buffersize**.

-cli Trace the CLI/ODBC driver and CLI applications.

-clitracelevel *loglevel*

This parameter is available starting with V11.1 Mod Pack 2 and Fix Pack 2. This parameter controls the logging level of the information dumped to CLI trace for CLI/ODBC driver and CLI applications. This option is ignored if **-cli** is not supplied while trace is being turned on. Possible values *loglevel* can take are [0-3] where each value is defined as follows:

- 0 - Log all the information captured (current default behavior).
- 1 - Do not log data bind-in data that is supplied by the application. Bind in data is the data that is supplied by application to client through API calls like SQLBindParameter(), SQLBindCol(), SQLExtendedBind(), and so forth, via the *rgbValue* application data pointers.
- 2 - Do not log bind-out data that is returned to application. Bind-out data is the data that is returned by the client to application through the application data pointers set by using API calls SQLBindParameter(), SQLBindCol(), SQLExtendedBind(), and so forth, via the *rgbValue* application data pointers.
- 3 - Do not log bind-in data that is supplied by and bind-out data that is returned to application.

The follow example shows the usage of the **-clitracelevel** parameter:

```
db2trc on -cli -clitracelevel 1 -f dumpFile  
db2trc off  
db2trc fmt -cli dumpFile clitrccfile.txt
```

This option is not applicable if **-cli** is not specified while turning on the trace.

-pattern

This parameter is available starting with Version 11.1 Mod Pack 2 and Fix Pack 2. This parameter allow users to log information into the CLI trace based on a search pattern. The option can take multiple search patterns separated by ;(semicolon) character. The multiple search patterns should be enclosed within double quotes. Up to 10 search patterns with not more than a combined 255 characters can be specified with the patterns separated by semicolon character. If there are more than 10 search patterns, only the first 10 search patterns will be considered and others will be ignored. If there are more than 255 characters, an appropriate error will be returned and no action will be taken. This option can be specified only during the collection of the dump file & not during the formatting of the CLI trace from the generated dump file. The search pattern can also have a format as in SELECT%table1. This means, search for the SELECT keyword followed by any character and then followed by table1 keyword. The following examples show the usage of the **-pattern** parameter:

- Example 1

The following command searches for all statements that have the "tab1" pattern. All the information on the statement handle that matched the "tab1" pattern is logged into the dump file.

```
db2trc on -cli -pattern tab1 -f file1.dmp
```

- Example 2

The following command searches for all statements that have the "tab1" or "tab2" pattern. All the information on the statement handle that matched the "tab1" or "tab2" pattern is logged into the dump file. The search will be made for every SQL being prepared or executed, and the first matched pattern will be logged.

```
db2trc on -cli -pattern "tab1;tab2" -f file1.dmp
```

- Example 3

The following command searches for all statements that have the SELECT followed by the "tab1" pattern. All the information on the statement handle that matched the "SELECT" keyword followed by any character, and then followed by the "tab1" keyword will be logged into the dump file.

```
db2trc on -cli -pattern SELECT%tab1 -f file1.dmp
```

This option is ignored if -cli option is not specified while turning on the trace.

-dumpstmt

Obtain the details of all statement handles that were allocated by the CLI driver prior to enabling the Db2 trace. The details include all prepared SQL statements for the allocated statement handles, which were allocated prior to enabling the Db2 trace. You can specify the -dumpstmt option with or without the -cli option. When the -dumpstmt option is specified with the -m option, the masks must include the component 191 (*.*.191.*.) for the -dumpstmt option to take effect.

CLI and ODBC applications must be thread safe and your operating system must support multithreading for the Db2 trace to be enabled with the -dumpstmt option. The -dumpstmt option traces applications that use the CLI driver.

-errors

Trace only errors and nonzero return codes on function exit. You cannot specify this option with the **-debug** or **-perfcount** options.

-lc List all of the valid CF trace components and trace levels for either the CF server or CF client.

-id [cf-id]

The CF server ID as specified in the db2nodes.cfg file. By default the operation is performed against all CF servers. However, if this option has been specified, only the specified CF server will be affected.

-trcom

Display network requests in the CLI/ODBC trace.

-stoptrc [-sqlcodes]

Stops the trace when one of the SQLCODEs specified by *-sqlcodes* is hit. *-sqlcodes* is a comma separated list of up to 20 SQLCODEs that must be specified as signed integers.

change Use the **change** option to change the trace options that are in effect. See the following *Shared trace-options* section for a list of parameters.

-resume

Use this option to resume execution of a suspended process. You cannot resume if **-suspend** was not enabled.

Shared trace-options

Common trace options shared between **on** and **change**.

-m mask

Reduces the amount of data that is collected or formatted. The trace mask has the following format:

types.products.components.functions.categories

Values for the mask are provided by IBM Support.

The mask consists of five parts (trace record types, products, components, functions, and function categories). Each part can consist of comma-separated lists, hyphen separated ranges, or single entries. You can use an asterisk (*) to match anything. You can specify field values by their names or corresponding numbers. You can use short forms of mask that consist of the *products*, *components*, or *functions* part names. Example: **-m "entry,exit.*.SQL0,SQLE.*.*"**

Setting the mask to "***.*.*.*.***" is equivalent to not specifying a mask.

For Db2 pureScale environments, the mask has been overloaded so that tracing of the CF server, CF client, or both can be enabled. The mask is used somewhat differently when dealing with the CF.

You can find the values for the mask by using the **-1c** option. For the CF server and CF client the trace mask pieces have the following meaning:

- *types* is always *
- *products* is either CF or CFCLI (case does not matter)
- *components* is any combination of one or more CF server or CF client components as can be listed by using the **-1c** flag
- *functions* is always * because the CF does not support this feature
- *categories* is any combination of one or more CF server or CF client trace level as can be listed by using the **-1c** flag

Example: **-m "*.*.CF.svr_list.*.CF_TRACE_ERROR,CF_TRACE_ALL"**

-p pid [.tid]

Enables the trace facility only for the specified process IDs (*pid*) and thread IDs (*tid*). The period (.) must be included if a tid is specified. You can specify multiple thread IDs for a process ID. A period separates multiple *tids* for a *pid*. A comma separates each *pid tid* pair. A maximum number 64 *tids* can be paired with a *pid*.

For example, to enable tracing for processes 10, 20, and 30 the syntax is:

```
db2trc on -p 10,20,30
```

To enable tracing only for thread 33 of process 100 and thread 66 of process 200 the syntax is:

```
db2trc on -p 100.33,200.66
```

To enable tracing for process 77 with threads 1, 2, 3, and 4, and for process 88 with threads 5, 6, 7, and 8 the syntax is:

```
db2trc on -p 77.1.2.3.4,88.5.6.7.8
```

-c cpid

Trace or format only this companion process.

-rc returnCode

Treat *returnCode* as a system error. *returnCode* must be specified as a signed integer.

-e maxSysErrors

Stop trace after *maxSysErrors* system errors occurred.

-t

Include timestamps.

-debug

This is an internal option used for debugging purposes by IBM Support. Usage is not recommended.

info The following is an example of environment information listed with this parameter:

```
D:\Program Files\IBM\SQLLIB\BIN>db2trc info
Marker          : @TRACE@
Trace version   :    7.0
Platform        :      NT
Build level     : s060629
maxBufferSize   : 2097152 bytes (2 MB)
auxBufferSize   : 6291456 bytes (6 MB)
allocationCount : 1
DB2TRCD pid    : 2384
DB2TRCD64 pid  : 0
Trace destination: <shared memory buffer>
debug           : disabled
debug runtime passno: 0
numSuspended    : 0
Trace starting time : 2011-03-25-15.03.58.909713-240

Buffer size      : 2097152 bytes (2 MB)
Allow buffer to wrap : yes
Mask             : *.*.*.*.*
Timestamps      : enabled
PID.TID mask    : all
Fixed data mask #1: all
Fixed data mask #2: all
Max system errors: infinite
Treat this rc as sys err: none
Member mask      : none
Application ID mask: none
Application Handle mask : none
```

dump dumpFile

Dumps the binary format trace information, stored in the buffer, to a file. The following command puts the information in the current directory in a file called db2trc.dmp:

```
db2trc dump db2trc.dmp
```

Specify a dump file name with this parameter. The binary format dump file is saved in the current directory unless the path is specified.

-q Quiet mode.

ccfmt *destFile*

Dump and format a code coverage trace. Specify a destination file name for the dump.

flow *dumpFile destFile*

After the trace is dumped to a binary file, format it into a readable text file. Use the **flow** option to format records sorted by process or thread. Specify the name of the dump file and the name of the destination file that will be generated. For example:

```
db2trc flow db2trc.dmp db2trc.flw
```

-x *firstRecord [-lastRecord]*

Only show record numbers *firstRecord* to *lastRecord*.

-data Include any trace record data in the flow.

-t Include timestamps (in sec:nsec format), if available.

-wc Include wall-clock timestamps, if available. To use this option, you must turn trace ON by also specifying the **-t** option which includes the capture of timestamps. For a usage example, see Example 1.

-mf Generate a separate destination file for each distinct flow.

-rds Include RDS operators information, if available.

format *dumpFile destFile*

After the trace is dumped to a binary file, format it into a readable text file. Use the **format** option to format records chronologically.

-x *firstRecord [-lastRecord]*

Only show record numbers *firstRecord* to *lastRecord*.

-r Output in reverse order.

-xml Output data in xml parsable format.

-c Format communications buffers.

-cli Format the trace binary files to show the CLI driver functions and the CLI application buffer in a readable text file. The *destFile* variable can be one of the following objects:

- Name of the formatted trace file that is to be created.

```
db2trc fmt -cli dumpFile clitrcfile.txt
```

- Name of the formatted trace file with the path name.

```
db2trc fmt -cli dumpFile /TMP/clitrcfile.txt
```

- An existing directory where user has write permission.

```
db2trc fmt -cli dumpFile /TMP
```

If the *destFile* directory exists and user has write permission to the directory, the trace is formatted into separate text files that are based on the process ID and thread ID. The trace output of the Db2 trace that is enabled with the **-cli** option and formatted with the **-cli** option is identical to the traditional CLI trace. If you specified **-t** when you started **db2trc**, then the trace will include a time stamp of the following format:

```
[processor_ticks.milliseconds - mm/dd/yyyy hour:min:sec.milliseconds]
```

The names of the trace files in the *destFile* directory consists of *p<pid>t<tid>.cli*. If there is a directory with same name as the *destFile* value and the user does not have write permission to the directory, an error is returned.

-ncf Do not use component custom formatting.

-errors

Trace only errors and nonzero return codes on function exit.

-global

Specifies that **db2trc** is also run on remote hosts. This option is deprecated in Db2 Version 9.7 Fix Pack 4 and later fix packs.

-host *hostname*

Specifies that **db2trc** is run only on the specified host or hosts. If this parameter is not specified, the command is issued on the local host. If multiple hosts are specified, all host names must be valid for the command to complete.

-sdir *shared directory path*

Specifies the shared directory that the **db2trc** command uses to save files applicable to the **-f** and **dump** parameters.

perffmt *dumpFile destFile*

Formats a dump file containing performance counter data into readable text.

formattedFlow | **fflw** *dumpFile destFile*

Formats the trace that is dumped to a binary file into a readable file. The data in this file is sorted in chronological order instead of being grouped by PID and TID, which occurs if you specify the **-flow** parameter.

-x *firstRecord* [-*lastRecord*]

Displays record numbers *firstRecord* to *lastRecord*.

-data Includes any trace record data in the flow.

-t Includes timestamps in *sec:nsec* format, if available.

-wc Includes wall-clock timestamps, if available. To use this parameter, you must turn on the trace by also specifying the **-t** option, which captures timestamps.

-rds Includes Relational Data Services (RDS) operator information, if available.

perfrep *dumpFile destFile*

Formats the trace that is dumped to a binary file into a performance report text file.

-g Groups the output by the combination of the trace's member (node) number, PID, and TID.

-sort *count* | *timespent* | *timeelapsed*

Sorts the output in one of the following ways:

count The number of invocations of each function.

timespent

The time spent in each function. This is the default value.

timeelapsed

The elapsed time spent in each function.

-order asc | ascending | desc | descending
 Specifies the order in which to sort the output data:

asc | ascending
 Ascending order.

desc | descending
 Descending order. This is the default.

print -stack recordID flowFile
 Prints a backtrace of all stack frames for the specified record ID from the specified flow file. See Example 5 for further details.

clear Clears the contents of the trace buffer, particularly just before connecting to a specific database. Use this option to reduce the amount of collected information by clearing the buffers of accumulated useless information before a connection to the wanted database is established.

stop This collection option stops tracing on demand; all processes suspend tracing, but the contents of the trace buffer are preserved so that they can be dumped later. This action is in contrast to the **off** option, which disables the trace facility altogether.

off Disables the trace facility. After the trace is dumped to a file, disable the trace facility by typing:
`db2trc off`

-id [cf-id]
 The CF server ID as specified in the db2nodes.cfg file. By default the operation is performed against all CF servers. However, if this option is specified, only the specified CF server is affected.

-u Provides additional information about most of the command line options. The general form of the command line entry is shown in the following *Usage notes* section. Here is an example to obtain more information about the dump command for the DAS instance:
`db2trc das dump -u`

Examples

Example 1

To capture a trace with wall-clock timestamps included, you must specify the **-t** option when you turn trace ON and you must specify **-t -wc** options with the **flow** option to output the wall-clock timestamps into the readable text file. The following is an example of the steps you can perform:

1. Turn trace ON, capture timestamp information, and specify the dump file name by executing the following command:
`db2trc on -t -f db2trc.dmp`
2. After the trace period has ended, turn trace OFF by executing the following command:
`db2trc off`
3. To format the binary dump (.dmp) file into a readable text file (for example, db2trc.flw), execute the following command:
`db2trc flow -t -wc db2trc.dmp db2trc.flw`

The following is an example of the output displayed when the formatting has been completed:

```

Total number of trace records      : 3349
Trace truncated                  : NO
Trace wrapped                    : NO
Number of trace records formatted : 43 (pid: 5414 tid 182967198368 node: 0)
Number of trace records formatted : 2690 (pid: 29615 tid 182960067008 node: 0)
Number of trace records formatted : 118 (pid: 5394 tid 183102335328 node: 0)
Number of trace records formatted : 498 (pid: 29616 tid 182965078816 node: -1)

```

4. To view the contents of the readable text file db2trc.flw, execute the following command:

```
more db2trc.flw
```

The following is an example of the output displayed when reading the contents of the readable text file containing wall-clock timestamp information:

```

pid = 5414 tid = 182967198368 node = 0

1  0.000000000 clp_bp_con data [probe 21] 2009-06-16-11.02.32.38407400
2  0.000038000 | sqlossig entry 2009-06-16-11.02.32.38411200
3  0.000050000 | sqlossig exit 2009-06-16-11.02.32.38412400
4  0.000057000 | sqlorque2 entry 2009-06-16-11.02.32.38413100
5  0.000062000 | sqlgmb1kEx entry 2009-06-16-11.02.32.38413600
6  0.000070000 | | sqloGetPrivatePoolHandle entry 2009-06-16-11.02.32.38414400
7  0.000077000 | | sqloGetPrivatePoolHandle exit 2009-06-16-11.02.32.38415100
8  0.000088000 | | sqlogmb1kEx mbt [Marker:PD_OSS_ALLOCATED_MEMORY] 2009-06-16-11.02.32.38416200
9  0.000092000 | | sqlogmb1kEx exit 2009-06-16-11.02.32.38416600
10 0.000094000 | | sqlorqueInternal entry 2009-06-16-11.02.32.38416800
11 0.000096000 | | sqloSetAlarmApp entry 2009-06-16-11.02.32.38417000
12 0.000099000 | | | sqloSigMask entry 2009-06-16-11.02.32.38417300
13 0.000101000 | | | sqloSigMask exit 2009-06-16-11.02.32.38417500
14 0.000103000 | | | sqlohsig entry 2009-06-16-11.02.32.38417700
15 0.000105000 | | | sqlohsig exit 2009-06-16-11.02.32.38417900
16 0.000108000 | | | sqloSetAlarmApp exit 2009-06-16-11.02.32.38418200
2825 5.000561000 | | | sqloClearAlarmApp entry 2009-06-16-11.02.37.38463500
2826 5.000576000 | | | | sqloSigMask entry 2009-06-16-11.02.37.38465000
2827 5.000579000 | | | | sqloSigMask exit 2009-06-16-11.02.37.38465300
2828 5.000582000 | | | | sqlohsig entry 2009-06-16-11.02.37.38465600
2829 5.000585000 | | | | sqlohsig exit 2009-06-16-11.02.37.38465900
2830 5.000587000 | | | | sqloClearAlarmApp exit 2009-06-16-11.02.37.38466100
2831 5.000589000 | | | | sqlorqueInternal exit [rc = 0x870F00B9 = -2029059911 = SQL0_SEM_TIMEOUT] 2009-06-16...
2832 5.000592000 | | | | sqlofmb1kEx entry 2009-06-16-11.02.37.38466600
2833 5.000597000 | | | | sqlofmb1kEx mbt [Marker:PD_OSS_FREED_MEMORY] 2009-06-16-11.02.37.38467100
2834 5.000599000 | | | | sqlofmb1kEx exit 2009-06-16-11.02.37.38467300
2835 5.000601000 | | | | sqlorque2 exit [rc = 0x870F00B9 = -2029059911 = SQL0_SEM_TIMEOUT] 2009-06-16-11.02.37.38467500
2836 5.000614000 clp_bp_con data [probe 21] 2009-06-16-11.02.37.38468800
2837 5.000617000 | sqlossig entry 2009-06-16-11.02.37.38469100
2838 5.000620000 | sqlossig exit 2009-06-16-11.02.37.38469400
2839 5.000623000 | sqlorque2 entry 2009-06-16-11.02.37.38469700
2840 5.000626000 | | sqlgmb1kEx entry 2009-06-16-11.02.37.38470000
2841 5.000628000 | | | sqloGetPrivatePoolHandle entry 2009-06-16-11.02.37.38470200
2842 5.000631000 | | | sqloGetPrivatePoolHandle exit 2009-06-16-11.02.37.38470500
2843 5.000636000 | | | sqlogmb1kEx mbt [Marker:PD_OSS_ALLOCATED_MEMORY] 2009-06-16-11.02.37.38471000
2844 5.000638000 | | | sqlogmb1kEx exit 2009-06-16-11.02.37.38471200
2845 5.000640000 | | | sqlorqueInternal entry 2009-06-16-11.02.37.38471400
2846 5.000643000 | | | sqloSetAlarmApp entry 2009-06-16-11.02.37.38471700
2847 5.000646000 | | | | sqloSigMask entry 2009-06-16-11.02.37.38472000
2848 5.000647000 | | | | sqloSigMask exit 2009-06-16-11.02.37.38472100
2849 5.000649000 | | | | sqlohsig entry 2009-06-16-11.02.37.38472300
2850 5.000651000 | | | | sqlohsig exit 2009-06-16-11.02.37.38472500
2851 5.000654000 | | | | sqloSetAlarmApp exit 2009-06-16-11.02.37.38472800

```

Example 2

The following are examples for the use of the -member trace mask

- db2trc on -member n1[,n2,n3,n64]

Use this command to specify which database members or partitions to trace.

Note: Must be an integer number. If multiple members are specified, they must be separated by a comma. You can specify up to 64 members.

- db2trc chg -member n1[,n2,n3,n64]

Use this command to change the member mask to the specified database members or partitions.

- db2trc stop -member n1[,n2,n3,n64]

Use this command to remove members from the member mask. When the last member is removed from the member mask, the trace is fully stopped, which has the same effect as running the **db2trc stop** command.

- The member number issued by this command must exist in the current member mask. Running **db2trc info** displays the current member mask).
- If you run the **db2trc on** command without the **-member** option, there will be no members in the member mask. This means that all members are traced.
- When all members (defined by db2nodes.cfg file) in the current host are specified in this command, it has the same effect as running **db2trc stop**. In this case when running **db2trc stop** without the **-member** option, the trace is fully stopped for all members on that host.
- **db2trc off -member n1[,n2,n3,n64]**
Use this command to remove members from the member mask. When the last member is removed from the member mask, the trace is turned off, which has the same effect as running **db2trc off**.
 - The member number issued by this command must exist in the current member mask. Run **db2trc info** to display the current member mask.
 - If you run the **db2trc on** command without the **-member** option, there will be no members in the member mask. This means that all members are traced
 - When all the members that are defined by the db2nodes.cfg file in the current host are specified in this command, it has the same effect as **db2trc off**. When running **db2trc off** without the **-member** option, the trace is turned off on that host
- **db2trc flw -member n1[,n2,n3,n64] and db2trc fmt -member n1[,n2,n3,n64]**
Use this command to specify which members to include in the formatted trace.

Example 3

The following are examples for the use of the **-member** trace mask with the db2nodes.cfg defined as the following data:

```
0 host1 0  
1 host1 1  
2 host1 2  
3 host2 0  
4 host3 0
```

- **db2trc on[chg] -member 1,2,3**
when **-member** is run the member number is mapped to the related host name, specified by **-member** and then run on the related host by means of the **rah** (or the **db2_all**) command . For this example **db2trc -member 1,2** runs on host1 and **db2trc -member 3** runs on host2.
- **db2trc on -host host1,host2**
db2trc on runs on both host1 and host2
- **db2trc on -member all**
db2trc on runs on host1, host2, and host3

Example 4

The following are examples for the use of the **-appid** and **-apphd1** parameters.

- db2trc on -appid appid1,appid2

This command turns on the trace for specific application IDs. The **db2trc** command with the **-appid** parameter supports up to 12 application IDs.

- db2trc chg -appid appid1,appid2

This command changes or resets the specific application ID. To reset, run the **db2trc chg -appid none** command. This command removes all application IDs in the mask.

- db2trc on -apphd1 apphd11,apphd12,apphd13

This command turns on a trace for the specific application handle. This command supports up to 16 application handles.

- db2trc chg -apphd1 apphd11,apphd12,apphd13

This command changes or resets the specific application handle. To reset, run the **db2trc chg -apphd1 none** command. This command removes all application handles in the mask

Example 5

The following example is a sample flow file **test.flw**:

```
pid = 1608 tid = 47604608002368 node = 0

1    sqlossig entry [eduid 1 eduname db2sysc]
2    sqlossig exit [rc = 0x840F0001 = -2079391743 = SQL0_ACDD]
3    sqkffastcommManager:::ResourceSelfTuning entry [eduid 1 eduname db2sysc]
4    |  sqlogmt entry [eduid 1 eduname db2sysc]
5    |  sqlogmt exit
6    sqkffastcommManager:::ResourceSelfTuning exit
7    sqkffastcommManager:::CollectResourceUsageStats entry [eduid 1 eduname db2sysc]
8    |  sqlogmt entry [eduid 1 eduname db2sysc]
9    |  sqlogmt exit
10   sqkffastcommManager:::CollectResourceUsageStats exit
11   sqkffastcommManager:::UpdateMemoryConsumptionStats entry [eduid 1 eduname db2sysc]
12   sqkffastcommManager:::UpdateMemoryConsumptionStats exit
13   sqleSyscUpdateDynamicVars entry [eduid 1 eduname db2sysc]
14   |  sqloGetSysMonSetting entry [eduid 1 eduname db2sysc]
15   |  |  sqloGetEnvUnCached entry [eduid 1 eduname db2sysc]
16   |  |  |  EnvPrfOpen entry [eduid 1 eduname db2sysc]
17   |  |  |  |  EnvKeyName entry [eduid 1 eduname db2sysc]

18   |  |  |  sqloxltc_app entry [eduid 1 eduname db2sysc]
19   |  |  |  sqloxltc_app exit
20   |  |  |  sqlo GetUserAttribByName data [probe 770]
21   |  |  |  sqlo GetUserAttribByName data [probe 820]
22   |  |  |  sqloxult_app entry [eduid 1 eduname db2sysc]
23   |  |  |  sqloxult_app exit
24   |  |  |  sqlo GetUserAttribByName exit
25   |  |  |  EnvKeyName exit
26   |  |  |  EnvPrfOpen exit
27   |  |  |  sqloGetEnvUnCached exit
28   |  |  |  sqloGetSysMonSetting exit
29   |  |  |  sqleSyscUpdateDynamicVars exit
30
```

To print a backtrace of all stack frames for line 5 from the **test.flw** file, execute the following command:

```
db2trc print -stack 5 test.flw
```

or

```
db2trc print -s 5 test.flw
```

The following is the output that is displayed:

```

pid = 1608 tid = 47604608002368 node = 0
3           sqkfFastCommManager::ResourceSelfTuning entry [eduid 1 eduname db2sysc]
4           | sqlogmt entry [eduid 1 eduname db2sysc]
5           | sqlogmt exit

```

Note that line 18 does not exist in the test.flw file. If the record ID specified does not exist, you will get an error message:

```

$ db2trc print -stack 18 test.flw
ERROR: Unable to find the Record ID 18 . Exiting.

```

See the command syntax diagram for global option command syntax information. See Example 4 in the following CF and CFCLI usage examples section for further details.

CF and CFCLI usage examples

Example 6

To turn a trace ON for the xport_common (CF_TRACE_WARNING), srv_init (CF_TRACE_PATH|CF_TRACE_ERROR), and srv_common (CF_TRACE_ALL) components, run the following command:

```

db2trc cf on -m "*.*.CF.xport_common,srv_init,srv_common.*.CF_TRACE_WARNING,
0x09,CF_TRACE_ALL"

```

After running the command, trace is OFF for all other components.

Example 7

To turn trace ON for all CF client components at the CF_TRACE_ALL level, run the following command:

```

db2trc cfcli on

```

Example 8

To turn trace ON for the srv_list (CF_TRACE_ERROR) component and all the other components at the CF_TRACE_ALL level, run the following command:

```

db2trc cf on -m "*.*.CF.srv_list.*.CF_TRACE_ERROR,CF_TRACE_ALL"

```

Example 9

To turn trace ON for all CF components at the CF_TRACE_WARNING or CF_TRACE_DEBUG level, run the following command:

```

db2trc cf on -m "*.*.CF.*.*.CF_TRACE_WARNING|CF_TRACE_DEBUG"

```

Example 10

To turn trace ON for all CF servers listed in the db2nodes.cfg file and all the CF components at the CF_TRACE_ALL level, run the following command:

```

db2trc cf on

```

Example 11

To turn trace ON for only CF server 129 listed in the db2nodes.cfg file and all the CF components at the CF_TRACE_ALL level, run the following command:

```

db2trc cf on -id 129

```

Example 12

The following example shows the usage of the **perfrep** parameter:

1. Turn on the trace by issuing the following command:

```

db2trc on -t

```

2. Perform Db2 operations, for example, by issuing the following command:

db2start

3. To dump the trace information to a binary file, issue the following command:

db2trc dump db2trc.dmp

4. To format the binary file into readable output that is grouped by member number, PID, and TID, issue the following command:

db2trc perfrep -g db2trc.dmp db2trc.perfrep

Sample output is as follows:

Node : 0 , PID : 12648456 , TID : 258

nCalls	TotalElapsed	AvgElapsed	TotalSpent	AvgSpent	FunctionName
2	22.163451643	11.081725821	22.163444161	11.081722081	sqlorqueInternal
3	0.097682328	0.032560776	0.097682328	0.032560776	OSSHLibrary::load
1	0.015628456	0.015628456	0.015579146	0.015579146	sqlnlsgetcpc
1	0.015929874	0.015929874	0.010516227	0.010516227	sqloruninstance
1	0.007650045	0.007650045	0.006686877	0.006686877	sqloexec
1	0.004468380	0.004468380	0.004468380	0.004468380	sqlosearchpath
1	0.004469429	0.004469429	0.002867957	0.002867957	sqlwatchdogSetup
2	0.049929905	0.024964952	0.002643447	0.001321724	pdloginternal
10	0.002660025	0.000266002	0.002576667	0.000257667	sqloggetUserAttribByName
3	0.002527244	0.000842415	0.002504231	0.000834744	sqloopenp
2	0.001962144	0.000981072	0.001932671	0.000966335	sqloggetUserAttribById
5	0.001829002	0.000365800	0.001344719	0.000268944	GlobalReg::GlobalReg
15	0.001569204	0.000104614	0.001109852	0.000073990	sqlogmblkEx
1	0.044276370	0.044276370	0.000982115	0.000982115	ossGetCPUInfo
1	22.178500518	22.178500518	0.000686105	0.000686105	sqlewatchdog
3	0.000667789	0.000222596	0.000667789	0.000222596	sqlogAddOneReservedHandle
40	0.000720231	0.000018006	0.000604822	0.000015121	GlobalReg::UnpackRecord
5	0.002412400	0.000482480	0.000589444	0.000117889	GenRegBin::GetNext

[....]

Node : 0 , PID : 11731144 , TID : 2

nCalls	TotalElapsed	AvgElapsed	TotalSpent	AvgSpent	FunctionName
1	18.300280961	18.300280961	18.300280961	18.300280961	sqloalarmThreadEntry
1	18.301955934	18.301955934	0.000651340	0.000651340	sqloEDUEntry
10	0.000346784	0.000034678	0.000216876	0.000021688	sqlogmblkEx
1	0.000475853	0.000475853	0.000161166	0.000161166	sqlo_create_init_EDU_data
10	0.000157996	0.000015800	0.000140807	0.000014081	sqlofmblkEx
1	0.000178087	0.000178087	0.000124753	0.000124753	sqloGetShrEDUWaitElem
1	0.000129908	0.0000129908	0.000081576	0.000081576	SMemBasePool::getNewChunkSubgroup
1	0.000200591	0.0000200591	0.000047364	0.000047364	sqlo_destroy_EDU_data
1	0.000045839	0.000045839	0.000045839	0.000045839	sqlo_waitlist::post
1	0.000031140	0.000031140	0.000024636	0.000024636	SMemSet::getChunksFromTree
1	0.000033143	0.000033143	0.000018288	0.000018288	sqloFreeShrEDUWaitElem
2	0.000016570	0.000008285	0.000016570	0.000008285	sqloMemProtEDU_init
2	0.000013807	0.000006904	0.000013807	0.000006904	SqlMemController::updateCachedMemory
1	0.000059408	0.000059408	0.000013568	0.000013568	sqloPostEDUWaitPost
1	0.000017188	0.000017188	0.000011827	0.000011827	SMemSet::returnContiguousChunks
2	0.000011225	0.000005613	0.000011225	0.000005613	sqlogmt2

[....]

Example 13

The following example shows the usage of the **formattedFlow** parameter:

1. Turn on the trace by issuing the following command:

db2trc on -t

2. Perform Db2 operations, for example, by issuing the following command:

db2start

3. To dump the trace information to a binary file, issue the following command:

db2trc dump db2trc.dmp

4. To format the binary file into a readable report, issue the following command:

db2trc fflw db2trc.dmp db2trc.fflw

Sample output is as follows:

PID-TID	EduName	Node	RecNum	Function
[...]				
12648456-258	db2wdog	[0]	19735	cryptContextInit entry
12648456-258	db2wdog	[0]	19736	cryptContextInit data [probe 10]
12648456-258	db2wdog	[0]	19737	cryptContextInit data [probe 100]
12648456-258	db2wdog	[0]	19738	cryptContextInit exit
12648456-258	db2wdog	[0]	19739	sqloWatchDogSetup data [probe 2]
12648456-258	db2wdog	[0]	19740	sqloWatchDogSetup exit
12648456-258	db2wdog	[0]	19741	sqlogmblkEx entry
12648456-258	db2wdog	[0]	19742	sqloGetPrivatePoolHandle entry
12648456-258	db2wdog	[0]	19743	sqloGetPrivatePoolHandle exit
11731144-258	db2sysc	[0]	19744	sqloGetEnvInternal entry
11731144-258	db2sysc	[0]	19745	sqloGetEnvInternal exit [rc = 0x870F0104 = -2029059836 = RC_ENV_NOT_FOUND]
12648456-258	db2wdog	[0]	19746	sqlogmblkEx mbt [Marker:PD_OSS_ALLOCATED_MEMORY]
12648456-258	db2wdog	[0]	19747	sqlogmblkEx exit
11731144-258	db2sysc	[0]	19748	sqloSystemControllerMain entry
11731144-258	db2sysc	[0]	19749	sqloChangeProcessName entry
11731144-258	db2sysc	[0]	19750	sqloChangeProcessName data [probe 5]
11731144-258	db2sysc	[0]	19751	sqloChangeProcessName exit
11731144-258	db2sysc	[0]	19752	sqloGetShrEDUWaitElem entry
11731144-258	db2sysc	[0]	19753	sqlo_waitlist::initialize entry
11731144-258	db2sysc	[0]	19754	sqlo_waitlist::initialize exit
11731144-258	db2sysc	[0]	19755	sqlogmblkEx entry
11731144-258	db2sysc	[0]	19756	sqlogmblkEx mbt [Marker:PD_OSS_ALLOCATED_MEMORY]
11731144-258	db2sysc	[0]	19757	sqlogmblkEx exit
11731144-258	db2sysc	[0]	19758	sqloGetShrEDUWaitElem data [probe 10]
11731144-258	db2sysc	[0]	19759	sqloGetShrEDUWaitElem data [probe 20]
11731144-258	db2sysc	[0]	19760	sqloGetShrEDUWaitElem exit
12648456-258	db2wdog	[0]	19761	sqloRunInstance data [probe 2]
12648456-258	db2wdog	[0]	19762	sqloRunInstance exit
11731144-258	db2sysc	[0]	19763	sqloGetKernelThreadIDFromEDUID entry [eduid 258 eduname db2sysc]
[...]				

Usage notes

You must issue the **db2trc** command several times in the course of conducting a trace.

1. Turn tracing on, which immediately begins the collection of the specified data and storage of it in the buffer after the Db2 instance is started
2. Clear the buffer before connecting to the database
3. Dump the binary format data into a dump file
4. Turn tracing off
5. Format the dump file into an easily readable text destination file

If you are tracing to a memory with the **-1** parameter, the trace buffer might be set to a value that is smaller than the trace value that is specified. Once set, the trace buffer that is allocated cannot be changed to a larger value while Db2 libraries are still loaded in the operating system. The following steps can be used to increase the maximum trace buffer size.

1. Stop the Db2 instance
2. Turn tracing on with the **-1** parameter and set the maximum trace buffer size
3. Start the Db2 instance
4. Clear the trace buffer

The following example shows the commands that you can run to conduct a trace of the SAMPLE database, with the contents of the trace buffer written to the dmp file:

```
db2trc on -i 8m -m "*.*.2.*.*" -t
db2start
db2trc clear
db2 connect to sample
db2trc dump dmp
db2trc off
```

Note: On Windows operating systems, the **db2trc** command traces all Db2 instances that belong to the same installed copy. On Linux and Unix operating systems, Db2 instances can be traced individually.

The general syntax of the **db2trc** command is shown in the following example. The command options can be grouped into two broad stages: collection and parsing.

- *Collection* options include turning a trace on or off, specifying the trace buffer size, specifying or changing trace options, dumping a trace, and clearing the trace buffer.
- *Parsing* options include sorting the formatted trace records chronologically, by process, or by thread.

STAGE #1 - COLLECTION

Usage: db2trc [facility] <command> [-u]

```
[facility]
    db2 - Db2 instance (default)
    das - Db2 Administration Server instance

<command>
    change - Change trace options
    clear  - Clear the trace buffer
    dump   - Generate trace dump file
    info   - Information
    off    - Disable the trace facility
    on     - Enable the trace facility
    stop   - Stop tracing
```

STAGE #2 - PARSING

Usage: db2trc <command> [-u]

```
<command>
    ccfmt   - Dump and format a code coverage trace
    flow    - Generate control flow diagram
    format  - Format
    info    - Information
    perffmt - Format a performance trace
```

For more information add the "-u" option to any of the above commands

In Stage #2 - Parsing the preceding section, the command **ccfmt** dumps and formats a *code coverage trace*. The code coverage trace is an extension of **db2trc** that keeps a count of function entries, exits, probe points, and codepaths. You can use the code coverage trace to gather statistics on which functions are being heavily used, or which functions are not being touched during tests.

When tracing the database server, it is recommended that the trace facility be turned on before starting the database manager. This is the most reliable method for the database manager, running on any UNIX and Linux platform, to be immediately aware of trace changes.

To turn tracing ON and receive information specific to Db2 Text Search, a mask with component code for cie (155) can be used:

```
db2trc on -m "*.*.155.*.*"
```

When the specific database partitions involved in a problem are known, only trace that database partition. Use the option, **db2trc on -member NN**, to specify which database partitions to trace.

When the problem is related to a specific application ID, you are able to limit trace only to that specific application ID by using the db2trc option **db2trc** on **-appid <appID>**.

db2trcoff - Trace OFF options for db2trc

The **db2trcoff** command issues the **db2trc** command with the **off** option. This command makes it easy to generate the dump, flow, and format files by you having to execute less commands than if you were to use the **db2trc** command.

The **db2trcoff** command supports all the parameters of the **db2trc** command.

Authorization

To trace a Db2 instance on a UNIX operating system, you must possess one of the following authorizations:

- *sysadm*
- *sysctrl*
- *sysmain*

To trace the Db2 Administration Server on a UNIX operating system:

- *dasadm*

Command syntax

```
►—db2trcoff—[—f1w] [—fmt] [—help]—►
```

Command parameters

-f1w

Generates a trace flow report. The name of the flow files are **db2trcoff.<time-stamp>.f1w**. The value of **<time-stamp>** has the following format, hours_minutes_seconds.

-fmt

Generates a trace format report. The name of the format files are **db2trcoff.<time-stamp>.fmt**. The value of **<time-stamp>** has the following format, hours_minutes_seconds.

-help

Displays help information.

Example

To turn the **db2trc** command off and generate both format and flow files, issue:
db2trcoff -f1w -fmt

Usage notes

The **db2trcoff** command always generates a dump file. The name of the dump file is **db2trcoff.<time-stamp>.dmp**. The value of **<time-stamp>** has the following format, hours_minutes_seconds.

db2trcon - Trace ON options for db2trc

The **db2trcon** command issues the **db2trc** command with the **on** option.

This command has several options which helps with using the **db2trc** command. The **db2trcon** command can issue the **db2trc** command for a period of time and it can also issue the **db2trc** command to be turned on for the top CPU consuming EDUs.

The **db2trcon** command supports all the parameters of the **db2trc** command.

Authorization

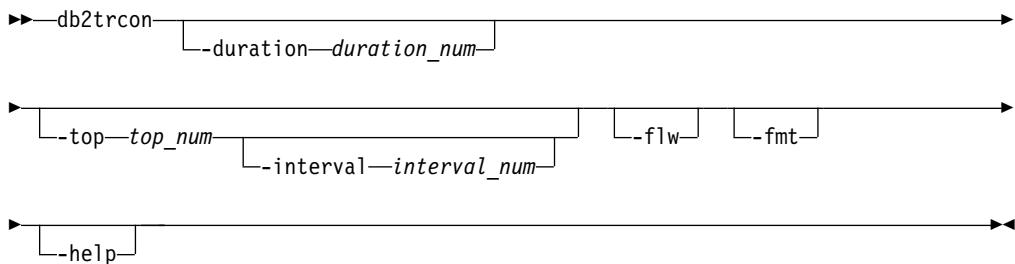
To trace a Db2 instance on a UNIX operating system, you must possess one of the following authorizations:

- *sysadm*
- *sysctrl*
- *sysmaint*

To trace the Db2 Administration Server on a UNIX operating system:

- *dasadm*

Command syntax



Command parameters

-duration *duration_num*

Specifies that trace is turned on for the specified time in seconds.

-top *top_num*

Specifies that trace is turned on for the top CPU consuming EDUs. The maximum number of EDUs for which the trace can be enabled for is 64.

-interval *interval_num*

Specifies the time period in seconds for collecting the top CPU consuming EDUs. If this option is not specified the default time period is 10 seconds.

-f1w

Generates a trace flow report. The name of the flow files are db2trcon.<time-stamp>.f1w. The value of <time-stamp> has the following format, hours_minutes_seconds.

-fmt

Generates a trace format report. The name of the format files are db2trcon.<time-stamp>.fmt. The value of <time-stamp> has the following format, hours_minutes_seconds.

-help

Displays help information.

Examples

The following example turns the **db2trc** command on for 1 minute:

```
db2trcon -duration 60
```

To turn the **db2trc** command on for the top 10 CPU consuming EDUs for the default time period of 10 seconds and to place the trace in **tmpDump.dmp**, issue:

```
db2trcon -top 10 -f tmpDump.dmp
```

The following example turns the **db2trc** command on for 45 seconds for the top 5 processor time consuming EDUs, collected in 15 second intervals. When the **db2trc** command is turned off, **db2trcon** generates the dump, flow and format files.

```
db2trcon -duration 45 -top 5 -interval 15 -fodc -ff
```

Usage notes

The **db2trcon** command always generates a dump file if issued with the **-duration** parameter. The **db2trcon** command also always generates a trace dump file if it is issued without the **-f** parameter from the **db2trc** command. The name of the dump file is **db2trcon.<time-stamp>.dmp**. The value of **<time-stamp>** has the following format, hours_minutes_seconds.

db2unins - Uninstall Db2 database products, features, or languages

Uninstalls one or more Db2 database products, features, or languages.

db2unins can be found both in the installation media and in a Db2 install copy on the system. If run from the installation media, only the **-f**, **-l**, **-t** and **-?** parameters can be used. If run from a Db2 install copy, all the options except **-f** can be used.

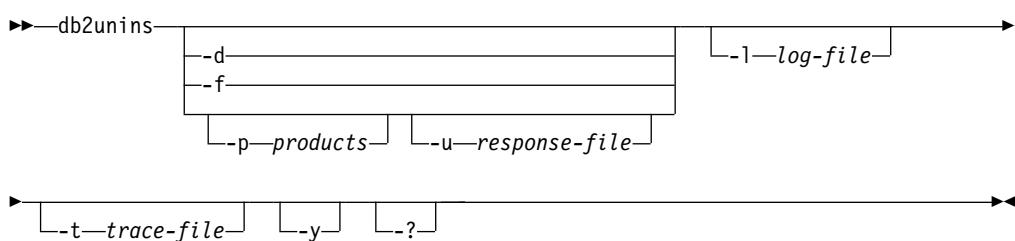
Authorization

SYSADM

Required connection

None

Command syntax



Command parameters

Note:

On Windows operating systems, the **db2unins** command can use the / or - switch symbols interchangeably.

Running the **db2unins** command without any of the -?, -d, -p or -u parameters will result in the removal of all Db2 database products under the current installation directory.

-d Displays the products that are installed in the current Db2 copy on the system. This option is only available when executed from an installed copy of a Db2 database product.

-f Performs a brute force uninstallation of all Db2 database products on the system. The **db2unins -f** command can only be issued from the installation media. Your system will reboot when you successfully issue **db2unins -f**. It can only be issued if there are no other Db2 products before version 9 installed on the system.

-p products

Specifies the products to be uninstalled. This parameter is only available when run from an installed Db2 copy. To uninstall multiple products, separate a list of products by a semicolon and enclosed in double quotation marks. When both parameters **-p** and **-u** are specified, the products specified in **-p** override the products specified in the response file. For example, db2unins -p "SERVER;QP" -u db2un.rsp uninstalls both Db2 SERVER and QP regardless of the **REMOVE_PROD** keyword value in db2un.rsp.

-u response-file

Performs an uninstallation of products, features, or languages based on what is specified in the response file. For example, db2unins -u db2un.rsp. This parameter is only available when run from an installed Db2 copy. If both parameters **-p** and **-u** are specified, the Db2 products specified in the **-p** parameter override the **REMOVE_PROD** keyword in the response file.

If you have a clustered environment, before uninstalling your Db2 product using a response file, you must first run the **db2mscs** command, with the **-u** option, from the same server that originally ran the **db2mscs** command to create the failover infrastructure. For details, see the **db2mscs** command.

-l log-file

Specifies the location of the log file. The default log file location is My Documents\DB2LOG\db2un_<timestamp>.log.

-t trace-file

Turns on the trace functionality. The trace file will be used for debugging problems with the **db2unins** command.

-y Ensures that no confirmation is done during the uninstallation process.

-? Displays help for the **db2unins** command.

Usage notes

- On Windows operating systems, a file named db2unins can be found in the root directory of the installation image, as well as, installed under the installation path *installPath\BIN*. However, although they have the same filename, these

files are not the same and behave differently. Do not perform a copy and paste operation of the file from the installation image to the installation path directory. If you do, problems will occur.

- On Windows operating systems, when specifying the full path, the path name must be contained within double quotation marks.
- If you want to use **db2unins -f** to manually remove all the Db2 database products on the system, you should use the utility from the version which is equal to the highest Db2 product version on the system. For example, if you have two copies installed, DB2COPY1 which is Db2 V9.1 and DB2COPY2 which is Db2 V9.5, run **db2unins -f** to remove both Db2 versions from the Db2 V9.5 product image. If you run **db2unins -f** from the Db2 V9.1 product image, it will not clean the machine completely.
- If there are instances that are clustered with Microsoft Cluster Service (MSCS), you can uncluster the instance by issuing the **db2mscs** or **db2iclus** command before uninstallation.

db2untag - Release container tag

Removes the Db2 tag on a table space container.

The tag is used to prevent Db2 from reusing a container in more than one table space. Displays information about the container tag, identifying the database with which the container is associated. Useful when it is necessary to release a container last used by a database that has since been deleted. If the tag is left behind, Db2 is prevented from using the resource in future.

Attention: This tool should only be used by informed system administrators.

Authorization

The user needs read/write access to the container for a table space that is owned by the ID that created the database.

Required connection

None

Command syntax

►—db2untag—[**-f**]—*filename*—————►

Command parameters

-f Indicates that the **db2untag** command will not prompt to confirm the operation on the filename. This option should be used with care as it will untag the filename without any prompt or confirmation.

filename

Specifies the fully qualified name of the table space container from which the Db2 tag is to be removed.

Usage notes

An SQLCODE -294 (Container in Use error) is sometimes returned from create database or from create or alter table space operations, usually indicating a

specification error on the operating system resource name when the container is already in use by another table space. A container can be used by only one table space at a time.

A system or database administrator who finds that the database which last used the container has been deleted, can use the **db2untag** tool if the container's tag was not removed. If the container is to be released, perform one of the following actions:

- For SMS containers, remove the directory and its contents using the appropriate delete commands.
- For DMS raw containers, either delete the file or device, or let **db2untag** remove the container tag. The tool will leave such a DMS container otherwise unmodified.

db2updserv - Show product updates

Shows the product updates and enhancements available for Db2 database products. On Windows, the output from this command goes to a Web page, on UNIX, it goes to a Java application .

Authorization

None

Required Connection

Internet connection required.

For UNIX and Linux systems, if you connect to the internet through an HTTP proxy server, you must specify your HTTP proxy server host name and port in the *DB2DIR</varname>/java/jdk64/jre/lib/net.properties* file before you run the **db2updserv** command. For more information, see the Usage Notes section.

Command Syntax

►—db2updserv—————►

Command parameters

None

Usage notes

- For UNIX and Linux systems only:

When using an HTTP proxy server, you must set your HTTP proxy host name and port in a properties file before you can use the **db2updserv** command. To set up your HTTP proxy server host name and port, edit the *DB2DIR/java/jdk64/jre/lib/net.properties* file, where *DB2DIR* is the location where the current version of the Db2 database product is installed. Edit the file to include the following parameters:

*http.proxyHost=host name
http.proxyPort=port number*

Where *host name* is the host name of your HTTP proxy server and *port number* is the port number for your HTTP proxy.

For example:

```
http.proxyHost=proxy.mycompany.com  
http.proxyPort=80
```

If other Java applications need to connect to other servers directly and not through an HTTP proxy server, than specify the server host names in the nonProxyHosts parameter.

db2updv111 - Update database to Version 11.1 fix pack

Updates the database system catalog to support the fix pack you have installed. This command can be used only on a database running Db2 Version 11.1 Fix Pack 1 or later on Linux, UNIX or Windows.

Authorization

SYSADM

Required connection

Database. The command automatically establishes a connection to the specified database.

Command syntax

```
►—db2updv111—d—database name—  
                  |—u—userid—p—password—|—a—  
                  |—o—|—h—►
```

Command parameters

-d *database name*

Specifies the name of the database to be updated.

-u *userid*

Specifies the user ID.

-p *password*

Specifies the password for the user.

-a

Forces all updates to be run.

-o

Enables Oracle data dictionary-compatible views

-h

Displays help information. When this option is specified, all other options are ignored, and only the help information is displayed.

Example

After installing Version 11.1 Fix Pack 1 or later, update the database system catalog in the SAMPLE database by issuing the following command:

```
db2updv111 -d sample
```

If your databases were created or upgraded to Db2 Version 11.1 GA and you applied Db2 Version 11.1 Fix Pack 1 or later, then running the above command will automatically apply all updates required from Version 11.1 GA up to and including the fix pack level that you are installing.

Usage notes

Before issuing the **db2updv111** command, you must commit the fix pack update. Committing the fix pack update puts the instance in a homogeneous state. If the fix pack update is not committed, issuing the **db2updv111** command returns an error because the instance is in heterogeneous state.

The instance must be in homogeneous state before issuing the **db2updv111** command. If the instance is in heterogeneous state, issuing this command returns an error. For more details, see “Database and instance operations affected by an online fix pack update in progress” in *Installing Db2 Servers*.

In a partitioned database environment, you must run this command from the catalog partition.

For improved performance, the **db2updv111** command only apply updates that are required in order to make the databases appear as if they were created at the fix pack level that you are installing. Thus, if the command is issued more than once, no errors are reported and each of the system catalog updates is applied only once. However, if you wish to forcefully reapply all of the updates, you may do so by appending the **-a** parameter.

Updates to the system catalogs include the following:

- Creation of any new procedures available in the fix pack level that you are installing.
- Alteration of routines to correct the definition.
- Alteration of system administrative views to the correct definition.

db2val - Db2 copy validation tool

Verifies the basic functions of a Db2 copy by checking the state of installation files, instance setup, and local database connections.

Authorization

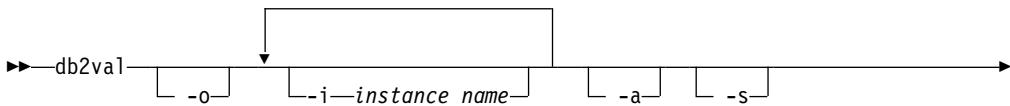
Instance validation requires one of the following authorities:

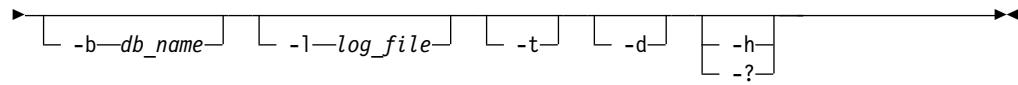
- On root copies, root authority is required on Linux and UNIX operating systems.
- SYSADM plus one of the following authorities:
 - Instance owner
 - Root access on Linux and UNIX operating systems, or Local Administrator authority on Windows operating systems

Required Connection

None.

Command syntax





Command parameters

- o** Specifies that only the installation files will be validated; validation of the instance, database, and extended security will not be performed. If this parameter is specified, the **-i**, **-a**, **-b**, and **-s** parameters are ignored.
- i *instance_name*** Specifies the name of the instance to validate including pureScale instance. To specify multiple instances are to be validated, specify this parameter multiple times. For example, **-i inst1 -i inst2**. On Windows operating systems, if this parameter is not specified, the current instance will be used as the default value. On Linux and UNIX operating systems, this parameter can only be used by root users in a root installation of a Db2 copy.
- a** Validates all instances in the Db2 copy. On Linux and UNIX operating systems, this parameter can only be used by root users in a root installation of a Db2 copy. This parameter overrides parameter **-i**.
- b <db_name>** Validates database creation and connections to the database specified. Only active Db2 instances will be validated and this parameter will be ignored for Db2 client and Db2 pureScale instances.
- t <trace_file>** This parameter applies only to Linux and UNIX operating systems. Specifies the full path and name of trace file specified by **trace_file**.
- d** This parameter is deprecated and might be removed in a future release. Use the **-t** parameter instead. Valid only on Linux and UNIX operating systems. Use this parameter only when instructed by Db2 Support. Turns the debug mode on.
- s** Starts the Db2 database manager for the specified instance that is part of a partitioned database environment.
- l <log_file>** Writes the log to the file name specified. Unless the **-l** parameter is specified, the default log path on Linux and UNIX operating systems is **/tmp/db2valxx.log** and on Windows operating systems is **My Documents\DB2LOG\db2valxx.log**, where **xx** is a generated value.
- ? | -h** Displays usage information for the **db2val** command.

Examples

To validate the instance TEST1 and the database DATA1, run the following command:

```
db2val -i TEST1 -b DATA1
```

To validate all the instances for the Db2 copy, run the following command:

```
db2val -a
```

To validate only the Db2 installation files, run the following command:

```
db2val -o
```

Usage Notes

In a Db2 pureScale environment, use "db2val -o" to validate installation files. Other options are not supported.

db2xdbmig - Migrate XSR objects

Migrates all XML schema repository (XSR) objects that are enabled for decomposition to the current version and service level of the Db2 copy where you are running the command.

This command is located in the *DB2DIR/bin* directory, where *DB2DIR* represents the installation location where the current version of the Db2 database system is installed.

Authorization

CREATE, ALTER and DROP privileges on all of the XSR objects in the database.

Command syntax

```
►►—db2xdbmig—database-alias—►►
```

Command parameters

database-alias

Specifies the alias of the database that contains the XSR objects.

Usage notes

- The **db2xdbmig** command affects only decomposition-enabled XML schemas.
- When migrating to Db2 Version 9.7 from a Db2 Version 9.1 GA or Fix Pack 1 copy, the **UPGRADE DATABASE** command implicitly runs the **db2xdbmig** command. You do not need to run this command in Db2 Version 9.7.

db2xprt - Format trap file

Formats the Db2 database binary trap files into a human readable ASCII file.

Trap files (*.TRP) are located in the instance directory (**DB2INSTPROF**) by default or in the diagnostic data directory path if the **diagpath** database manager configuration parameter is set. It can be found under the SQLLIB/BIN directory. The **db2xprt** command uses Db2 symbol files (.PDB) in order to format the trap files.

Authorization

You must have access to the **diagpath** directory.

Command syntax

```
►►—db2xprt [ /p—path ] [ /n ] —infile —[ /v ] —outfile—►►
```

Command parameters

/p path

A semicolon (;) separated path that points to the location or locations where the binary files and PDB files are located.

/v Displays version information.

/n Formats data without regard to line number information.

infile Specifies the input file.

outfile Specifies the output file.

Examples

If a trap file called DB30882416.TRP had been produced in your **diagpath**, you could format it as follows:

```
db2xprt DB30882416.TRP DB30882416.FMT
```

disable_MQFunctions - Disable WebSphere MQ functions

Disables the use of Db2 WebSphere MQ functions for the specified database.

Authorization

one of the following authorities:

- SYSADM
- DBADM
- IMPLICIT_SCHEMA on the database, if the implicit or explicit schema name of the function does not exist
- CREATEIN privilege on the schema, if the schema name, DB2MQ or DB2MQ1C exists

Command syntax

```
►►—disable_MQFunctions—n—database—u—userid—p—password—————→  
►—————v—————  
|—————a11—————  
|—————0pc—————  
|—————1pc—————
```

Command Parameters

-n database

Specifies the name of the database.

-u userid

Specifies the user ID used to connect to the database.

-p password

Specifies the password for the user ID.

-v Optional. This is used for transactional and non-transactional user-defined function support. The values can be either a11, 0pc, or 1pc. When you specify 0pc, the disablement deletes from schema db2mq. If you specify 1pc, then the disablement deletes from schema db2mq1c. If you specify

all, then the disablement deletes from both schemas (db2mq and db2mq1c). If you do not specify this option, the disablement defaults to the all option.

Example

In the following example, DB2MQ and DB2MQ1C functions are disabled for the database SAMPLE.

```
disable_MQFunctions -n sample -u user1 -p password1
```

doce_deinstall - Uninstall Db2 Information Center

Uninstalls the Db2 Information Center that is in the same install path as the **doce_deinstall** tool. This command is only available on Linux operating systems.

The **doce_deinstall** command is located at *DB2DIR/install1*, where *DB2DIR* is the location where the current version of the *Db2 Information Center* is installed. The **doce_deinstall** command is also available from the DOCE DVD. If run from the DVD, the **doce_deinstall** command requires a **-b** option.

Authorization

Root user authority

Required Connection

None

Command syntax

```
►►doce_deinstall—a[—b—installpath] [—l—log-file]  
►[—t—trace-file] [—r—response_file] [—h]  
►[—?]
```

Command parameters

-a Removes the Information Center from its current location.

-b This option is valid if the command is run from the Db2 database product media. It specifies the absolute path where the Db2 database product was installed and will be uninstalled. The command will prompt for the path if the option is not specified.

-l log-file

Specifies the log file. The default log file is */tmp/doce_deinstall.log\$\$*, where *\$\$* is the process ID.

-t trace-file

Turns on the debug mode. The debug information is written to the file name specified as *trace-file*.

-r response_file

Removes the Information Center using a response file. For example, *doce_deinstall -r db2un.rsp*. Cannot be combined with the **-a** parameter.

-h | -?

Displays usage information.

Example

To uninstall a Db2 Information Center that is installed in /opt/ibm/db2/doce, issue:

```
cd /opt/ibm/db2/doce  
doce_deinstall -a
```

doce_install - Install Db2 Information Center

Installs the Db2 Information Center. If no path is specified, the Db2 Information Center is installed by default in /opt/ibm/db2ic/V11.1. This command applies only to the Linux operating systems.

Authorization

Root user authority

Required Connection

None

Command syntax

```
►—doce_install— [—b—install-path] [—p—product]  
► [—c—image-location] [—n] [—L—language] [—l—log-file]  
► [—t—trace-file] [—h]  
[—?]
```

Command parameters

-b *install-path*

Specifies the path where the Db2 Information Center is to be installed. *install-path* must be a full path name and its maximum length is limited to 128 characters. The default installation path is /opt/ibm/db2ic/V11.1. This parameter is mandatory when the **-n** parameter is specified.

-p *productID*

Specifies the *productID* of the Db2 Information Center. *productID* does not require DB2 as a prefix. This parameter is mandatory when the **-n** parameter is specified.

-c *image-location*

Specifies the product image location. To indicate multiple image locations, specify this parameter multiple times. For example, -c CD1 -c CD2. This parameter is only mandatory if the **-n** parameter is specified, your install requires more than one CD, and your images are not set up for automatic discovery. Otherwise, you are prompted for the location of the next CD at the time it is needed.

-n

Specifies noninteractive mode.

-L language

Specifies national language support. The default is English. To install multiple languages at the same time, this parameter can be specified multiple times. For example, to install both English and German, specify -L EN -L DE.

-l log-file

Specifies the log file. The default log file is /tmp/doce_install.log\$\$, where \$\$ is the process ID.

-t trace-file

Turns on the debug mode. The debug information is written to the file name specified as *trace-file*.

-h | -?

Displays usage information.

Example

- To install from an image in /mnt/cdrom, and to be prompted for all needed input, issue:

```
cd /mnt/cdrom  
./doce_install
```

- To install Db2 Information Center to /db2/V11.1, from an image in /mnt/cdrom, non-interactively in English, issue:

```
cd /mnt/cdrom  
./doce_install -p doce -b /db2/V11.1 -n
```

dsmtop - Db2 text-based monitoring tool

The **dsmtop** command is a simple text-based tool for monitoring, similar to the now deprecated db2top command. The **dsmtop** command can monitor Db2 Version 10.1 and above. It is intended primarily for use on Linux and AIX, but will also run on, Windows although with some limitations.

Scope

The **dsmtop** command is a lightweight, low-overhead tool that works in a text-only environment, such as a simple Unix command line. There is no web server and no need for a windowing environment. Monitoring is accomplished by using **mon_get** table functions.

Command features

You can use the **dsmtop** command to see key performance indicators in the same way that the **db2top** command worked. The **dsmtop** command provide

Sessions

See at a glance which connections are active, blocked, or idle.

Running SQL

See a list of recently run statements. Drill down is provided to see the full SQL text or run explain on a statement.

Top Consumers

Find which connections or activities are consuming the most CPU, IO or other resource.

Time spent

Shows a breakdown of where the monitored database is spending time.

Run **dsmtop**

The easiest way to run **dsmtop** is to fully specify the database and user credentials. The **dsmtop** command will use the JDBC type 4 driver. Use the following method as all necessary libraries are bundled in the distribution.

```
dsmtop -d <database_name> -n <host_name> -r <port_number> -u <user_id>
```

For example:

```
dsmtop -d gsdb -n localhost -r 50000 -u kdeck
```

The **dsmtop** command requires a password. You can specify the password on the command line with **-p**. However, this is not recommended as the password will then be visible to other users running similar commands. Once you are connected, you can save the credentials using the following menu choice:

File -> Write

Credentials are written to a file called **dsmtoprc** which is located in **\$HOME** for Linux or UNIX systems, or **%UserProfile%** for Windows. Further uses of the **dsmtop** command will read from the **dsmtoprc** file to fill in default values for database, host, port, user ID and password (encrypted).

Run **dsmtop** without re-authenticating

The **dsmtop** command can connect to a local database without specifying your user ID or password, if you are currently authenticated already. To connect this way, the **dsmtop** command uses a JDBC type 2 driver. There are some requirements before you can connect in this way:

- The JDBC type 2 driver requires Db2 Server or Db2 Client products installed.
- For UNIX, Linux or AIX machines, you need to setup some environment variables such as **LD_LIBRARY_PATH**, **LIBPATH** or **SHLIB_PATH** to load the JDBC native library.

In a typical Db2 install on Linux or AIX, there are files provided that you can source to set the environment:

```
<INSTALL_PATH>/sql1ib/db2profile
```

or

```
<INSTALL_PATH>/sql1ib/db2cshrc
```

If these files are missing, refer to this page for information about how to generate them: Linux and UNIX environment variable settings

The **dsmtop** command will use the JDBC type 2 driver if you do not specify a user ID or a password, either through the command line or from the **dsmtoprc** file. You can also specify **-j 2** on the command line to explicitly use the type 2 driver.

If you are using the JDBC type 2 driver and encounter an error similar to the following:

```
The DDM parameter is not supported.  
Unsupported DDM parameter code point: 0x2460.  
ERRORCODE=-4499, SQLSTATE=58016
```

The most likely cause is a known problem that can happen if the JDBC type 2 native library in your environment is newer than the **db2jcc.jar** file shipped with the **dsmtop** command. To resolve this issue, you should replace the **db2jcc.jar**

from the **dsmtop** product with the **db2jcc.jar** from the Db2 Server or Db2 Client that is installed in the same machine. For example, if you have the Db2 product installed in the `/home/sql1lib` directory, you should replace `<your_base_path>/dsmtop/lib/db2jcc.jar` with the `/home/sql1lib/java/db2jcc.jar`

For more information on the **dsmtop** command, refer to: Text Based Monitoring for Db2 LUW - dsmtop

enable_MQFunctions - Enable WebSphere MQ functions

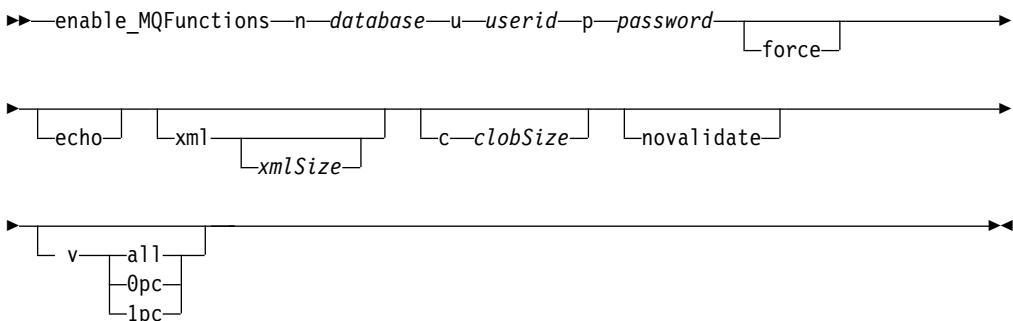
Enables Db2 WebSphere MQ functions for the specified database and validates that the Db2 WebSphere MQ functions can be executed properly. The command fails if WebSphere MQ and WebSphere MQ AMI have not been installed and configured.

Authorization

One of the following authorities:

- CREATE_EXTERNAL_ROUTINE authority on the database and at least one of the following authorities:
 - If the schema name of the function does not refer to an existing schema, IMPLICIT_SCHEMA authority on the database
 - If the schema name DB2MQ or DB2MQ1C exists, CREATEIN privilege on the schema
- DBADM

Command syntax



Command parameters

-n database

Specifies the name of the database that you want to enable.

-u userid

Specifies the user ID to connect to the database.

-p password

Specifies the password for the user ID.

-force Optional. The use of this option allows the utility program to ignore the existing MQ UDFs. In other words, the program drops any existing functions, before recreating any MQ UDFs. Without this option, the command will not proceed after it finds that the MQ UDFs already exist.

-xml xmlSize

Optional. This is for defining the XML versions of the 0pc functions. This option has no effect if the **-v 1pc** option is specified.

The *xmlSize* specifies the length of XML data. The minimum length is 1 byte. The maximum length is 100M. The default is 1M. You can specify the length as *n* (number of bytes), *nK* (length in kilobytes), or *nM* (length in megabytes).

-c clobSize

Optional. Specifies the length of CLOB data. The minimum length is 1 byte; this is the default. The maximum length is 100M. You can specify the length as *n* (number of bytes), *nK* (length in kilobytes), or *nM* (length in megabytes).

-novalidate

Optional. This specifies that there will not be any validation of the Db2 MQSeries® functions.

-v

Optional. This is used for transactional and non-transactional user-defined function support. The values can be either all, 0pc, or 1pc. When you specify 0pc, the enablement creates schema db2mq. If you specify 1pc, then the enablement creates schema db2mq1c. If you specify all, then the enablement creates all schemas under user-defined functions (db2mq and db2mq1c). If you do not specify this option, the enablement defaults to the all option.

-echo

Optional. Prints the detailed SQL used to create the UDFs or diagnostic information.

Examples

The following example enables the transactional and non-transactional user-defined functions. The user connects to the database SAMPLE.

```
enable_MQFunctions -n sample -u user1 -p password1
```

In the next example, the user connects to the database SAMPLE. The example creates DB2MQ1C functions with schema DB2MQ1C.

```
enable_MQFunctions -n sample -u user1 -p password1 -v 1pc
```

Usage notes

The Db2 MQ user-defined functions run under the schemas DB2MQ or DB2MQ1C which are automatically created by this command. Before executing this command:

- Ensure that WebSphere MQ and WebSphere Application Messaging Interface (AMI) are installed, and that the version of WebSphere MQ is 5.1 or higher.
- Ensure that the environment variable **\$AMT_DATA_PATH** is defined.
- If you want to use transactional MQ UDFs, make sure that the database is configured for federated operations. Do this with the following command
 - update dbm cfg using federated yes
- Change the directory to the cfg subdirectory of the **DB2PATH**

On UNIX:

- Use **db2set** to add **AMT_DATA_PATH** to the **DB2ENVLIST**.
- Ensure that the user account associated with UDF execution is a member of the mqm group.
- Ensure that the user who will be calling this command is a member of the mqm group.

Note: AIX 4.2 is not supported by MQSeries 5.2.

installDSDriver - Extract IBM Data Server Driver components

Installs IBM Data Server Driver (ds driver) components and creates db2profile and db2cshrc files.

On Linux and UNIX operating systems, the **installDSDriver** command installs and upgrades all the components of the IBM Data Server Driver in the specified directory and removes the .tar files that were extracted.

The **installDSDriver** command from the 32-bit IBM Data Server Driver Package software creates the db2profile file for the Bash or Korn shell and the db2cshrc file for the C shell. The db2profile and db2cshrc files are created under the root installation path (*INSTALL_PATH*) of the IBM Data Server Driver Package software.

The **installDSDriver** command from the 64-bit IBM Data Server Driver Package software creates following script files under the root installation path (*INSTALL_PATH*) of the IBM Data Server Driver Package software:

- The db2profile file for the 64-bit Bash or Korn shell environment.
- The db2profile32 file for the 32-bit Bash or Korn shell environment.
- The db2cshrc file for the 64-bit C shell environment.
- The db2cshrc32 file for the 32-bit C shell environment.

Authorization

None

Prerequisite

The unzip utility must be installed on the operating system before running the command.

Command syntax

```
►--installDSDriver-->
    |-----upgrade-----<existing-dsdriver-path>----->
    |
    |-----installDtrc-----<unzipped bulk deploy root directory path in the network drive>----->
    |
    |-----h----->
```

Command parameters

-h Displays usage information.

-upgrade <existing-dsdriver-path>

Upgrades existing IBM Data Server Driver Package software installation specified in the <existing-dsdriver-path> path. All user created files are preserved in the existing IBM Data Server Driver Package software installation path, that includes following files:

- The db2cli.ini file.
- The db2dsdriver.cfg file.
- The Db2 connect license file.

If the **-upgrade** <existing-dsdriver-path> option is not specified, the **installDSDriver** script installs the IBM Data Server Driver as a new installation.

-installDtrc

Tells the **installDSDriver** script to copy platform-specific DTRC client library files from the specified network drive path to the installed ds driver location during ds driver installation. Takes the location of a bulk deploy root directory as the input. A message is displayed to the standard output and log file to indicate whether the files are successfully copied:

- Copying DTRC
bulk deploy library files....> SUCCESSFUL.

If the files are not copied successfully, the following message is displayed:

- Copying DTRC
bulk deploy library files....> FAILED.

This option is provided only with the IBM data server driver package.

Usage notes

- The **installDSDriver** script from the 64-bit IBM Data Server Driver Package software installs both 32-bit and 64-bit drivers and removes both 32-bit and 64-bit tar files.
- For the 32-bit IBM Data Server Driver Package software installation, the **db2profile** file is for the Bash or Korn shell and the **db2cshrc** file is for the C shell.

To run the **db2profile** or **db2cshrc** script from the installation path, you can issue the following commands:

- Korn or Bash shell environment:
`$. ./db2profile`
- C shell environment:
`source ./db2cshrc`

To configure the 32-bit drivers after installing the 64-bit IBM Data Server Driver Package software, run the **db2profile32** or **db2cshrc32** script from the installation path:

- Korn or Bash shell environment:
`$. ./db2profile32`
- C shell environment:
`source ./db2cshrc32`

To install the DTRC client on several machines, the platform specific DTRC client library files from the network drive are automatically copied to the ds driver location during ds driver installation. For Linux and Unix, this is achieved through **-installDtrc**. If the DTRC bulk deploy library files already exist, **installDSDriver** will overwrite the existing DTRC library files. This is also supported during the upgrade of the installed dsdriver location. During the upgrade, you may use **-installDtrc** along with **-upgrade** to the copy or overwrite the DTRC bulk deploy library files. If copying the DTRC bulk deploy library file fails, the log file will be updated with the reason along with the required user response. The log file will be located inside the dsdriver directory. **-installDtrc** is only available from v11 onwards.

For Windows, the option of copying the DTRC bulk deploy library files during installation is provided only with the silent installation. Set the EI_BULK_DEPLOY_ROOT_DIRECTORY keyword to the path of the bulk deploy root directory.

installFixPack - Update installed Db2 database products

Update the installed Db2 database products in a given location, on all UNIX and Linux platforms, to the same level as the image. If there are multi-copy Db2 database products installed, the **installFixPack** command updates one copy at a time according to the path specified.

This command can be found at the top directory in the image.

Fix pack installation will proceed when the database manager (DBM) of every instance (and in a partitioned database environment, every database partition) related to the installation path is stopped, and all Db2 libraries are unloaded. If all the preconditions are satisfied, **installFixPack** will update those instances and DAS related to the installation path. An additional manual update is not required. For all UNIX and Linux operating systems, the **djxlink** bind command will be launched automatically when the database is reconnected or when applications are restarted.

In some cases, you may specify different force options to continue the fix pack installation, for example, when not all DBMs are stopped, or Db2 libraries remain loaded. **installFixPack** will continue, but you may need to manually update the instances and DAS, as well as restart the applications.

For a partitioned database environment instance, install the fix pack on all the database partitions, while the instance update is only needed on the instance owning database partition. To keep the instance fully functional after the update, it is recommended to install all the products and features on all the database partitions, at least on the instance owning database partition.

If you are applying the fix pack to a dsf instance type (that is, a Db2 pureScale instance associated with the Db2 copy in a Db2 pureScale environment), you must install the fix pack to a new path. You cannot apply the fix pack to the original installation path. The path where the fix pack is installed must be different than the existing installation. In addition, this new path must be the same on all hosts. When installing a fix pack to a new location, the Db2 pureScale instance does not need to be stopped before installing the fix pack.

If you are applying the fix pack to an ese instance type, you can either apply the fix pack on top of the original installation path or you can install the fix pack to a new path. If you install the fix pack on top of the original installation path, the instance must be stopped before applying the fix pack. For details, see: "Installing a fix pack to update a Version 9.8 ese or dsf instance type" in *Installing Db2 Servers*

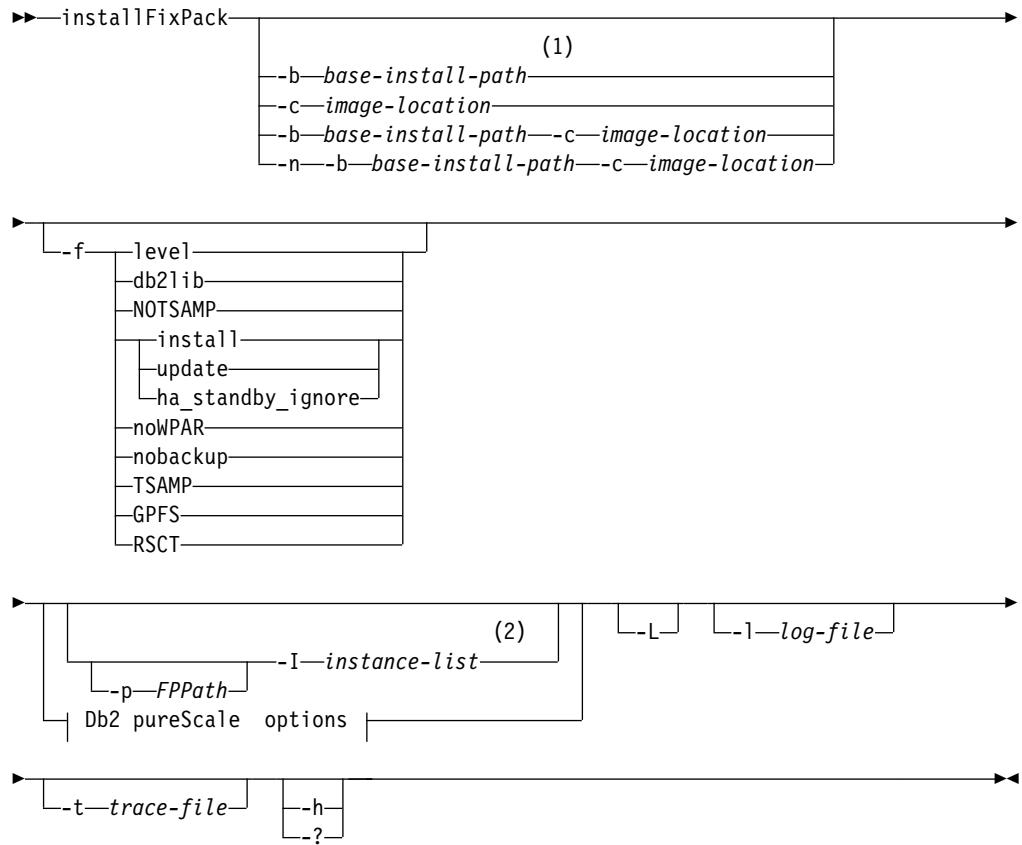
Authorization

Root installations require root user authority. For non-root installations, you must log on with the user ID that owns the non-root installation.

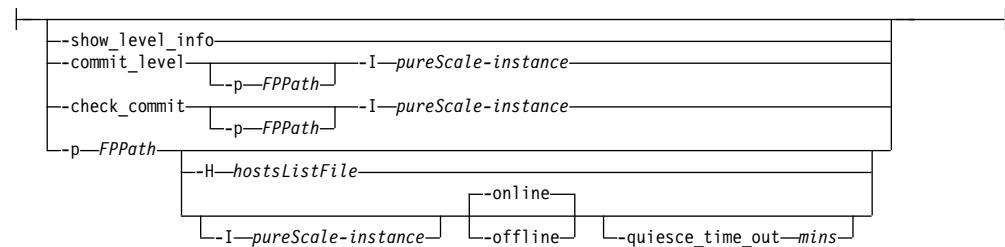
Required Connection

None

Command syntax



Db2 pureScale options:



Notes:

- If you omit this option, you will be prompted for the required information without an error message halt.
- Use for instances that have a type other than pureScale instance and have the same base install path.

Command parameters

- n** Specifies non-interactive mode. When specified, you must also specify **-b**, **-p**, and **-c**. This mode can be used for applications to provide all the required information at the command line in an unattended mode.

-b *base-install-path*

Specifies the base path where the Db2 database product has been installed. Mandatory when **-n** is specified. The length of the path is limited to 128 characters and is a full path name.

The **-b** option is not required for a non-root installation of Db2, but it is still mandatory for a root installation. If **-b** is used in a non-root install, the value of *base-install-path* must be the user's *HOME/sql1lib* directory, or else the path is considered invalid. If **-b** is not provided in a non-root install, the Db2 installer will use the user's *HOME/sql1lib* as the install path and continue. But, if **-b** is used and the provided install path has a Db2 copy installed by a root user, the path is considered invalid since the Db2 copy can only be updated by the user who installed it.

-c *NLPACK_location*

Specifies the location of the related Db2 National Language Pack (NLPACK). This parameter is mandatory when **-n** is specified. The Db2 NLPACK location needs to be provided explicitly if all of the following conditions are met:

- The **-n** option is specified.
- The installation requires National Language (non-English) support.
- The Db2 NLPACK is neither on the Db2 DVD nor in the same subdirectory as the Db2 database product being installed.

-f Force option. **-f** with no argument is not supported. The following force arguments can be combined. For example, **-f level -f db2lib**.

-f *level*

Force a down level or same level fix pack install. If the fix pack image is at a higher level than the installed Db2 database product, this option is ignored.

Important: The Tivoli System Automation (TSA) and the IBM General Parallel File System (GPFS®) cannot be downgraded with the **-f level** parameter. To downgrade these systems you must complete the following steps:

1. Drop the instance.
2. Uninstall Db2 including TSA/GPFS.
3. Reinstall Db2 pureScale with the TSA/GPFS level required.

-f *db2lib*

This parameter is ignored in a Db2 pureScale environment. Force **installFixPack** to bypass the checking on Db2 library loading. To ensure that the instances or applications work properly after the installation, the DBM must be stopped for all the related instances (including all database partitions for the related partitioned database environment instances), and all Db2 libraries related to the installation path must be unloaded.

-f NOTSAMP

This parameter is ignored in a Db2 pureScale environment. Specifies that the SA MP should not be updated (applicable only to root installation).

-f *install*

Force the **installFixPack** command to bypass all checking on Db2 library loading and checking that the instance and DAS are stopped. To ensure that the instances or applications work properly after the installation, the DBM must be stopped for all the related instances (including all database partitions for the related partitioned database environment instances), and

all Db2 libraries related to the installation path must be unloaded. If this option is specified, neither the instance nor DAS are updated. After the installation, you need to manually update the instance and DAS. Also, note that the options update, install, and ha_standby_ignore are mutually exclusive and cannot be specified in the same installation.

-f update

Force the **installFixPack** command to bypass all the checking on Db2 library loading, and checking that the instance and DAS are stopped. To ensure that the instances or applications work properly after the installation, the DBM must be stopped for all the related instances (including all database partitions for the related partitioned database environment instances), and all Db2 libraries related to the installation path must be unloaded. If this option is specified, both the instance and DAS are updated. Also, note that the options update, install, and ha_standby_ignore are mutually exclusive and cannot be specified in the same installation.

-f ha_standby_ignore

This parameter ignores the check for the **sql1ib** directory by forcing the **installFixPack** command to bypass this check. For example, the check for **sql1ib** directory is ignored in a clustered environment where the standby node does not have the **sql1ib** library mounted. To ensure that the instances or applications work properly after the installation, the DBM must be stopped for all the related instances (including all database partitions for the related partitioned database environment instances), and all Db2 libraries related to the installation path must be unloaded. If this option is specified, neither the instance nor DAS are updated. After the installation, you need to manually update the instance and DAS. Also, note that the options update, install, and ha_standby_ignore are mutually exclusive and cannot be specified in the same installation.

-f noWPAR

This parameter is ignored in a Db2 pureScale environment. Applicable to AIX 6.1 or later in a global environment. Force **installFixPack** not to do any checking or any actions on the AIX system workload partitions (WPARs) which share the Db2 copy being updated on the global environment. If **-f noWPAR** is specified, you must manually update the instances and DAS on each system WPAR that shares this Db2 copy.

-f nobackup

This parameter is ignored in a Db2 pureScale environment. Force **installFixPack** to not backup installation files when the components are updated. If you choose not to backup the files, the space requirement of the installation directory is reduced. However, choosing not to backup the files also means that if any errors occur, the Db2 installer will not be able to perform a rollback operation. In this case, you will need to manually clean up the files and reinstall the fix pack.

-f TSAMP

Force the **installFixPack** command to continue the fix pack installation process and update the current version of IBM Tivoli System Automation for Multiplatforms (SA MP) to the latest version. Specify this parameter, if the current version of Tivoli SA MP is different from the version that was previously installed by the Db2 installer. If you cancel the fix pack installation process, Tivoli SA MP does not revert to an earlier version.

-f GPFS

Force the **installFixPack** command to continue the fix pack installation

process and update the current version of IBM General Parallel File System (GPFS) to the latest version. Specify this parameter, if the current version of GPFS is different from the version that was previously installed by the Db2 installer. If you cancel the fix pack installation process, GPFS does not revert to an earlier version.

-f RSCT

Force the **installFixPack** command to continue the fix pack installation process and update the current version of IBM Reliable Scalable Cluster Technology (RSCT) to the latest version. Specify this parameter, if the current version of RSCT is different from the version that was previously installed by the Db2 installer. If you cancel the fix pack installation process, RSCT does not revert to an earlier version.

-p FPPath

Specify where the fix pack is to be installed. In a Db2 pureScale environment, this parameter is mandatory. Consider the following when using this parameter:

- When this parameter is specified, instances are not updated automatically. You must manually update the instances using the **db2iupd** command. In addition, in a Db2 pureScale environment, if the fix pack is applied on multiple hosts, you must run the **db2iupd** command on all hosts.
- If you are installing a fix pack to update a Db2 pureScale instance (dsf type instance), the path where the fix pack is installed must be different than the existing installation, and, this path must be the same on all hosts. For fix pack installations outside of a Db2 pureScale environment, the path can be different than the existing installation.

-show_level_info

Displays the following fix pack online update attributes for the current level of code.

- The architecture level.
- The code level.
- Information on whether this level of code can be installed online.
- Information on the minimum committed level required before installing online.

-commit_level

Updates the pureScale instance to a new level of code. This option is mandatory for an online fix pack update and its scope is limited to Db2 pureScale environments.

-check_commit

Verifies whether the Db2 pureScale instance is ready for a commit.

-I pureScale-instance

Specifies the pureScale instance name.

-online

Specify this option to start or continue with a fix pack online update. In a fix pack online update, the Db2 cluster can run different levels of code as long as the specified code level is same as the current effective code level (CECL) or higher. Note that during a fix pack online update, the activation of the new level of code can take place while the instance is up and running. This will be the default option when **-I pureScale-instance** option is used for pureScale fix pack update.

-offline

Specify this option to start or continue with an offline update. In an offline update, the Db2 cluster cannot run different levels of code. Note that during an offline update the activation of the new level of code can only take place while the whole instance is down.

-quiesce_time_out mins

Specifies how long the command waits before disconnecting applications from the given member. Once this timeout is reached, any active units of work remaining at the time are interrupted. If this parameter is not specified, default timeout value of 2 minutes is used.

-H hostsListFile

This parameter can only be specified in a Db2 pureScale environment. This parameter enables a fix pack update across multiple hosts. All hosts specified in the host list file must have the same service level. When this parameter is specified, you cannot specify the **-L** parameter.

Note: After running the **installFixPack** command with this parameter, always check the log file to ensure that there are no installation errors on any of the remote hosts.

-L Indicates the fix pack is to be applied locally to the current host only.
When this parameter is specified, you cannot specify the **-H** parameter.

-l log-file

Specifies the log file. For root installations, the default log file is `/tmp/installFixPack.log$$`, where `$$` represents the process ID. For non-root installations, the default log file is `/tmp/installFixPack_userID.log`, where `userID` represents the user ID that owns the non-root installation. If the IBM Tivoli System Automation for Multiplatforms (SA MP) is being installed or updated with the **installFixPack** command, the corresponding log file will be located in the same directory as Db2 log files.

-t trace-file

Turns on the debug mode. The debug information is written to the file name specified.

-h | -?

Displays help information.

Usage notes

- If you have Db2 Text Search installed and Text Search is running on any instances related to the Db2 copy, installation attempts to stop the Text Search service but continues with the installation.
- Format of the host list file can be shown in the following section:

```
HOST=host1
host1.HOSTNAME=<hostname1>
HOST=host2
host2.HOSTNAME=<hostname2>
...
...
```

Examples

- To perform an interactive update from GA to Fix Pack 1 when Db2 Enterprise Server Edition is installed on `/opt/ibm/db2/COPY1`, from the Fix Pack 1 image, issue:

```
./installFixPack -b /opt/ibm/db2/COPY1
-l log-file-name -t trace-file-name
```

- To perform a silent update from GA to Fix Pack 1 when Db2 Enterprise Server Edition is installed on /opt/ibm/db2/COPY1, from the Fix Pack 1 image, issue:
`./installFixPack -b /opt/ibm/db2/COPY1 -c full_path_to_NLPACK_image
-n -l log-file-name -t trace-file-name`
- If for any reason the installed Db2 database product files get corrupted, instead of uninstalling and installing again to refresh the installation, issue:
`./installFixPack -f level -b full_path_where_DB2_product_installed
-l log-file-name -t trace-file-name`
- To reduce the space requirement of the installation directory, issue:
`./installFixPack -f nobackup -b full_path_where_DB2_product_installed
-l log-file-name -t trace-file-name`
- To apply a fix pack to update a Db2 pureScale instance (dsf type instance), the path where the fix pack is installed must be different than the existing installation, and, this path must be the same on all hosts:
`./installFixPack -b full_path_where_DB2_product_installed
-p path_where_DB2_fixPack_installed
-L -l log-file-name -t trace-file-name`
- To apply a fix pack to update an ese instance type, the path can be the same as the existing installation, or the path can be different:
`./installFixPack -b full_path_where_DB2_product_installed
-p full_path_where_DB2_product_installed
-L -l log-file-name -t trace-file-name`
- In a Db2 pureScale environment, to apply a fix pack update across multiple hosts:
`./installFixPack -b full_path_where_DB2_product_installed
-p full_path_where_DB2_product_installed -H hostsListFile
-l log-file-name -t trace-file-name`
- To display information related to the online fix pack update such as the current level of code:
`./installFixPack -show_level_info -l log-file-name -t trace-file-name`
- To check whether the Db2 instance is ready for a commit:
`./installFixPack -check_commit -I pureScale-instance
-l log-file-name -t trace-file-name`

setup - Install Db2 database products

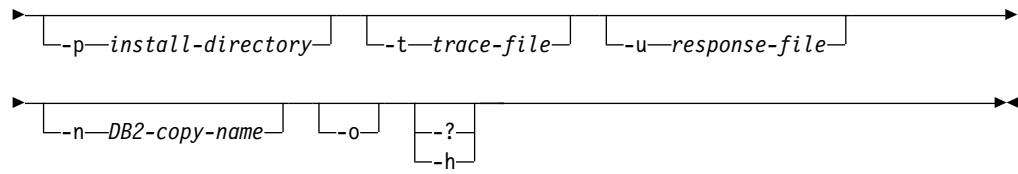
Installs Db2 database products. This command is only available on Windows operating systems. The command for UNIX operating systems is **db2setup**.

This utility is located on the Db2 installation media. It launches the Db2 Setup wizard to define the installation and install Db2 database products. If invoked with the **-u** option, it performs an installation without further input, taking installation configuration information from a response file.

When installing the IBM Data Server Runtime Client on Windows, the setup options are different from Db2 product installation. Refer to “IBM Data Server Runtime Client installation command line options (Windows)” for the appropriate options.

Command syntax

```
►►setup [ -c ] [ -f ] [ -i language ] [ -l log-file ] [ -m ]
```



Command parameters

Note:

The install Db2 **setup** command can use the / or - switch symbols interchangeably.

- c** Ensures that the **setup.exe** exits immediately after starting the installation. By selecting this option, the return code of the installation is not available when monitoring the exit code of **setup.exe**.
- f** Forces any Db2 processes to stop before installing.
- i language** Specifies the two-letter language code of the language in which to perform the installation.
- l log-file** Full path and file name of the log file to use.
- m** Used with **-u** option to show the progress dialog during the installation. However, it will not prompt for any input.
- p install-directory** Changes the installation path of the product. Specifying this option overrides the installation path that is specified in the response file.
- t trace-file** Generates a file with install trace information.
- u response-file** Specifies the full path and file name of the response file to use.
- n DB2-copy-name** Specifies the Db2 copy name that you want the install to use. Specifying this option overrides the copy name that is specified in the response file.
- o** Always perform a new copy installation with a generated default copy name. This option is only available for installing the IBM Data Server Driver Package on Windows.
- ? | -h** Generates usage information.

Usage notes

- When specifying the full path, the path name must be contained within double quotation marks.

DB2 Text Search commands

db2ts ALTER INDEX

The **db2ts ALTER INDEX** command changes the update characteristics of an index.

For execution, you must prefix the command with **db2ts** at the command line.

Authorization

The privileges that are held by the authorization ID of the statement must include the SYSTS_MGR role and at least one of the following authorities:

- DBADM authority
- ALTERIN privilege on the base schema
- CONTROL or ALTER privilege on the base table on which the text search index is defined

To change an existing schedule, the authorization ID must be the same as the index creator or must have DBADM authority.

Required connection

Database

Command syntax

```
►►ALTER INDEX—index-name—FOR TEXT—| update characteristics |— options —►►
    ►| connection options |————►►
```

update characteristics:

```
|— UPDATE FREQUENCY—| NONE |———— update frequency |————►►
    ►| incremental update characteristics |————►►
```

update frequency:

```
|— D-( * |———— integer1 |———— )—H-( * |———— integer2 |———— )—M-( , |———— integer3 |———— )—|
```

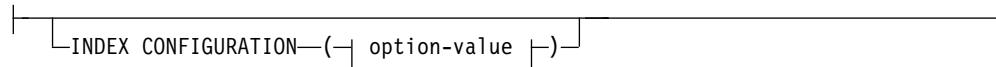
incremental update characteristics:

```
|— UPDATE MINIMUM—minchanges |————►►
```

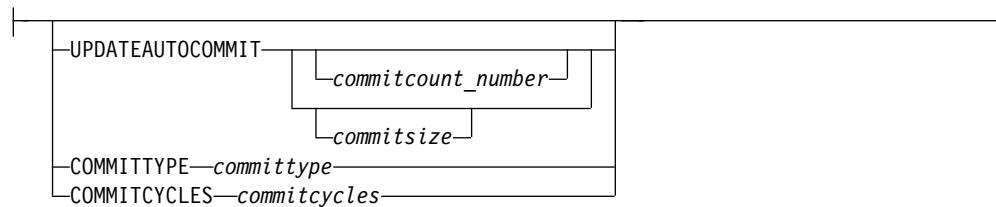
options:

```
|— index configuration options |———— activation options |————►►
```

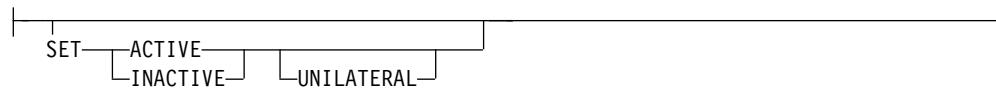
index configuration options:



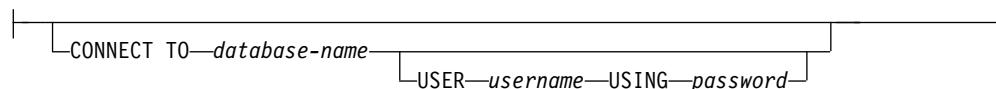
option-value:



activation options:



connection options:



Command parameters

ALTER INDEX *index-name*

The schema and name of the index as specified in the **CREATE INDEX** command. It uniquely identifies the text search index in a database.

UPDATE FREQUENCY

Specifies the frequency with which index updates are made. The index is updated if the number of changes is at least the value that is set for **UPDATE MINIMUM** parameter. The update frequency **NONE** indicates that no further index updates are made. This can be useful for a text column in a table with data that does not change. It is also useful when you intend to manually update the index (by using the **UPDATE INDEX** command). You can do automatic updates only if you have issued the **START FOR TEXT** command and the Db2 Text Search instance services are running.

The default frequency value is taken from the view SYSIBMTS.TSDEFAULTS, where DEFAULTNAME='UPDATEFREQUENCY'.

NONE

No automatic updates are applied to the text index. Any further index updates are started manually.

D The days of the week when the index is updated.

- * Every day of the week.

integer1

Specific days of the week, from Sunday to Saturday: 0 - 6

- The hours of the specified days when the index is updated.
 - * Every hour of the day.
- integer2***
Specific hours of the day, from midnight to 11 pm: 0 - 23
- The minutes of the specified hours when the index is updated.
- integer3***
Specified as top of the hour (0), or in multiples of 5-minute increments after the hour: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50 or 55

If you do not specify the **UPDATE FREQUENCY** option, the frequency settings remain unchanged.

UPDATE MINIMUM *minchanges*

Specifies the minimum number of changes to text documents that must occur before the index is incrementally updated. Multiple changes to the same text document are treated as separate changes. If you do not specify the **UPDATE MINIMUM** option, the setting is left unchanged.

INDEX CONFIGURATION (*option-value*)

Specifies an optional input argument of type VARCHAR(32K) that allows altering text index configuration settings. The following option is supported:

Table 55. Specifications for option-value

Option	Value	Data type	Description
SERIALUPDATE	<i>updatemode</i>	Integer	<p>Specifies whether the update processing for a partitioned text search index must be run in parallel or in serial mode. In parallel mode, the execution is distributed to the database partitions and run independently on each node. In serial mode, the execution is run without distribution and stops when a failure is encountered. Serial mode execution usually takes longer but requires less resources.</p> <ul style="list-style-type: none"> • 0 = parallel mode • 1 = serial mode

Table 55. Specifications for option-value (continued)

Option	Value	Data type	Description
UPDATEAUTOCOMMIT	<i>commitsize</i>	String	<p>Specifies the number of rows or number of hours after which a commit is run to automatically preserve the previous work for either initial or incremental updates.</p> <p>If you specify the number of rows:</p> <ul style="list-style-type: none"> After the number of documents that are updated reaches the COMMITCOUNT number, the server applies a commit. COMMITCOUNT counts the number of documents that are updated by using the primary key, not the number of staging table entries. <p>If you specify the number of hours:</p> <ul style="list-style-type: none"> The text index is committed after the specified number of hours is reached. The maximum number of hours is 24. <p>For initial updates, the index update processes batches of documents from the base table. After the <i>commitsize</i> value is reached, update processing completes a COMMIT operation and the last processed key is saved in the staging table with the operational identifier '4'. Use this key to restart update processing either after a failure or after the number of specified <i>commitcycles</i> are completed. If you specify a <i>commitcycles</i>, the update mode is modified to incremental to initiate capturing changes by using the LOGTYPE BASIC option to create triggers on the text table. However, until the initial update is complete, log entries that are generated by documents that have not been processed in a previous cycle are removed from the staging table.</p> <p>Using the UPDATEAUTOCOMMIT option for an initial text index update leads to a significant increase of execution time.</p> <p>For incremental updates, log entries that are processed are removed correspondingly from the staging table with each interim commit.</p>
COMMITTYPE	<i>committype</i>	String	Specifies rows or hours for the UPDATEAUTOCOMMIT index configuration option. The default is rows.
COMMITCYCLES	<i>commitcycles</i>	Integer	<p>Specifies the number of commit cycles. The default is 0 for unlimited cycles.</p> <p>If cycles are not explicitly specified, the update operation uses as many cycles as required based on the batch size that is specified with the UPDATEAUTOCOMMIT option to finish the update processing.</p> <p>You can use this option with the UPDATEAUTOCOMMIT setting with a <i>committype</i>.</p>

activation options

This input argument of type integer sets the status of a text index.

ACTIVE

Sets the text index status to active

INACTIVE

Sets the text index status to inactive

UNILATERAL

Specifies a unilateral change that affects the status of Db2 Text Search indexes. If you specify this argument, only the status of a Db2 Text Search index is changed to active or inactive. Without the UNILATERAL argument, the activation status of the Db2 Text Search and Db2 Net Search Extender indexes is jointly switched so that only one of the text indexes is active.

CONNECT TO *database-name*

This clause specifies the database to which a connection is established. The database must be on the local system. If specified, this clause takes precedence over the environment variable DB2DBDFT. You can omit this clause if the following statements are all true:

- The DB2DBDFT environment variable is set to a valid database name.
- The user running the command has the required authorization to connect to the database server.

USER *username* USING *password*

This clause specifies the user name and password that is used to establish the connection.

Usage notes

All limits and naming conventions that apply to Db2 database objects and queries also apply to Db2 Text Search features and queries. Db2 Text Search related identifiers must conform to the Db2 naming conventions. Also, there are some additional restrictions, such as identifiers of the following form:

[A-Za-z] [A-Za-z0-9@#\$_]*

or

"[A-Za-z] [A-Za-z0-9@#\$_]*"'

You cannot issue multiple commands concurrently on a text search index if they might conflict. If a command is issued while another conflicting command is running, an error occurs and the command fails, after which you can try to run the command again. Some of the conflicting commands are:

- **ALTER INDEX**
- **CLEAR EVENTS FOR INDEX**
- **DROP INDEX**
- **UPDATE INDEX**
- **DISABLE DATABASE FOR TEXT**

Changes to the database: Updates the Db2 Text Search catalog information.

The result of activating indexes depends on the original index status. The following table describes the results.

Table 56. Status changes without invalid index:

Initial Db2 Text Search or Net Search Extender Status	Request Active	Request Active Unilateral	Request Inactive	Request Inactive Unilateral
Active / Inactive	No change	No change	Inactive / Active	Inactive / Inactive
Inactive / Active	Active / Inactive	Error	No change	No change
Inactive / Inactive	Active / Inactive	Active / Inactive	Inactive / Active	No change

SQL20427N and CIE0379E error messages are returned for active index conflicts.

You can specify the **UPDATEAUTOCOMMIT** index configuration option without type and cycles for compatibility with an earlier version. It is associated by default with the **COMMITTYPE** rows option and unrestricted cycles.

You can specify the **UPDATEAUTOCOMMIT**, **COMMITTYPE** and **COMMITSIZE** index configuration options for an UPDATE INDEX operation to override the configured values. Values that you submit for a specific update operation are applied only once and not persisted.

db2ts CLEANUP FOR TEXT

Cleans up Db2 Text Search collections within an instance or within a database.

When a cleanup operation is executed for a database, invalid text indexes and their associated collections are dropped. When a cleanup operation is executed for the instance, obsolete collections are removed. A collection can become obsolete if a database containing text search indexes is dropped before Db2 Text Search has been disabled for the database.

Note: While the commands operate on text search indexes, text search server tools operate on text search collections. A text search collection refers to the underlying representation of a text search index. The relationship between a text search index and its associated collections is 1:1 in a non-partitioned setup and 1:n in a partitioned setup, where n is the number of data partitions. Query the **SYSIBMTS.TSCOLLECTIONNAMES** catalog table to determine the text search collections for a text search index. For additional information, see the topic about Administration Tool for Db2 Text Search.

For execution, the command needs to be prefixed with **db2ts** at the command line.

Authorization

To issue the command on instance level, you must be the owner of the text search server process. For the integrated text search server, this is the instance owner.

To issue the command on database level, the privileges held by the authorization ID of the statement must include the SYSTS_ADMIN role and the DBADM authority.

Required connection

This command must be issued from the Db2 database server.

Command syntax

Instance level

►►CLEANUP FOR TEXT—————►►

Database level

►►CLEANUP FOR TEXT—connection-options—————►►

Command parameters

None

db2ts CLEAR COMMAND LOCKS

Removes all command locks for a specific text search index or for all text search indexes in the database. A command lock is created at the beginning of a text search index command, and is destroyed when it is done. It prevents undesirable conflict between different commands.

Use of this command is required in the rare case that locks remain in place due to an unexpected system behavior, and need to be cleaned up explicitly.

For execution, the command needs to be prefixed with **db2ts** at the command line.

Authorization

The privileges held by the authorization ID of the statement used to clear locks on the index must include both of the following authorities:

- SYSTS_MGR role
- DBADM authority or CONTROL privilege on the base table on which the index is defined

The privileges held by the authorization ID of the statement used to clear locks on the database connection must include the SYSTS_ADM role.

Required connection

Database

Command syntax

►►CLEAR COMMAND LOCKS——FOR INDEX—*index-name*—FOR TEXT—————►►

►| connection options |—————►►

connection options:

|—————CONNECT TO—*database-name*—————|—————USER—*username*—USING—*password*—————|—————|

Command parameters

FOR INDEX *index-name*

The name of the index as specified in the **CREATE INDEX** command.

CONNECT TO *database-name*

This clause specifies the database to which a connection will be established.

The database must be on the local system. If specified, this clause takes precedence over the environment variable **DB2DBDFT**. This clause can be omitted if the following are all true:

- The **DB2DBDFT** environment variable is set to a valid database name.
- The user running the command has the required authorization to connect to the database server.

USER *username* USING *password*

This clause specifies the authorization name and password that will be used to establish the connection.

Usage notes

You would invoke this command because the process owning the command lock is dead. In this case, the command (represented by the lock) may not have completed, and the index may not be operational. You need to take appropriate action. For example, the process executing the **DROP INDEX** command dies suddenly. It has deleted some index data, but not all the catalog and collection information. The command lock is left intact. After clearing the **DROP INDEX** command lock, you may want to re-execute the **DROP INDEX** command. In another example, the process executing the **UPDATE INDEX** command is interrupted. It has processed some documents, but not all, and the command lock is still in place. After reviewing the text search index status and clearing the **UPDATE INDEX** command lock, you can re-execute the **UPDATE INDEX** command.

When this command is issued, the content of the Db2 Text Search view **SYSIBMTS.TSLOCKS** is updated.

db2ts CLEAR EVENTS FOR TEXT

This command deletes indexing events from an index's event table used for administration. The name of this table can be found in the view **SYSIBMTS.TSINDEXES** in column **EVENTVIEWNAME**.

Every index update operation that processes at least one document produces informational and, in some cases, error entries in the event table. For automatic updates, this table has to be regularly inspected. Document specific errors have to be corrected (by changing the document content). After correcting the errors, the events can be cleared (and should be, in order not to consume too much space).

For execution, the command needs to be prefixed with **db2ts** at the command line.

Authorization

The privileges held by the authorization ID of the statement must include both of the following authorities:

- SYSTS_MGR role
- DBADM with DATAACCESS authority or CONTROL privilege on the table on which the index is defined

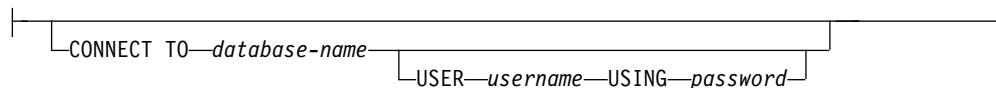
Required connection

Database

Command syntax

►—CLEAR EVENTS FOR INDEX—*index-name*—FOR TEXT— connection options ►►

connection options:



Command parameters

index-name

The name of the index as specified in the **CREATE INDEX** command. The index name must adhere to the naming restrictions for Db2 indexes.

CONNECT TO *database-name*

This clause specifies the database to which a connection will be established. The database must be on the local system. If specified, this clause takes precedence over the environment variable DB2DBDFT. This clause can be omitted if the following are all true:

- The DB2DBDFT environment variable is set to a valid database name.
 - The user running the command has the required authorization to connect to the database server.

USER *username* **USING** *password*

This clause specifies the authorization name and password that will be used to establish the connection.

Usage notes

All limits and naming conventions, that apply to Db2 database objects and queries, also apply to Db2 Text Search features and queries. Db2 Text Search related identifiers must conform to the Db2 naming conventions. In addition, there are some additional restrictions. For example, these identifiers can only be of the form:

[A-Za-z] [A-Za-z0-9@#\$]*

or

"[A-Za-z]|[A-Za-z0-9@#\$]*"

When regular updates are scheduled (see **UPDATE FREQUENCY** options in **CREATE INDEX** or **ALTER INDEX** commands), the event table should be regularly checked. To cleanup the Db2 Text Search event table for a text search index, use the **CLEAR EVENTS FOR INDEX** command after you have checked the reason for the event and removed the source of the error.

Be sure to make changes to all rows referenced in the event table. By changing the rows in the user table, you ensure that the next **UPDATE INDEX** attempt can be made to successfully re-index the once erroneous documents.

Note that multiple commands cannot be executed concurrently on a text search index if they may conflict. If this command is issued while a conflicting command is running, an error will occur and the command will fail, after which you can try to run the command again. Some of the conflicting commands are:

- **CLEAR EVENTS FOR INDEX**
- **UPDATE INDEX**
- **ALTER INDEX**
- **DROP INDEX**
- **DISABLE DATABASE FOR TEXT**

Changes to the database: The event table is cleared.

db2ts CREATE INDEX

The **db2ts CREATE INDEX** command creates a text search index for a text column. You can then search the column data by using text search functions.

The text search index does not contain any data until you run the text search **UPDATE INDEX** command or the Db2 Administrative Task Scheduler runs the **UPDATE INDEX** command according to the defined update frequency for the index.

To issue the **CREATE INDEX** command, you must prefix the command name with **db2ts**.

Authorization

The authorization ID of the **db2ts CREATE INDEX** command must hold the SYSTS_MGR role and CREATETAB authority on the database and one of the following items:

- CONTROL privilege on the table on which the index will be defined
- INDEX privilege on the table on which the index will be defined and one of the following items:
 - IMPLICIT_SCHEMA authority on the database, if the implicit or explicit schema name of the index does not exist
 - CREATEIN privilege on the schema, if the schema name of the index exists
- DBADM authority

To schedule automatic index updates, the instance owner must have DBADM authority or CONTROL privileges on the administrative task scheduler tables.

Required connection

Database

Command syntax

```
►->CREATE INDEX—index_name—FOR TEXT—ON schema_name—table_name————→  
    |————(—text_column_name—)————→  
    |————(—function_name—(—text_column_name—)————)————→  
    |————| text default information |————| update characteristics |————→
```

► storage options ┌─ index configuration options ┌─ connection options ─►

text default information:

└─ CODEPAGE—*code_page* └─ LANGUAGE—*locale* └─ FORMAT—*format* ─►

update characteristics:

└─ UPDATE FREQUENCY ┌─ NONE ┌─ update frequency ─►
► incremental update characteristics ─►

update frequency:

└─ D-(*) ┌─ integer1 ─►) ┌─ H-(*) ┌─ integer2 ─►) ┌─ M-(*, integer3 ─►) ─►

incremental update characteristics:

└─ UPDATE MINIMUM—*minchanges* ─►

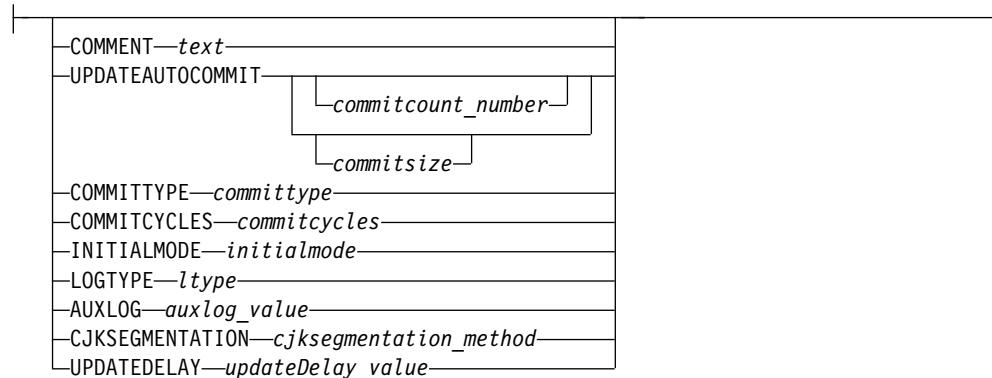
storage options:

└─ COLLECTION DIRECTORY—*directory* ─►
► ADMINISTRATION TABLES IN—*tablespace_name* ─►

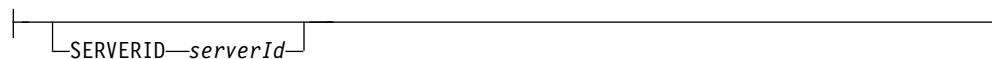
index configuration options:

└─ INDEX CONFIGURATION—(*, option value ─►) ─►

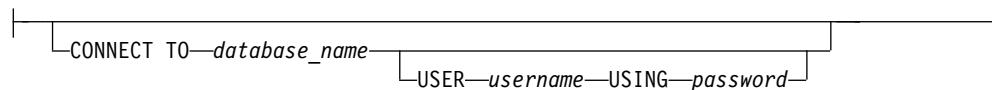
option value:



server configuration options:



connection options:



Command parameters

INDEX *index_name*

Specifies the name of the index to create. This name (optionally, schema qualified) will uniquely identify the text search index within the database. The index name must adhere to the naming restrictions for Db2 indexes.

ON *table_name*

Specifies the table name containing the text column. In Db2 Version 10.5 Fix Pack 1 and later fix packs, you can create a text search index on a nickname. You cannot create text search indexes on federated tables, materialized query tables, or views.

text_column_name

Specifies the name of the column to index. The data type of the column must be one of the following types: CHAR, VARCHAR, CLOB, DBCLOB, BLOB, GRAPHIC, VARGRAPHIC, or XML. If the data type of the column is not one of these data types, use a transformation function with the name *function_schema.function_name* to convert the column type to one of the valid types. Alternatively, you can specify a user-defined external function that accesses the text documents that you want to index.

You can create only a single text search index for a column.

function_name(*text_column_name*)

Specifies the schema-qualified name of an external scalar function that accesses text documents in a column that is not of a supported data type for text searching. The name must conform to Db2 naming conventions. This parameter performs a column type conversion. This function must take only one parameter and return only one value.

CODEPAGE *code_page*

Specifies the Db2 code page (CODEPAGE) to use when indexing text

documents. The default value is specified by the value in the view SYSIBMTS.TSDEFAULTS, where DEFAULTNAME='CODEPAGE'. This parameter applies only to binary data types, such as the column type or return type from a transformation function must be BLOB or FOR BIT DATA.

LANGUAGE *locale*

Specifies the language that Db2 Text Search uses for language-specific processing of a document during indexing. To have your documents automatically scanned to determine the locale, specify AUTO for the *locale* option. If you do not specify a locale, the database territory determines the default setting for the **LANGUAGE** parameter.

FORMAT *format*

Specifies the format of text documents in the column. The supported formats include TEXT, XML, HTML, and INSO. Db2 Text Search requires this information when indexing documents. If you do not specify the format, the default value is used. The default value is in the view SYSIBMTS.TSDEFAULTS, where DEFAULTNAME='FORMAT'; For columns of data type XML, the default format 'XML'; is used, regardless of the value of DEFAULTNAME. To use the INSO format, you must install rich text support

UPDATE FREQUENCY

Specifies the frequency of index updates. The index is updated if the number of changes is at least the value of the **UPDATE MINIMUM** parameter. You can do automatic updates if the Db2 Text Search instance services are running, which you start by issuing the **START FOR TEXT** command.

The default frequency value is taken from the view SYSIBMTS.TSDEFAULTS, where DEFAULTNAME is set to UPDATEFREQUENCY.

NONE

No further index updates are made. The **NONE** option can be useful for a text column in a table with data that does not change. It is also useful if you intend to manually update the index by using the **UPDATE INDEX** command.

D The days of the week when the index is updated.

* Every day of the week.

integer1

Specific days of the week, from Sunday to Saturday: 0 - 6.

H The hours of the specified days when the index is updated.

* Every hour of the day.

integer2

Specific hours of the day, from midnight to 11 p.m.: 0 - 23.

M The minutes of the specified hours when the index is updated.

integer3

The top of the hour (0) , or 5-minute increments after the hour: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, or 55.

UPDATE MINIMUM *minchanges*

Specifies the minimum number of changes to text documents before the index is updated incrementally according to the frequency that you specify for the **UPDATE FREQUENCY** parameter. Only positive integer values are allowed. The default value is taken from the view SYSIBMTS.TSDEFAULTS, where DEFAULTNAME='UPDATERMINIMUM'.

The **UPDATE INDEX** command ignores the value of the **UPDATE MINIMUM** parameter unless you specify the **USING UPDATE MINIMUM** option for that command.

A small value for the **UPDATE MINIMUM** parameter increases consistency between the table column and the text search index. However, it also increases the load on the system.

COLLECTION DIRECTORY *directory*

Specifies the directory in which the text search index collection is stored. You must specify the absolute path, where the maximum length of the absolute path name is 215 characters. The process owner of the text search server instance service must have read and write access to this directory.

The **COLLECTION DIRECTORY** parameter is supported only for an integrated text search server setup. For additional information about collection locations, review the usage notes.

ADMINISTRATION TABLES IN *tablespace_name*

Specifies the name of an existing nontemporary table space for the administration tables that are created for the index.

For a nonpartitioned database, if you do not specify a table space, the table space of the base table for which you are creating the index is used.

For a partitioned database, you must use the **ADMINISTRATION TABLES IN** parameter. To ensure that the staging tables for the text search index are distributed in the same manner as the corresponding base table, the table space must be in the same partition group as the table space of the base table.

INDEX CONFIGURATION (*option_value*)

Specifies more index-related options as option-value string pairs. Options and values are as follows:

Table 57. Option-value pairs

Option	Value	Data type	Description
COMMENT	<i>text</i>	String value of fewer than 512 bytes	Adds a string comment value to the REMARKS column in the Db2 Text Search catalog view TSINDEXES. It also appends the string comment value as the description of the collection to the table.

Table 57. Option-value pairs (continued)

Option	Value	Data type	Description
UPDATEAUTOCOMMIT	<i>commitsize</i>	String	<p>Specifies the number of rows or number of hours after which a commit is run to preserve the previous work for either initial or incremental updates.</p> <p>If you specify the number of rows, after the number of updated documents reaches the COMMITCOUNT number, the server applies a commit. COMMITCOUNT counts the number of documents that are updated by using the primary key, not the number of staging table entries.</p> <p>If you specify the number of hours, the data in text index is committed after the specified number of hours is reached. The maximum number of hours is 24.</p> <p>For an initial update, the index update processes batches of documents from the base table. After the <i>commitsize</i> value is reached, update processing completes a COMMIT operation, and the last processed key is saved in the staging table with the operational identifier '4.' This key is used to restart update processing after a failure or after the completion of the specified number of <i>commitcycles</i>. If you specify a <i>commitcycles</i> value, the update mode is changed to incremental to initiate capturing changes by using the LOGTYPEBASIC option to create triggers on the text table. However, until the initial update is complete, log entries that were generated by documents that were not processed in a previous cycle are removed from the staging table.</p> <p>Using the UPDATEAUTOCOMMIT option for an initial text index update significantly increases execution time.</p> <p>For incremental updates, log entries that are processed are removed from the staging table with each interim commit.</p>
COMMITTYPE	<i>committype</i>	String	Specifies rows or hours for the UPDATEAUTOCOMMIT index configuration option. The default is rows.
COMMITCYCLES	<i>commitcycles</i>	Integer	<p>Specifies the number of commit cycles. The default is 0, meaning unlimited cycles.</p> <p>If you do not specify the number of cycles, the update operation uses as many cycles as required to finish the update processing, based on the batch size that you specify for the UPDATEAUTOCOMMIT option.</p> <p>You can use the COMMITCYCLES option with the UPDATEAUTOCOMMIT option with a committype option .</p>

Table 57. Option-value pairs (continued)

Option	Value	Data type	Description
INITIALMODE	<i>initialmode</i>	String	<p>Specifies how the updates are processed. The possible values of the INITIALMODE option are as follows:</p> <ul style="list-style-type: none"> FIRST The primary update is the default value of the INITIALMODE option. SKIP The update mode is immediately set to incremental, triggers are added for the LOGTYPEBASIC option, but no initial update is performed. NOW The update is started after the index is created as the final part of the CREATE INDEX command operation. This option is supported only for single-node setups.
LOGTYPE	<i>ltype</i>	String	<p>Specifies whether triggers are added to populate the primary log table. The values are as follows:</p> <ul style="list-style-type: none"> BASIC The primary staging table is created, and triggers are created on the text table to recognize any changes. This is the default value for text search indexes on base tables. This option is not supported for nicknames. CUSTOM The primary staging table is created, but no triggers are created on the text table. To identify changes for incremental updates, especially if you do not plan to use the ALLROWS option for updates. The CUSTOM option is supported for nicknames. <p>Note: The default value of the LOGTYPE option is CUSTOM for text search indexes on nicknames.</p>
AUXLOG	<i>auxlog_value</i>	String	<p>Controls the creation of the additional log infrastructure to capture changes that are not recognized by a trigger. The default setting for range-partitioned tables is ON. You can change the default value in the default table by setting AuxLogNorm for non-range-partitioned tables and AuxLogPart for range-partitioned tables.</p> <p>For text search indexes on nicknames, only the OFF option is supported for the AUXLOG option.</p>

Table 57. Option-value pairs (continued)

Option	Value	Data type	Description
CJKSEGMENTATION	<i>cjksegmentation_method</i>	String value of fewer than 512 bytes	<p>Specifies the segmentation method that applies to documents that use the Chinese, Japanese, or Korean language (zh_CN, zh_TW, ja_JP, or ko_KR locale set), including such documents when automatic language detection is enabled (when you specify the LANGUAGE parameter with the AUTO option). Supported values are:</p> <ul style="list-style-type: none"> • MORPHOLOGICAL • NGRAM <p>If you do not specify a value, the value stored in the SYSIBMTS.TSDEFAULTS view is used. Specifically, the value in the DEFAULTVALUE column of the row whose DEFAULTNAME value is CJKSEGMENTATION.</p> <p>The specified segmentation method is added to the SYSIBMTS.TSCONFIGURATION administrative view. You cannot change the method after creating the text index.</p>

Important: You must enclose non-numeric values, such as comments, in single quotation marks. A single quotation mark character within a string value must be represented by two consecutive single quotation marks, as shown in the following example:

```
INDEX CONFIGURATION (COMMENT 'Index on User''s Guide column')
```

SERVERID *serverId*

If a multiple server setup is used, specifies the **serverId** from SYSIBMTS.SYSTSSERVERS in which the index is to be created. If there are no multiple servers, the default server is used to create the index.

partition options

Reserved for internal IBM use.

CONNECT TO *database_name*

Specifies the database to which a connection is established. The database must be on the local system. This parameter takes precedence over the **DB2DBDFT** environment variable. You can omit this parameter if the following statements are both true:

- The **DB2DBDFT** environment variable is set to a valid database name.
- The user running the command has the required authorization to connect to the database server.

USER *username* **USING** *password*

Specifies the authorization name and password that are used to establish the connection.

Usage notes

All limits and naming conventions that apply to Db2 database objects and queries also apply to Db2 Text Search features and queries. Db2 Text Search identifiers must conform to the Db2 naming conventions. There are some additional restrictions. For example, these identifiers can be of the form:

[A-Za-z][A-Za-z0-9@#\$_]*

or

"[A-Za-z] [A-Za-z0-9@#\$_]*"

Successful execution of the **CREATE INDEX** command has the following effects:

- The Db2 Text Search server data is updated. A collection with the name *instance_database_name_index_identifier_number* is created per database partition, as in the following example:

tigertail_MYTSDB_TS250517_0000

You can retrieve the collection name from the COLLECTIONNAME column in the SYSIBMTS.TSCOLLECTIONNAMES view.

- The Db2 Text Search catalog information is updated.
- An index staging table is created in the specified table space with Db2 indexes. In addition, an index event table is created in the specified table space. If you specified the AUXLOG ON option, a second staging table is created to capture changes through integrity processing.
- If Db2 Text Search coexists with Db2 Net Search Extender and an active Net Search Extender index exists for the table column, the new text search index is set to inactive.
- The new text search index is not automatically populated. The **UPDATE INDEX** command must be executed either manually or automatically (as a result of an update schedule being defined for the index through the specification of the **UPDATE FREQUENCY** option) for the text search index to be populated.
- If you specified a frequency, a schedule task is created for the Db2 Administrative Scheduler.

The following key-related restrictions apply:

- You must define a primary key for the table. In Db2 Text Search, you can use a multicolumn Db2 primary key without type limitations. The maximum number of primary key columns is two fewer than the maximum number of primary key columns that are allowed by Db2.
- The maximum total length of all primary key columns for a table with Db2 Text Search indexes is 15 bytes fewer than the maximum total primary key length that is allowed by Db2. See the restrictions for the Db2 CREATE INDEX statement.

You cannot issue multiple commands concurrently on a text search index if they might conflict. If you issue this command while a conflicting command is running, an error occurs, and the command fails, after which you can try to run the command again. A conflicting command is **DISABLE DATABASE FOR TEXT**.

You cannot change the auxiliary log property for a text index after creating the index.

The AUXLOG option is not supported for nicknames for data columns that support an MQT with deferred refresh. It is also not supported for views.

To create a text search index on a nickname, the nickname must be a non-relational flat file nickname. Non-relational XML nicknames are not supported.

For compatibility with an earlier version, you can specify the UPDATEAUTOCOMMIT index configuration option without type and cycles. This option is associated by default with the COMMITTYPE rows option and unrestricted cycles.

To override the configured values, you can specify the UPDATEAUTOCOMMIT, COMMITTYPE, and COMMITSIZE index configuration options for an **UPDATE INDEX** operation. Values that you submit for a specific update are applied only once and not persisted.

If you specify the INITIALMODE SKIP option, the text search index manager populates the index. Use this option to control the sequence in which data from the text table is initially processed.

The following rules apply to the LOGTYPE index configuration option:

- If you use the LOGTYPE CUSTOM setting, use the SYSIBMTS.TSSTAGING administrative view to insert log entries for new, changed, and deleted documents.
- To view the setting for an index, check the value of the LOGTYPE option in the SYSIBMTS.TSCONFIGURATION administrative view.
- To view the default log type that is applied to new text indexes, check the value of the LOGTYPE option in the SYSIBMTS.TSDEFAULTS administrative view.
- The LOGTYPE option is not valid with the ALLROWS option of the **CREATE INDEX** command because the ALLROWS option forces an initial update and no log tables are created.

For a partitioned database environment, administration tables that are specific to text search indexes, such as staging tables, and text search indexes are distributed in a manner like that used for the corresponding base table. When creating a text search index, use the **ADMINISTRATION TABLES IN** parameter so that the specified table space is in the same partition group as the table space of the base table.

The **CJKSEGMENTATION** option applies to zh_CN, zh_TW, ja_JP and ko_KR locale sets for Chinese, Japanese, and Korean languages. The MORPHOLOGICAL or NGRAM option that you specify for the segmentation method is added to the SYSIBMTS.TSCONFIGURATION administration view.

If you create an index with the **LANGUAGE** parameter set to the AUTO option, you can specify the CJKSEGMENTATION option. The specified segmentation method applies to Chinese, Japanese, and Korean language documents. You cannot change the value that you set for the *cjksegmentation_method* option after index creation is complete.

If you create a text search index by setting the **LANGUAGE** parameter to AUTO and the CJKSEGMENTATION option to MORPHOLOGICAL, searches for valid strings on a morphological index might not return the expected results. In such a case, use the CONTAINS function with the QUERYLANGUAGE option to obtain the results, as shown in the following sample statement:

```
select bookname from ngrambooks where contains (story, '듄', 'QUERYLANGUAGE=zh_CN') = 1
```

If you use the **INITIALMODE** SKIP option, combined with the **LOGTYPE ON** and **AUXLOG ON** options, you must manually insert the log entries into the staging table, but only for the initial update. All subsequent updates are handled automatically.

db2ts DISABLE DATABASE FOR TEXT

This command reverses the changes (for example, drops the text-search related tables and view) made by the command **ENABLE DATABASE FOR TEXT**.

When issued, this command:

- Disables the Db2 Text Search feature for the database

- Drops text search catalog tables and views and related database objects
 - If the **FORCE** option is specified, all text index information is removed from the database and all associated collections are deleted. See the “db2ts DROP INDEX command” for reference.

For execution, the command needs to be prefixed with **db2ts** at the command line.

Authorization

The privileges held by the authorization ID of the statement must include both of the following authorities:

- DBADM with DATAACCESS authority.
 - SYSTS ADM role

Required connection

Database

Command syntax

►►—DISABLE DATABASE FOR TEXT— connection options ►►

connection options:

```
CONNECT TO database-name [USER username USING password]
```

Command parameters

FORCE

Specifies that all text search indexes be forcibly dropped from the database.

If this option is not specified and text search indexes are defined for this database, the command will fail.

If this option is specified and Db2 Text Search service has not been started (the db2ts **START FOR TEXT** command has not been issued), the text search indexes (collections) are not dropped and need to be cleaned up manually with the db2ts **CLEANUP** command.

CONNECT TO *database-name*

This clause specifies the database to which a connection will be established. The database must be on the local system. If specified, this clause takes precedence over the environment variable DB2DBDFT. This clause can be omitted if the following are all true:

- The DB2DBDFT environment variable is set to a valid database name.
 - The user running the command has the required authorization to connect to the database server.

USER *username* **USING** *password*

This clause specifies the authorization name and password that will be used to establish the connection.

Usage notes

This command does not influence the Db2 Net Search Extender enablement status of the database. It deletes the Db2 Text Search catalog tables and views that are created by the **ENABLE FOR TEXT** command.

Before dropping a Db2 database that has text search index definitions, issue this command and make sure that the text indexes and collections have been removed successfully.

If some indexes could not be deleted using the **FORCE** option, the collection names are written to the **db2diag** log file.

Note: The user is discouraged from usage that results in orphaned collections, such as, collections that remain defined on the text search server but are not used by Db2. Here are some cases that cause orphaned collections:

- When a **DROP DATABASE CLP** command is executed without running a **DISABLE DATABASE FOR TEXT** command
- When a **DISABLE DATABASE FOR TEXT** command is executed using the **FORCE** option.
- Some other error conditions.

Multiple commands cannot be executed concurrently on a text search index if they may conflict. If this command is issued while a conflicting command is running, an error will occur and the command will fail, after which you can try to run the command again. Some of the conflicting commands are:

- **DROP INDEX**
- **UPDATE INDEX**
- **CLEAR EVENTS FOR INDEX**
- **ALTER INDEX**
- **DISABLE DATABASE FOR TEXT**

db2ts DROP INDEX

The **db2ts DROP INDEX** command drops an existing text search index.

For execution, the command needs to be prefixed with **db2ts** at the command line.

Authorization

The privileges held by the authorization ID of the statement must include the SYSTS_MGR role and one of the following privileges or authorities:

- CONTROL privilege on the table on which the index is defined
- DROPIN privilege on the schema on which the index is defined
- If the text search index has an existing schedule, the authorization ID must be the same as the index creator, or must have DBADM authority.

Required connection

Database

Command syntax

```
►►—DROP INDEX—index-name—FOR TEXT—→  
►—————| connection options |—————►  
| drop options |
```

connection options:

```
|—————| CONNECT TO—database-name |—————|  
|—————| USER—username—USING—password |—————|
```

Command parameters

DROP INDEX *index-name* FOR TEXT

The schema and name of the index as specified in the **CREATE INDEX** command.
It uniquely identifies the text search index in a database.

drop_options

Reserved for internal IBM use.

CONNECT TO *database-name*

This clause specifies the database to which a connection is established. The database must be on the local system. If specified, this clause takes precedence over the environment variable DB2DBDFT. This clause can be omitted if the following statements are all true:

- The DB2DBDFT environment variable is set to a valid database name.
- The user running the command has the required authorization to connect to the database server.

USER *username* USING *password*

This clause specifies the authorization name and password that are used to establish the connection.

Usage notes

Multiple commands cannot be executed concurrently on a text search index if the command might conflict. If this command is issued while a conflicting command is running, an error occurs and the command fails, after which you can try to run the command again. The following commands are some common conflicting commands:

- **DROP INDEX**
- **UPDATE INDEX**
- **CLEAR EVENTS FOR INDEX**
- **ALTER INDEX**
- **DISABLE DATABASE FOR TEXT**

A **STOP FOR TEXT** command that runs in parallel with the **DROP** operation will not cause a conflicting command message, instead, if the text search server is shut down before DROP has removed the collection, an error will be returned that the text search server is not available.

After a text search index is dropped, text search is no longer possible on the corresponding text column. If you plan to create a new text search on the same text column, you must first disconnect from the database and then reconnect before creating the new text search index.

The **db2ts DROP INDEX FOR TEXT** command makes the following changes to the database:

- Updates the Db2 Text Search catalog information.
- Drops the index staging and event tables.
- Deletes triggers on the user text table.
- Destroys the collection associated with the Db2 Text Search index definition.

db2ts ENABLE DATABASE FOR TEXT

The **db2ts ENABLE DATABASE FOR TEXT** command enables Db2 Text Search for the current database.

It creates administrative tables and views, sets default values for parameters, and must run successfully before you can create text search indexes on columns in tables within the database. The command needs to be prefixed with db2ts at the command line.

After enabling the database, it is necessary to specify the connection information for the text search server in the SYSIBMTS.TSSERVERS view. The enable operation includes an attempt to populate the server data and will show a warning if the server configuration cannot be accessed. In any case, it is recommended to verify the connection information in the view. For details, see the topic about updating Db2 Text Search server information.

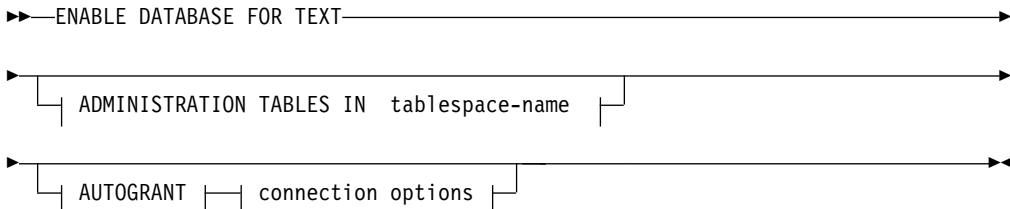
Authorization

- The privileges held by the authorization ID of the statement must include the SYSTS_ADMIN role and the DBADM authority.

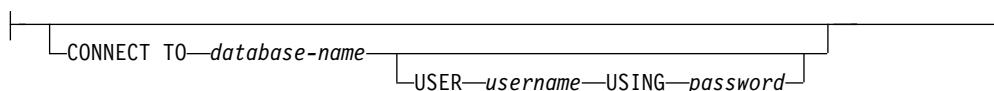
Required connection

Database

Command syntax



connection options:



Command parameters

ADMINISTRATION TABLES IN *tablespace-name*

Specifies the name of an existing regular table space for administration tables created while enabling the database for Db2 Text Search. It is recommended that the table space is in the database partition group IBMCATGROUP. For a partitioned database, the bufferpool and table space should be defined with 32 KB page size.

If the clause is not specified, SYSTOOLSPACE is used as default table space. In this case, ensure that SYSTOOLSPACE already exists. If it does not exist, the SYSPROC.SYSINSTALLOBJECTS procedure may be used to create it.

Note: Use quotation marks to specify a case-sensitive table space name.

AUTOGANT

This option has been deprecated and does not grant privileges to the instance owner anymore. Its use is no longer suggested and might be removed in a future release.

CONNECT TO *database-name*

This clause specifies the database to which a connection is established. The database must be on the local system. If specified, this clause takes precedence over the environment variable DB2DBDFT. This clause can be omitted if the following statements are all true:

- The DB2DBDFT environment variable is set to a valid database name.
- The user running the command has the required authorization to connect to the database server.

USER *username* USING *password*

This clause specifies the authorization name and password used to establish the connection.

Example

Example 1: Enable a database for Db2 Text Search creating administration tables in table space named tsspace and return any error messages in English.

```
CALL SYSPROC.SYSTS_ENABLE('ADMINISTRATION TABLES IN tsspace', 'en_US', ?)
```

The following is an example of output from this query.

```
Value of output parameters
-----
Parameter Name : MESSAGE
Parameter Value : Operation completed successfully.

Return Status = 0
```

Usage notes

When executed successfully, this command does the following actions:

- Enables the Db2 Text Search feature for the database.
- Establishes Db2 Text Search database configuration default values in the view SYSIBMTS.TSDEFAULTS.
- Creates the following Db2 Text Search administrative views in the SYSIBMTS schema:
 - SYSIBMTS.TSDEFAULTS
 - SYSIBMTS.TSLOCKS

- SYSIBMTS.TSINDEXES
 - SYSIBMTS.TSCONFIGURATION
 - SYSIBMTS.TSCOLLECTIONNAMES
 - SYSIBMTS.TSSERVERS

db2ts HELP

db2ts HELP displays the list of available Db2 Text Search commands, or the syntax of an individual command.

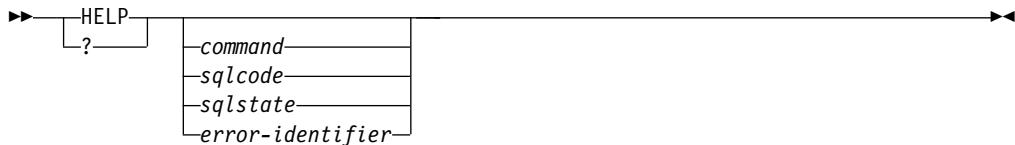
Use the **db2ts HELP** command to get help on specific error messages as well.

For execution, the command needs to be prefixed with **db2ts** at the command line.

Authorization

None.

Command syntax



Command parameters

HELP | ?

Provides help information for a command or a reason code.

command

The first keywords that identify a Db2 Text Search command:

- ALTER
 - CLEANUP
 - CLEAR (for both CLEAR COMMAND LOCKS and CLEAR EVENTS FOR INDEX)
 - CREATE
 - DISABLE
 - DROP
 - ENABLE
 - RESET PENDING
 - START
 - STOP
 - UPDATE

sqlcode

SQLCODE for message returned by db2ts command (within or outside the administration stored procedure) or text search query.

sqlstate

Sqlstate returned by command, administration stored procedure, or text search query.

error-identifier

An identifier is part of the *text-search-error-msg* that is embedded in error messages. This identifier starts with 'CIE' and is of the form CIE n nnnn where n nnnn is a number. This identifier represents the specific error that is returned upon an error during text search. It may also be returned in an informational message upon completion of a text search command or in the message printed at the completion of a text search administration procedure. If the identifier does not start with 'CIE', then **db2ts help** cannot provide information about the *error-identifier*. For example, db2ts cannot provide help for a message with an *error-identifier* such as IQQR0012E.

Usage notes

When using a UNIX shell, it might be necessary to supply the arguments to **db2ts** using double quotation marks, as in the following example:

```
db2ts "? CIE00323"
```

Without the quotation marks, the shell tries to match the wildcard with the contents of the working directory and it may give unexpected results.

If the first keyword of any db2ts command is specified, the syntax of the identified command is displayed. For the two db2ts commands that share the same first keyword (**CLEAR COMMAND LOCKS** and **CLEAR EVENTS FOR INDEX**), the syntax of both commands will be displayed when db2ts help clear is issued, but each command may be specifically displayed by adding the second keyword to distinguish them, for example db2ts help clear events. If a parameter is not specified after ? or **HELP**, db2ts lists all available db2ts commands.

Specifying a *sqlcode*, *sqlstate*, or CIE *error-identifier* will return information about that code, state, or error identifier. For example,

```
db2ts help SQL20423
```

or

```
db2ts ? 38H10
```

or

```
db2ts ? CIE00323
```

db2ts RESET PENDING command

Issues a SET INTEGRITY statement for all text-maintained staging tables that are associated with a particular table.

Certain commands cause the Db2 Text Search staging tables to go into pending mode, which blocks other database or text search operations. If you use the **db2ts RESET PENDING** command, you do not have to find all text indexes and associated staging tables and then issue a SET INTEGRITY statement for each table.

After detaching a data partition, you must issue the **RESET PENDING** command to update the staging-table content.

Authorization

This command requires the SYSTS_MGR role and at least one of the following authorities or privileges:

- DATAACCESS authority
 - CONTROL on the base table on which the text index is created

Note: Currently ALL privileges are granted to the SYSTS_MGR to allow for the creation or dropping of new index tables. However, if a dependent object like an index is implicitly created on the index table, then authorization is not propagated. To delete the dependent object, grant CONTROL privilege to the user.

Required connection

You must issue this command from the Db2 database server.

Command syntax

►►RESET PENDING FOR TABLE— *table-schema.table-name*—FOR TEXT
►►|connection-options|►►

Connection-options:

```
|   CONNECT TO database-name |  
|       USER userid USING password |
```

Command parameters

table-name

The name of the table for which the text-maintained staging infrastructure was added and for which integrity processing is required.

table-schema

The schema of the table for which a command was issued that resulted in a pending mode.

Usage notes

Use the **RESET PENDING** command after issuing a command that causes the underlying tables to be put into pending mode, such as the **LOAD** command with the **INSERT** parameter, or after issuing a command that requires a **SET INTEGRITY** statement to refresh dependent tables, such as the **ALTER TABLE ... DETACH** statement.

db2ts SET COMMAND LOCK command

The **db2ts SET COMMAND LOCKS** command creates a manual lock when an administrative operation is applied on the collection level.

Authorization

To set a command lock, you must have the corresponding privileges as for clearing the lock. For example, to set a lock on a specific index, the SYSTS_MGR role and the corresponding table privileges are required.

Command syntax

```
►—SET COMMAND LOCKS—[FOR INDEX—index-name]—FOR TEXT—►
```

Command parameters

SET COMMAND LOCKS FOR INDEX *index-name*

Specifies the name of the index, which uniquely identifies the text search index within the database.

Usage notes

The lock is visible in the SYSIBMTS.TSLOCKS administrative view. It prevents other administrative operations, but allows index search to continue. You must explicitly remove the lock with the **CLEAR COMMAND LOCKS** operation.

db2ts START FOR TEXT

The **db2ts START FOR TEXT** command starts the Db2 Text Search instance services that support other Db2 Text Search administration commands and the ability to reference text search indexes in SQL queries.

The **db2ts START FOR TEXT** command also includes starting processes for rich text support on the host machine running the Db2 Text Search server, if the server is configured for rich text support.

This command must be issued from the Db2 database server.

To start instance services in a partitioned database environment using an integrated text search setup, you must run the command on the integrated text search server host machine. By default, the integrated text search server host machine is the host of the lowest-numbered database partition server.

Authorization

Instance owner. No database privilege is required

Command syntax

```
►—START FOR TEXT—[STATUS|VERIFY]—►
```

Command parameters

STATUS

Verifies the status of the Db2 Text Search server. A verbose informational message is returned indicating the STARTED or STOPPED status of the server.

VERIFY

Verifies the started status of the Db2 Text Search server and exits with a standard message and return code 0 indicating that the operation is successful. A non-zero code is returned for any other state of the text search server or if the status cannot be verified.

Examples

- Check that the text search server is started.

Linux/UNIX:

```
$ db2ts START FOR TEXT VERIFY  
CIE00001 Operation completed successfully.
```

```
$ echo $?  
0
```

Windows:

```
C:\> db2ts START FOR TEXT VERIFY  
CIE00001 Operation completed successfully.
```

```
C:\> echo %ERRORLEVEL%  
0
```

Usage notes

- In a partitioned database environment, the **db2ts START FOR TEXT** command with the **STATUS** and **VERIFY** parameters can be issued on any one of the partition server hosts. To start the instance services, you must run the **db2ts START FOR TEXT** command on the integrated text search server host machine. The integrated text search server host machine is the host of the lowest-numbered database partition server. If custom collection directories are used, ensure that no lower numbered partitions are created later. This restriction is especially relevant for Linux and UNIX platforms. If you configure Db2 Text Search when creating an instance, the configuration initially determines the integrated text search server host. That configuration must always remain the host of the lowest-numbered database partition server.
- On Windows platforms, there is a Windows service associated with each Db2 instance for Db2 Text Search. The service name can be determined by issuing the following command:

```
DB2TS - <instance name>[-<partition number>]
```

. Apart from the using the **db2ts START FOR TEXT** command, you can also start the service using the Control Panel or the **NET START** command.

db2ts STOP FOR TEXT

The **db2ts STOP FOR TEXT** command stops Db2 Text Search instance services. If the running services include processes for rich text support then those services are stopped as well.

This command must be issued from the Db2 database server.

When running this command from the command line, prefix the command with db2ts at the Db2 command line.

This command provides the convenience of stopping a stand-alone text search server which can also be achieved in its own installation environment using the provided script. If the instance services are already stopped, the command only checks and reports its status to the user.

Authorization

Instance owner. No database privilege is required

Command syntax

```
►—STOP FOR TEXT— STATUS  
          |  
          VERSIFY
```

Command parameters

STATUS

Verifies the status of the Db2 Text Search servers. A verbose informational message is returned indicating the STARTED or STOPPED status of the servers.

VERSIFY

Verifies the stopped status of the Db2 Text Search server. It exits with the standard message and return code 0 to indicate the command ran successfully. Otherwise, the text search server returns a non-zero code to indicate failure.

Usage notes

- To avoid interrupting the execution of currently running commands, ensure no other administrative commands like the **db2ts UPDATE INDEX FOR TEXT** command are still active before issuing the **db2ts STOP FOR TEXT** command.
- In a partitioned database environment, the **db2ts START FOR TEXT** command with the **STATUS** and **VERSIFY** parameters can be issued on any one of the partition server hosts.
- In a partitioned database environment on Windows platforms using an integrated text search server, stop the instance services by issuing the **db2ts STOP FOR TEXT** command on the integrated text search server host machine. By default, the integrated text search server host machine is the host of the lowest-numbered database partition server. Running the command on the integrated text search server host machine ensures that all processes and services are stopped. If the command is run on a different partition server host, the DB2TS service must be stopped separately using a command such as NET STOP.

db2ts UPDATE INDEX

The **db2ts UPDATE INDEX** command updates the text search index to reflect the current contents of the text column with which the index is associated. You can do a search during the update. However the search operates on the partially updated index until the update is complete.

For execution, you must prefix the command with **db2ts** at the command line.

Authorization

The privileges that are held by the authorization ID of the statement must include the SYSTS_MGR role and at least one of the following authorities:

- DATAACCESS authority
- CONTROL privilege on the table on which the text index is defined
- INDEX with SELECT privilege on the base table on which the text index is defined

In addition, for an initial update the authorization requirements apply as outlined in the **CREATE TRIGGER** statement.

Required connection

Database

Command syntax

```
►►—UPDATE INDEX—index-name—FOR TEXT—  
                                |————— UPDATE OPTIONS —————|—————>  
►| connection options |—————>
```

connection options:

```
|—————|—————|—————|—————>  
| CONNECT TO—database-name |—————|—————|—————>  
|—————|—————|—————|—————>  
|—————|—————|—————|—————>  
|—————|—————|—————|—————>
```

Command parameters

UPDATE INDEX *index-name*

Specifies the name of the text search index to be updated. The index name must adhere to the naming restrictions for Db2 indexes.

UPDATE OPTIONS

An input argument of type VARCHAR(32K) that specifies update options. If no options are specified the update is started unconditionally. The possible values are:

UPDATE OPTIONS value	Description
USING UPDATE MINIMUM	This option enforces the use of the UPDATE MINIMUM value that is defined for the text search index and processes updates if the specified minimum number of changes occurred.
FOR DATA REDISTRIBUTION	This option specifies that a text search index in a partitioned database must be refreshed after data partitions are added or removed and a subsequent data redistribution operation must be completed. Search results might be inconsistent until the text search index is updated with the FOR DATA REDISTRIBUTION option.
ALLROWS	This option specifies that an initial update must be attempted unconditionally.

UPDATE OPTIONS value	Description
UPDATEAUTOCOMMIT <i>commitsize</i>	<p>Specifies the number of rows or number of hours after which a commit is run to automatically preserve the previous work for either initial or incremental updates.</p> <p>If you specify the number of rows:</p> <ul style="list-style-type: none"> After the number of documents that are updated reaches the COMMITCOUNT number, the server applies a commit. COMMITCOUNT counts the number of documents that are updated by using the primary key, not the number of staging table entries. <p>If you specify the number of hours:</p> <ul style="list-style-type: none"> The text index is committed after the specified number of hours is reached. The maximum number of hours is 24. <p>For initial updates, the index update processes batches of documents from the base table. After the <i>commitsize</i> value is reached, update processing completes a COMMIT operation and the last processed key is saved in the staging table with operational identifier '4'. This key is used to restart update processing either after a failure or after the number of specified <i>commitcycles</i> are completed. If a <i>commitcycles</i> is specified, the update mode is modified to incremental to initiate capturing changes by using the LOGTYPE BASIC option to create triggers on the text table. However, until the initial update is complete, log entries that are generated by documents that have not been processed in a previous cycle are removed from the staging table.</p> <p>Using the UPDATEAUTOCOMMIT option for an initial text index update leads to a significant increase of execution time.</p> <p>For incremental updates, log entries that are processed are removed correspondingly from the staging table with each interim commit.</p> <p>In a multi-partition database environment, the <i>commitsize</i> value specified is per node.</p>
COMMITTYPE <i>committype</i>	Specifies rows or hours for the UPDATEAUTOCOMMIT index configuration option. The default is rows.

UPDATE OPTIONS value	Description
COMMITCYCLES <i>commitcycles</i>	<p>Specifies the number of commit cycles. The default is 0 for unlimited cycles.</p> <p>If cycles are not explicitly specified, the update operation uses as many cycles as required based on the batch size that is specified with the UPDATEAUTOCOMMIT option to finish the update processing.</p> <p>You can use this option with the UPDATEAUTOCOMMIT setting with a <i>committype</i>.</p>

CONNECT TO *database-name*

This clause specifies the database to which a connection is established. The database must be on the local system. If specified, this clause takes precedence over the environment variable DB2DBDFT. You can omit this clause if the following statements are all true:

- The DB2DBDFT environment variable is set to a valid database name.
- The user running the command has the required authorization to connect to the database server.

USER *username* USING *password*

This clause specifies the authorization name and password that are used to establish the connection.

Usage notes

All limits and naming conventions that apply to Db2 database objects and queries also apply to Db2 Text Search features and queries. Db2 Text Search related identifiers must conform to the Db2 naming conventions. In addition, there are some additional restrictions. For example, these identifiers can only be of the form:

[A-Za-z] [A-Za-z0-9@#\$_]*

or

"[A-Za-z] [A-Za-z0-9@#\$_]*"

If synonym dictionaries are created for a text index, issuing the ALLROWS and FOR DATA REDISTRIBUTION update options removes dictionaries from existing collections. You can associate new collections with the text index after database partitions are added. The synonym dictionaries for all associated collections have to be added again.

The command does not complete successfully until all index update processing is completed. The duration depends on the number of documents to be indexed and the number of documents already indexed. You can retrieve the collection name from the SYSIBMTS.TSCOLLECTIONNAMES view (column COLLECTIONNAME).

Multiple commands cannot be issued concurrently on a text search index if they might conflict. If you run this command while a conflicting command is running, an error occurs and the command fails, after which you can try to run the command again. The following commands are some of the common conflicting commands:

- **UPDATE INDEX**

- **CLEAR EVENTS FOR INDEX**
- **ALTER INDEX**
- **DROP INDEX**
- **DISABLE DATABASE FOR TEXT**

Note: In cases of individual document errors, the documents must be corrected. The primary keys of the erroneous documents can be looked up in the event table for the index. The next **UPDATE INDEX** command reprocesses these documents if the corresponding rows in the user table are modified.

The **UPDATE INDEX** command include changes to the database, such as:

- Insert rows to the event table (including parser error information from Db2 Text Search).
- Delete from the index staging table in case of incremental updates.
- Before first update, create triggers on the user text table.
- The collection is updated.
- New or changed documents are parsed and indexed.
- Deleted documents are discarded from the index.

You can specify the **UPDATEAUTOCOMMIT** index configuration option without type and cycles for compatibility with an earlier version. It is associated by default with the **COMMITTYPE** rows option and unrestricted cycles.

When you specify **UPDATEAUTOCOMMIT**, **COMMITTYPE** or **COMMITSIZE** values for the update operation, they override existing configured values only for the specific update and are not persisted.

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