291
UTL_I18N

`UTL_I18N` is a set of services that provides additional globalization functionality for applications written in PL/SQL.

> **See Also:**
>
> *Oracle Database Globalization Support Guide*

The chapter contains the following topics:

UTL_I18N Overview

`UTL_I18N` services provide additional globalization functionality for applications written in PL/SQL.

The `UTL_I18N` PL/SQL package consists of the following categories of services:

- String conversion functions for various datatypes.
- Functions that convert a text string to character references and vice versa.
- Functions that map between Oracle, Java, and ISO languages and territories.
- Functions that map between Oracle, Internet Assigned Numbers Authority (IANA), and e-mail safe character sets.
- A function that returns the Oracle character set name from an Oracle language name.
- A function that returns the maximum number of bytes for a character of an Oracle character set.
- A function that performs script transliteration.
- Functions that return the ISO currency code, local time zones, and local languages supported for a given territory.
- Functions that return the most appropriate linguistic sort, a listing of all the applicable linguistic sorts, and the local territories supported for a given language.
- Functions that map between the Oracle full and short language names.
- A function that returns the language translation of a given language and territory name.
- A function that returns a listing of the most commonly used time zones.

- Procedures that detect the most likely Oracle character sets and Oracle languages for a given data sample.

UTL_I18N Security Model

The functions and procedures of the `UTL_I18N` package neither read database contents nor modify them. They operate on their arguments only and/or they retrieve static internationalization information from NLS Data files. The execution privilege for the package is granted to `PUBLIC` by default

UTL_I18N Constants

`UTL_I18N` defines constants to use when specifying parameter values.

These constants are shown in the following table.

Table 291-1 UTL_I18N Constants

Constant	Type	Value	Description
GENERIC_CONTEXT	PLS_INTEGER	0	Returns the default character set for general cases.
MAIL_GENERIC	PLS_INTEGER	0	Map from an Oracle character set name to an email safe character set name on a non-Windows platform.
ORACLE_TO_IANA	PLS_INTEGER	0	Map from an Oracle character set name to an IANA character set name.
SHIFT_IN	PLS_INTEGER	0	Used with `shift_status`. Must be set the first time it is called in piecewise conversion.
IANA_TO_ORACLE	PLS_INTEGER	1	Map from an IANA character set name to an Oracle character set name.
MAIL_CONTEXT	PLS_INTEGER	1	The mapping is between an Oracle character set name and an email safe character set name.
MAIL_WINDOWS	PLS_INTEGER	1	Map from an Oracle character set name to an email safe character set name on a Windows platform.
SHIFT_OUT	PLS_INTEGER	1	
FWKATAKANA_HIRAGANA	VARCHAR2(30)	'fwkatakana_hiragana'	Converts only fullwidth Katakana characters to fullwidth Hiragana characters.
FWKATAKANA_HWKATAKANA	VARCHAR2(30)	'fwkatakana_hwkatakana'	Converts only fullwidth Katakana characters to halfwidth Katakana characters.
HIRAGANA_FWKATAKANA	VARCHAR2(30)	'hiragana_fwkatakana'	Converts only fullwidth Hiragana characters to fullwidth Katakana characters.
HIRAGANA_HWKATAKANA	VARCHAR2(30)	'hiragana_hwkatakana'	Converts only fullwidth Hiragana characters to halfwidth Katakana characters.

Table 291-1 (Cont.) UTL_I18N Constants

Constant	Type	Value	Description
HWKATAKANA_FWKATAKANA	VARCHAR2(30)	'hwkatakana_fwkatakana'	Converts only halfwidth Katakana characters to fullwidth Katakana characters.
HWKATAKANA_HIRAGANA	VARCHAR2(30)	'hwkatakana_hiragana'	Converts only halfwidth Katakana characters to fullwidth Hiragana characters.
KANA_FWKATAKANA	VARCHAR2(30)	'kana_fwkatakana'	Converts any type of Kana character to a fullwidth Katakana character.
KANA_HIRAGANA	VARCHAR2(30)	'kana_hiragana'	Converts any type of Kana character to a fullwidth Hiragana character.
KANA_HWKATAKANA	VARCHAR2(30)	'kana_hwkatakana'	Converts any type of Kana character to a halfwidth Katakana character.
LATIN_ASCII_DIN91379	VARCHAR2(30)	'latin_ascii_din91379'	Converts Latin characters to ASCII characters.
CYRILLIC_LATIN_ISO9	VARCHAR2(30)	'cyrillic_latin_iso9'	Converts Cyrillic characters to Latin characters.
GREEK_LATIN_ISO843	VARCHAR2(30)	'greek_latin_iso843'	Converts Greek characters to Latin characters.
ARABIC_LATIN_ISO233	VARCHAR2(30)	'arabic_latin_iso233'	Converts Arabic characters to Latin characters.
HEBREW_LATIN_ISO259	VARCHAR2(30)	'hebrew_latin_iso259'	Converts Hebrew characters to Latin characters.
MODERN_HEBREW_LATIN_ISO259_2	VARCHAR2(30)	'modern_hebrew_latin_iso259_2'	Converts Modern Hebrew characters to Latin characters.
CYR_ASCII_ICAO9303	VARCHAR2(30)	'cyr_ascii_ICAO9303'	Converts Cyrillic characters to ASCII characters.
CYR_BY_ASCII_ICAO9303	VARCHAR2(30)	'cyr_by_ascii_ICAO9303'	Converts Cyrillic Belarus characters to ASCII characters.
CYR_UA_ASCII_ICAO9303	VARCHAR2(30)	'cyr_ua_ascii_ICAO9303'	Converts Cyrillic Ukraine characters to ASCII characters.
CYR_RS_ASCII_ICAO9303	VARCHAR2(30)	'cyr_rs_ascii_ICAO9303'	Converts Cyrillic Serbia characters to ASCII characters.
CYR_BG_ASCII_ICAO9303	VARCHAR2(30)	'cyr_bg_ascii_ICAO9303'	Converts Cyrillic Bulgaria characters to ASCII characters.
CYR_MK_ASCII_ICAO9303	VARCHAR2(30)	'cyr_mk_ascii_ICAO9303'	Converts Cyrillic North Macedonia characters to ASCII characters.

UTL_I18N Data Structures

The `UTL_I18N` package defines `RECORD` types and `TABLE` types.

RECORD Types

- CHARSET_RESULT_RECORD Record Type
- LANGUAGE_CHARSET_RESULT_RECORD Record Type
- LANGUAGE_RESULT_RECORD Record Type

TABLE Types

- CHARSET_RESULT_TABLE Table Type
- LANGUAGE_CHARSET_RESULT_TABLE Table Type
- LANGUAGE_RESULT_TABLE Table Type

CHARSET_RESULT_RECORD Record Type

This record type contains information returned by the `DETECT_CHARSET` procedure in the `UTL_I18N` package.

Syntax

```
TYPE CHARSET_RESULT_RECORD IS RECORD (
  charset      VARCHAR2(28),
  score        NUMBER);
```

Fields

Table 291-2 CHARSET_RESULT_RECORD Fields

Field	Description
`charset`	Oracle character set
`score`	A numeric value representing the likelihood that `charset` is the Oracle character set for the given data sample. The value is between 0 (least likely) and 1 (most likely).

LANGUAGE_CHARSET_RESULT_RECORD Record Type

This record type contains information returned by the `DETECT_LANGUAGE_CHARSET` procedure in the `UTL_I18N` package.

Syntax

```
TYPE LANGUAGE_CHARSET_RESULT_RECORD IS RECORD (
  language      VARCHAR2(28),
  charset       VARCHAR2(28),
  score         NUMBER);
```

Fields

Table 291-3 LANGUAGE_CHARSET_RESULT_RECORD Fields

Field	Description
`language`	Oracle language
`charset`	Oracle character set
`score`	A numeric value representing the likelihood that `language` is the Oracle language and `charset` is the Oracle character set for the given data sample. The value is between 0 (least likely) and 1 (most likely).

LANGUAGE_RESULT_RECORD Record Type

This record type contains information returned by the `DETECT_LANGUAGE` procedure in the `UTL_I18N` package.

Syntax

```
TYPE LANGUAGE_RESULT_RECORD IS RECORD (
  language      VARCHAR2(28),
  score         NUMBER);
```

Fields

Table 291-4 LANGUAGE_RESULT_RECORD Fields

Field	Description
`language`	Oracle language
`score`	A numeric value representing the likelihood that `language` is the Oracle language for the given data sample. The value is between 0 (least likely) and 1 (most likely).

CHARSET_RESULT_TABLE Table Type

This is a table of `CHARSET_RESULT_RECORD` Record Type.

Syntax

```
TYPE charset_result_table IS TABLE OF charset_result_record;
```

Related Topics

- CHARSET_RESULT_RECORD Record Type
  This record type contains information returned by the `DETECT_CHARSET` procedure in the `UTL_I18N` package.

LANGUAGE_CHARSET_RESULT_TABLE Table Type

This is a table of `LANGUAGE_CHARSET_RESULT_RECORD` Record Type.

Syntax

```
TYPE language_charset_result_table IS TABLE OF language_charset_result_record;
```

Related Topics

- LANGUAGE_CHARSET_RESULT_RECORD Record Type
  This record type contains information returned by the `DETECT_LANGUAGE_CHARSET` procedure in the `UTL_I18N` package.

LANGUAGE_RESULT_TABLE Table Type

This is a table of `LANGUAGE_RESULT_RECORD` Record Type.

Syntax

```
TYPE language_result_table IS TABLE OF language_result_record;
```

Related Topics

- LANGUAGE_RESULT_RECORD Record Type
  This record type contains information returned by the `DETECT_LANGUAGE` procedure in the `UTL_I18N` package.

Summary of UTL_I18N Subprograms

This table lists the `UTL_I18N` subprograms and briefly describes them.

Table 291-5 UTL_I18N Package Subprograms

Procedure	Description
DETECT_CHARSET Procedure	Detects the most likely Oracle character sets for a given data sample.
DETECT_LANGUAGE Procedure	Detects the most likely Oracle languages for a given data sample.
DETECT_LANGUAGE_CHARSET Procedure	Detects the most likely Oracle languages and Oracle character sets for a given data sample.
ESCAPE_REFERENCE Function	Converts a given text string to its character reference counterparts, for characters that fall outside the document character set.
GET_COMMON_TIME_ZONES Function	Returns the list of common time zone IDs that are independent of the locales.
GET_DEFAULT_CHARSET Function	Returns the default Oracle character set name or the default e-mail safe character set name from an Oracle language name.
GET_DEFAULT_ISO_CURRENCY Function	Returns the default ISO 4217 currency code for the specified territory.
GET_DEFAULT_LINGUISTIC_SORT Function	Returns the default linguistic sort name for the specified language.
GET_LOCAL_LANGUAGES Function	Returns the local language names for the specified territory.
GET_LOCAL_LINGUISTIC_SORTS Function	Returns the local linguistic sort names for the specified language.
GET_LOCAL_TERRITORIES Function	Returns the local territory names for the specified language.
GET_LOCAL_TIME_ZONES Function	Returns the local time zone IDs for the specified territory.
GET_MAX_CHARACTER_SIZE Function	Returns the maximum character size of a given character set.
GET_TRANSLATION Function	Returns the translation of the language and territory name in the specified translation language.

Table 291-5 (Cont.) UTL_I18N Package Subprograms

Procedure	Description
MAP_CHARSET Function	• Maps an Oracle character set name to an IANA character set name. • Maps an IANA character set name to an Oracle character set name. • Maps an Oracle character set name to an e-mail safe character set name.
MAP_FROM_SHORT_LANGUAGE Function	Maps an Oracle short language name to an Oracle language name.
MAP_LANGUAGE_FROM_ISO Function	Returns an Oracle language name from an ISO locale name.
MAP_LOCALE_TO_ISO Function	Returns an ISO locale name from the Oracle language and territory name.
MAP_TERRITORY_FROM_ISO Function	Returns an Oracle territory name from an ISO locale name.
MAP_TO_SHORT_LANGUAGE Function	Maps an Oracle language name to an Oracle short language name.
RAW_TO_CHAR Functions	Converts `RAW` data that is not encoded in the database character set into a `VARCHAR2` string
RAW_TO_NCHAR Functions	Converts `RAW` data that is not encoded in the national character set into an `NVARCHAR2` string
STRING_TO_RAW Function	Converts a `VARCHAR2` or `NVARCHAR2` string to another character set. The result is returned as a `RAW` datatype.
TRANSLITERATE Function	Performs script transliteration.
UNESCAPE_REFERENCE Function	Converts an input string that contains character references to a text string.
VALIDATE_CHARACTER_ENCODING Function	Validates the character encoding of VARCHAR2, NVARCHAR2, CLOB, and NCLOB data.

DETECT_CHARSET Procedure

This procedure detects the most likely Oracle character sets for a given data sample.

The procedure is overloaded to accept data of type BFILE, BLOB, CLOB, VARCHAR2, or NVARCHAR2. The procedure analyzes the data and returns its possible Oracle character sets, ranked by likelihood. It stores the results in a table of type `CHARSET_RESULT_TABLE`.

Syntax

This procedure analyzes BFILE data:

```
UTL_I18N.DETECT_CHARSET (
    result         OUT charset_result_table,
    src            IN BFILE,
    profile        IN BINARY_INTEGER DEFAULT 1,
    num_results    IN BINARY_INTEGER DEFAULT NULL,
    sample_size    IN BINARY_INTEGER DEFAULT NULL
);
```

This procedure analyzes BLOB data:

```
UTL_I18N.DETECT_CHARSET (
    result         OUT charset_result_table,
```

```
    src             IN BLOB,
    profile         IN BINARY_INTEGER DEFAULT 1,
    num_results     IN BINARY_INTEGER DEFAULT NULL,
    sample_size     IN BINARY_INTEGER DEFAULT NULL
);
```

This procedure analyzes CLOB data:

```
UTL_I18N.DETECT_CHARSET (
    result          OUT charset_result_table,
    src             IN CLOB,
    profile         IN BINARY_INTEGER DEFAULT 1,
    num_results     IN BINARY_INTEGER DEFAULT NULL,
    sample_size     IN BINARY_INTEGER DEFAULT NULL
);
```

This procedure analyzes VARCHAR2 or NVARCHAR2 data:

```
UTL_I18N.DETECT_CHARSET (
    result          OUT charset_result_table,
    src             IN VARCHAR2,
    profile         IN BINARY_INTEGER DEFAULT 1,
    num_results     IN BINARY_INTEGER DEFAULT NULL,
    sample_size     IN BINARY_INTEGER DEFAULT NULL
);
```

Parameters

Table 291-6 DETECT_CHARSET Procedure Parameters

Parameter	Description
`result`	Result table of type `CHARSET_RESULT_TABLE`. Each result row consists of an Oracle character set name and its score. The rows are ordered by score in descending order, that is, the character set with the highest score (most likely) is listed first, and the character set with the lowest score (least likely) is listed last.
`src`	Data sample whose character set is to be detected.
`profile`	Language and character set detection profile identifier: • `1` - Supports the languages and character sets supported by LCSSCAN and GDK. When this profile is used and the given sample data is binary data, the procedure does not return a reasonable result. • `2` - Supports the languages and character sets supported by LCSSCAN and GDK, as well as the pseudo BINARY language and the pseudo BINARY character set. This profile does not support the AL16UTF16 character set. The default profile identifier is `1`. **See Also:** *Oracle Database Globalization Support Guide* for the list of languages and character sets supported by LCSSCAN and GDK
`num_results`	Number of result rows to store in the result table. The default is NULL, meaning the procedure stores all result rows in the result table.
`sample_size`	Sampling size of the data (in bytes). If this value is greater than the length of the data, then the data length is used. The default is NULL, meaning the full length of the data is used.

Usage Notes

If the given data sample is NULL, then the procedure returns a result table with no rows.

Example

Create a table that contains a data sample of type VARCHAR2.

```
CREATE TABLE src_data (sample VARCHAR2(40));
INSERT INTO src_data VALUES ('Hello! How are you?');
```

Use the `DETECT_CHARSET` procedure to analyze the data sample.

```
VAR l_char VARCHAR2(40)
EXEC SELECT sample INTO :l_char FROM src_data;


VAR l_cur REFCURSOR

DECLARE
  l_result     UTL_I18N.CHARSET_RESULT_TABLE;
BEGIN
  UTL_I18N.DETECT_CHARSET(l_result, :l_char, 1, 5);
  OPEN :l_cur FOR SELECT * FROM TABLE(l_result);
END;
/

PRINT l_cur
```

The result table displays the five most likely Oracle character sets for the given data sample.

```
CHARSET                          SCORE
-------------------------- ----------
US7ASCII                       .853497
EE8ISO8859P2                  .0933974
NEE8ISO8859P4                 .0224543
AL16UTF16                     .0100793
WE8ISO8859P9                 .00778038
```

DETECT_LANGUAGE Procedure

This procedure detects the most likely Oracle languages for a given data sample.

The procedure is overloaded to accept data of type BFILE, BLOB, CLOB, VARCHAR2, or NVARCHAR2. The procedure analyzes the data and returns its possible Oracle languages, ranked by likelihood. It stores the results in a table of type `LANGUAGE_RESULT_TABLE`.

Syntax

This procedure analyzes BFILE data:

```
UTL_I18N.DETECT_LANGUAGE (
    result         OUT language_result_table,
    src            IN BFILE,
    profile        IN BINARY_INTEGER DEFAULT 1,
    num_results    IN BINARY_INTEGER DEFAULT NULL,
    sample_size    IN BINARY_INTEGER DEFAULT NULL
);
```

This procedure analyzes BLOB data:

```
UTL_I18N.DETECT_LANGUAGE (
    result         OUT language_result_table,
    src            IN BLOB,
    profile        IN BINARY_INTEGER DEFAULT 1,
    num_results    IN BINARY_INTEGER DEFAULT NULL,
    sample_size    IN BINARY_INTEGER DEFAULT NULL
);
```

This procedure analyzes CLOB data:

```
UTL_I18N.DETECT_LANGUAGE (
    result         OUT language_result_table,
    src            IN CLOB,
    profile        IN BINARY_INTEGER DEFAULT 1,
    num_results    IN BINARY_INTEGER DEFAULT NULL,
    sample_size    IN BINARY_INTEGER DEFAULT NULL
);
```

This procedure analyzes VARCHAR2 or NVARCHAR2 data:

```
UTL_I18N.DETECT_LANGUAGE (
    result         OUT language_result_table,
    src            IN VARCHAR2,
    profile        IN BINARY_INTEGER DEFAULT 1,
    num_results    IN BINARY_INTEGER DEFAULT NULL,
    sample_size    IN BINARY_INTEGER DEFAULT NULL
);
```

Parameters

Table 291-7 DETECT_LANGUAGE Procedure Parameters

Parameter	Description
`result`	Result table of type `LANGUAGE_RESULT_TABLE`. Each result row consists of an Oracle language name and its score. The rows are ordered by score in descending order, that is, the language with the highest score (most likely) is listed first, and the language with the lowest score (least likely) is listed last.
`src`	Data sample whose language is to be detected.
`profile`	Language and character set detection profile identifier: • `1` - Supports the languages and character sets supported by LCSSCAN and GDK. When this profile is used and the given sample data is binary data, the procedure does not return a reasonable result. • `2` - Supports the languages and character sets supported by LCSSCAN and GDK, as well as the pseudo BINARY language and the pseudo BINARY character set. This profile does not support the AL16UTF16 character set. The default profile identifier is `1`. **See Also:** *Oracle Database Globalization Support Guide* for the list of languages and character sets supported by LCSSCAN and GDK
`num_results`	Number of result rows to store in the result table. The default is NULL, meaning the procedure stores all result rows in the result table.
`sample_size`	Sampling size of the data (in bytes). If this value is greater than the length of the data, then the data length is used. The default is NULL, meaning the full length of the data is used.

Usage Notes

If the given data sample is NULL, then the procedure returns a result table with no rows.

Examples

Create a table that contains a data sample of type VARCHAR2.

```
CREATE TABLE src_data (sample VARCHAR2(40));
INSERT INTO src_data VALUES ('Hello! How are you?');
```

Use the `DETECT_LANGUAGE` procedure to analyze the data sample.

```
VAR l_char VARCHAR2(40)
EXEC SELECT sample INTO :l_char FROM src_data;


VAR l_cur REFCURSOR

DECLARE
  l_result     UTL_I18N.LANGUAGE_RESULT_TABLE;
BEGIN
  UTL_I18N.DETECT_LANGUAGE(l_result, :l_char, 1, 5);
  OPEN :l_cur FOR SELECT * FROM TABLE(l_result);
END;
/

PRINT l_cur
```

The result table displays the five most likely Oracle languages for the given data sample.

```
LANGUAGE                          SCORE
------------------------------ ----------
ENGLISH                          .245638
ITALIAN                         .0876835
POLISH                          .0758762
FRENCH                          .0744972
INDONESIAN                      .0538222
```

DETECT_LANGUAGE_CHARSET Procedure

This procedure detects the most likely Oracle languages and Oracle character sets for a given data sample.

The procedure is overloaded to accept data of type BFILE, BLOB, CLOB, VARCHAR2, or NVARCHAR2. The procedure analyzes the data and returns its possible Oracle languages and Oracle character sets, ranked by likelihood. It stores the results in a table of type `LANGUAGE_CHARSET_RESULT_TABLE`.

Syntax

This procedure analyzes BFILE data:

```
UTL_I18N.DETECT_LANGUAGE_CHARSET (
    result         OUT language_charset_result_table,
    src            IN BFILE,
    profile        IN BINARY_INTEGER DEFAULT 1,
    num_results    IN BINARY_INTEGER DEFAULT NULL,
    sample_size    IN BINARY_INTEGER DEFAULT NULL
);
```

This procedure analyzes BLOB data:

```
UTL_I18N.DETECT_LANGUAGE_CHARSET (
    result         OUT language_charset_result_table,
    src            IN BLOB,
    profile        IN BINARY_INTEGER DEFAULT 1,
    num_results    IN BINARY_INTEGER DEFAULT NULL,
    sample_size    IN BINARY_INTEGER DEFAULT NULL
);
```

This procedure analyzes CLOB data:

```
UTL_I18N.DETECT_LANGUAGE_CHARSET (
    result         OUT language_charset_result_table,
    src            IN CLOB,
    profile        IN BINARY_INTEGER DEFAULT 1,
    num_results    IN BINARY_INTEGER DEFAULT NULL,
    sample_size    IN BINARY_INTEGER DEFAULT NULL
);
```

This procedure analyzes VARCHAR2 or NVARCHAR2 data:

```
UTL_I18N.DETECT_LANGUAGE_CHARSET (
    result         OUT language_charset_result_table,
    src            IN VARCHAR2,
    profile        IN BINARY_INTEGER DEFAULT 1,
    num_results    IN BINARY_INTEGER DEFAULT NULL,
    sample_size    IN BINARY_INTEGER DEFAULT NULL
);
```

Parameters

Table 291-8 DETECT_LANGUAGE_CHARSET Procedure Parameters

Parameter	Description
`result`	Result table of type `LANGUAGE_CHARSET_RESULT_TABLE`. Each result row consists of an Oracle language, an Oracle character set name, and their score. The rows are ordered by score in descending order, that is, the language and character set with the highest score (most likely) is listed first, and the language and character set with the lowest score (least likely) is listed last.
`src`	Data sample whose language and character set are to be detected.

Table 291-8 (Cont.) DETECT_LANGUAGE_CHARSET Procedure Parameters

Parameter	Description
profile	Language and character set detection profile identifier: • 1 - Supports the languages and character sets supported by LCSSCAN and GDK. When this profile is used and the given sample data is binary data, the procedure does not return a reasonable result. • 2 - Supports the languages and character sets supported by LCSSCAN and GDK, as well as the pseudo BINARY language and the pseudo BINARY character set. This profile does not support the AL16UTF16 character set. The default profile identifier is 1. **See Also:** *Oracle Database Globalization Support Guide* for the list of languages and character sets supported by LCSSCAN and GDK
num_results	Number of result rows to store in the result table. The default is NULL, meaning the procedure stores all result rows in the result table.
sample_size	Sampling size of the data (in bytes). If this value is greater than the length of the data, then the data length is used. The default is NULL, meaning the full length of the data is used.

Usage Notes

If the given data sample is NULL, then the procedure returns a result table with no rows.

Examples

Create a table that contains a data sample of type VARCHAR2.

```
CREATE TABLE src_data (sample VARCHAR2(40));
INSERT INTO src_data VALUES ('Hello! How are you?');
```

Use the DETECT_LANGUAGE_CHARSET procedure to analyze the data sample.

```
VAR l_char VARCHAR2(40)
EXEC SELECT sample INTO :l_char FROM src_data;


VAR l_cur REFCURSOR

DECLARE
  l_result     UTL_I18N.LANGUAGE_CHARSET_RESULT_TABLE;
BEGIN
  UTL_I18N.DETECT_LANGUAGE_CHARSET(l_result, :l_char, 1, 5);
  OPEN :l_cur FOR SELECT * FROM TABLE(l_result);
END;
/

PRINT l_cur
```

The result table displays the five most likely Oracle languages and Oracle character sets for the given data sample.

```
LANGUAGE                       CHARSET                          SCORE
------------------------------ ------------------------------ ----------
ENGLISH                        US7ASCII                          .245023
ITALIAN                        US7ASCII                         .0873574
FRENCH                         US7ASCII                         .0741715
INDONESIAN                     US7ASCII                         .0534795
POLISH                         EE8ISO8859P2                     .0380973
```

ESCAPE_REFERENCE Function

This function converts a text string to its character reference counterparts for characters that fall outside the character set used by the current document.

Character references are mainly used in HTML and XML documents to represent characters independently of the encoding of the document. Character references may appear in two forms, numeric character references and character entity references. Numeric character references specify the Unicode code point value of a character, while character entity references use symbolic names to refer to the same character. For example, `&#xe5;` is the numeric character reference for the small letter "a" with a ring above, whereas `&aring;` is the character entity reference for the same character. Character entity references are also used to escape special characters, as an example, `<` represents the < (less than) sign. This is to avoid possible confusion with the beginning of a tag in Markup languages.

Syntax

```
UTL_I18N.ESCAPE_REFERENCE(
    str            IN VARCHAR2 CHARACTER SET ANY_CS,
    page_cs_name   IN VARCHAR2 DEFAULT NULL)
 RETURN VARCHAR2 CHARACTER SET str%CHARSET;
```

Parameters

Table 291-9 ESCAPE_REFERENCE Function Parameters

Parameter	Description
`str`	Specifies the input string
`page_cs_name`	Specifies the character set of the document. If `page_cs_name` is `NULL`, then the database character set is used for `CHAR` data and the national character set is used for `NCHAR` data.

Usage Notes

If the user specifies an invalid character set or a `NULL` string, then the function returns a `NULL` string.

Examples

```
UTL_I18N.ESCAPE_REFERENCE('hello < '||chr(229),'us7ascii')
```

This returns `'hello < &#xe5;'`.

GET_COMMON_TIME_ZONES Function

This function returns a listing of the most coemmonly used time zones. This list contains a subset of the time zones that are supported in the database.

Syntax

```
UTL_I18N.GET_COMMON_TIME_ZONES
 RETURN STRING_ARRAY;
```

Examples

Returns the list of the most commonly used time zones.

```
DECLARE
   retval UTL_I18N.STRING_ARRAY;
BEGIN
   retval := UTL_I18N.GET_COMMON_TIME_ZONES;
END;
/
```

GET_DEFAULT_CHARSET Function

This function returns the default Oracle character set name or the default e-mail safe character set name from an Oracle language name.

> **See Also:**
>
> "MAP_CHARSET Function" for an explanation of an e-mail safe character set

Syntax

```
UTL_I18N.GET_DEFAULT_CHARSET(
   language  IN VARCHAR2,
   context   IN PLS_INTEGER DEFAULT GENERIC_CONTEXT,
   iswindows IN BOOLEAN DEFAULT FALSE)
 RETURN VARCHAR2;
```

Parameters

Table 291-10 GET_DEFAULT_CHARSET Function Parameters

Parameter	Description
`language`	Specifies a valid Oracle language
`context`	`GENERIC_CONTEXT | MAIL_CONTEXT` `GENERIC_CONTEXT`: Returns the default character set for general cases `MAIL_CONTEXT`: Returns the default e-mail safe character set name
`iswindows`	If `context` is set as `MAIL_CONTEXT`, then `iswindows` should be set to `TRUE` if the platform is Windows and `FALSE` if the platform is not Windows. The default is `FALSE`. `iswindows` has no effect if `context` is set as `GENERIC_CONTEXT`.

Usage Notes

If the user specifies an invalid language name or an invalid flag, then the function returns a `NULL` string.

Examples

GENERIC_CONTEXT, iswindows=FALSE

```
UTL_I18N.GET_DEFAULT_CHARSET('French', UTL_I18N.GENERIC_CONTEXT, FALSE)
```

This returns `'WE8ISO8859P1'`.

MAIL_CONTEXT, iswindows=TRUE

```
UTL_I18N.GET_DEFAULT_CHARSET('French', UTL_I18N.MAIL_CONTEXT, TRUE)
```

This returns 'WE8MSWIN1252'.

MAIL_CONTEXT, iswindows=FALSE

```
UTL_I18N.GET_DEFAULT_CHARSET('French', UTL_I18N.MAIL_CONTEXT, FALSE)
```

This returns 'WE8ISO8859P1'.

GET_DEFAULT_ISO_CURRENCY Function

This function returns the default ISO 4217 currency code for the specified territory.

Syntax

```
UTL_I18N.GET_DEFAULT_ISO_CURRENCY (
   territory    IN VARCHAR2 CHARACTER SET ANY_CS)
RETURN VARCHAR2;
```

Parameters

Table 291-11 GET_DEFAULT_ISO_CURRENCY Function Parameters

Parameter	Description
`territory`	Specifies a valid Oracle territory. It is case-insensitive.

Usage Notes

If the user specifies an invalid territory name, then the function returns a `NULL` string.

Examples

Displays the default ISO currency code for China.

```
DECLARE
   retval VARCHAR2(50);
BEGIN
   retval := UTL_I18N.GET_DEFAULT_ISO_CURRENCY('CHINA');
   DBMS_OUTPUT.PUT_LINE(retval);
END;
/
```

GET_DEFAULT_LINGUISTIC_SORT Function

This function returns the most commonly used Oracle linguistic sort for the specified language.

Syntax

```
UTL_I18N.GET_DEFAULT_LINGUISTIC_SORT (
   language  IN VARCHAR2 CHARACTER SET ANY_CS)
RETURN VARCHAR2;
```

Parameters

Table 291-12 GET_DEFAULT_LINGUISTIC_SORT Function Parameters

Parameter	Description
`language`	Specifies a valid Oracle language. It is case-insensitive.

Usage Notes

If the user specifies an invalid language name, then the function returns a `NULL` string.

Examples

Displays the name of the most appropriate linguistic sort name for the language used in the current SQL session.

```
DECLARE
   retval VARCHAR2(50);
BEGIN
  SELECT value INTO retval FROM nls_database_parameters
   WHERE parameter = 'NLS_LANGUAGE';
   retval := UTL_I18N.GET_DEFAULT_LINGUISTIC_SORT(retval);
   DBMS_OUTPUT.PUT_LINE(retval);
END;
/
```

GET_LOCAL_LANGUAGES Function

This function returns the local language names for the specified territory.

Syntax

```
UTL_I18N.GET_LOCAL_LANGUAGES (
   territory    IN VARCHAR2 CHARACTER SET ANY_CS)
RETURN STRING_ARRAY;
```

Parameters

Table 291-13 GET_LOCAL_LANGUAGES Function Parameters

Parameter	Description
`territory`	Specifies a valid Oracle territory. It is case-insensitive.

Usage Notes

If the user specifies an invalid territory name, then the function returns a `NULL` string.

Examples

Returns the list of local languages used in Belgium.

```
DECLARE
   retval UTL_I18N.STRING_ARRAY;
   cnt    INTEGER;
BEGIN
   retval   :=  UTL_I18N.GET_LOCAL_LANGUAGES('BELGIUM');
   DBMS_OUTPUT.PUT('Count = ');
   DBMS_OUTPUT.PUT_LINE(retval.LAST);
   cnt := retval.FIRST;
   WHILE cnt IS NOT NULL LOOP
      DBMS_OUTPUT.PUT_LINE(retval(cnt));
      cnt := retval.NEXT(cnt);
   END LOOP;
END;
/
...
Count = 2
DUTCH
FRENCH
```

GET_LOCAL_LINGUISTIC_SORTS Function

This function returns a list of the Oracle linguistic sort names that are appropriate for the specified language. A `BINARY` sort is included for all languages.

Syntax

```
UTL_I18N.GET_LOCAL_LINGUISTIC_SORTS (
   language  IN VARCHAR2 CHARACTER SET ANY_CS)
RETURN STRING_ARRAY;
```

Parameters

Table 291-14 GET_LOCAL_LINGUISTIC_SORTS Function Parameters

Parameter	Description
`language`	Specifies a valid Oracle language. It is case-insensitive.

Usage Notes

If the user specifies an invalid language name, then the function returns a `NULL` string.

Examples

Displays the local linguistic sort names for `JAPANESE`.

```
DECLARE
   retval UTL_I18N.STRING_ARRAY;
   cnt INTEGER;
BEGIN
  retval := UTL_I18N.GET_LOCAL_LINGUISTIC_SORTS('Japanese');
```

```
  DBMS_OUTPUT.PUT('Count = ');
  DBMS_OUTPUT.PUT_LINE(retval.COUNT);
  cnt := retval.FIRST;
   WHILE cnt IS NOT NULL LOOP
      DBMS_OUTPUT.PUT_LINE(retval(cnt));
      cnt := retval.NEXT(cnt);
    END LOOP;
END;
/

...
Count = 2
JAPANESE_M
BINARY
```

GET_LOCAL_TERRITORIES Function

This function returns the local territory names for the specified language.

Syntax

```
UTL_I18N.GET_LOCAL_TERRITORIES (
   language  IN VARCHAR2 CHARACTER SET ANY_CS)
 RETURN STRING_ARRAY;
```

Parameters

Table 291-15 GET_LOCAL_TERRITORIES Function Parameters

Parameter	Description
`language`	Specifies a valid Oracle language. It is case-insensitive.

Usage Notes

If the user specifies an invalid language name, then the function returns a `NULL` string.

Examples

Returns the list of Oracle territories that use German as one of their local languages.

```
DECLARE
   retval  UTL_I18N.STRING_ARRAY;
   cnt     INTEGER;
BEGIN
   retval  := UTL_I18N.GET_LCOAL_TERRITORIIES('GERMAN');
   DBMS_OUTPUT.PUT('Count = ');
   DBMS_OUTPUT.PUT_LINE(retval.LAST);
  cnt := retval.FIRST;
   WHILE cnt IS NOT NULL LOOP
      DBMS_OUTPUT.PUT_LINE(retval(cnt));
      cnt := retval.NEXT(cnt));
   END LOOP;
END;
/
...
Count = 4
GERMANY
AUSTRIA
```

```
LUXEMBOURG
SWITZERLAND
```

GET_LOCAL_TIME_ZONES Function

This function returns the local time zone IDs for the specified territory.

Syntax

```
UTL_I18N.GET_LOCAL_TIME_ZONES (
   territory      IN VARCHAR2 CHARACTER SET ANY_CS DEFAULT NULL)
RETURN STRING_ARRAY;
```

Parameters

Table 291-16 GET_LOCAL_TIME_ZONES Function Parameters

Parameter	Description
territory	Specifies a valid Oracle territory. It is case-insensitive.

Usage Notes

If the user specifies an invalid territory name, then the function returns a NULL string.

Examples

Creates a function that returns the list of time zones locally used in the territory AZERBAIJAN followed by the general common time zones. This is useful for when the user's territory is known and the application still allows the user to choose other time zones as a user's preference.

```
CREATE OR REPLACE FUNCTION get_time_zones
(territory IN VARCHAR2 CHARACTER SET ANY_CS)
RETURN utl_i18n.string_array
IS
  retval  utl_i18n.string_array;
  retval2 utl_i18n.string_array;
  stpos   INTEGER;
BEGIN
  retval  := utl_i18n.get_local_time_zones(
    territory);
  retval2 := utl_i18n.get_common_time_zones;
  stpos := retval.LAST + 1;
  retval(stpos) := '-----'; -- a separator
  FOR i IN retval2.FIRST..retval2.LAST LOOP
    stpos := stpos + 1;
    retval(stpos) := retval2(i);
  END LOOP;
  RETURN retval;
END;
/
```

Returns the list of local time zones for AZERBAIJAN followed by the common time zones with a separator string of five dashes (-----).

```
DECLARE
   retval UTL_I18N.STRING_ARRAY;
   cnt INTEGER;
BEGIN
```

```
   DBMS_OUTPUT.ENABLE(100000);
   retval UTL_I18N.GET_TIME_ZONES('AZERBAIJAN');
   cnt := retval.FIRST;
  WHILE cnt IS NOT NULL LOOP
    DBMS_OUTPUT.PUT_LINE(retval(cnt));
    cnt := retval.NEXT(cnt);
  END LOOP;
END;
/

Asia/Baku
-----
Pacific/Pago_Pago
Pacific/Honolulu
America/Anchorage
America/Vancouver
America/Los_Angeles
America/Tijuana
America/Edmonton
America/Denver
America/Phoenix
America/Mazatlan
America/Winnipeg
America/Regina
America/Chicago
America/Mexico_City
America/Guatemala
America/El_Salvador
America/Managua
America/Costa_Rica
America/Montreal
...
```

GET_MAX_CHARACTER_SIZE Function

This function returns the maximum character size of a given character set.

Syntax

```
UTL_I18N.GET_MAX_CHARACTER_SIZE(
    charset_name       IN VARCHAR2 CHARACTER SET ANY_CS)
RETURN PLS_INTEGER;
```

Parameters

Table 291-17 GET_MAX_CHARACTER_SIZE Function Parameters

Parameter	Description
charset_name	Specifies a valid character set name. It is case-insensitive.

Usage Notes

For shift-sensitive character sets, the returned maximum character size will include the possible extra shift characters.

Examples

```
UTL_I18N.GET_MAX_CHARACTER_SIZE('AL32UTF8');
```

This returns 4.

GET_TRANSLATION Function

This function returns the translation of the language and territory name in the specified translation language.

Syntax

```
UTL_I18N.GET_TRANSLATION (
   parameter        IN VARCHAR2 CHARACTER SET ANY_CS,
   trans_language   IN VARCHAR2 'AMERICAN',
   flag             IN PLS_INTEGER DEFAULT LANGUAGE_TRANS)
RETURN VARCHAR2 CHARACTER SET parameter%CHARSET;
```

Parameters

Table 291-18 GET_TRANSLATION Function Parameters

Parameter	Description
`parameter`	Specifies a valid language name, territory name, or a combined string in the form of *`language_territory`*. It is case-insensitive.
`trans_language`	Specifies a translation language name. For example, `ITALIAN` is for the Italian language. The default is `AMERICAN`, which indicates American English.
`flag`	Specifies the translation type: • `LANGUAGE_TRANS`: The function returns the language translation. • `TERRITORY_TRANS`: The function returns the territory translation. • `LANGUAGE_TERRITORY_TRANS`: The function returns the language and territory translation. The default translation type is `LANGUAGE_TRANS`.

Usage Notes

If `VARCHAR2` is used as a parameter type, the returned translation text can be corrupted due to the conversion to the database character set. Using `NVARCHAR2` as the parameter type will preserve the translation text because Unicode can encode all translated languages.

If the specified translation language is not available or an invalid name is provided, the default "American English" translations are returned. For example, Oracle does not provide `GUJARATI` translations, so the returned translation would be in American English.

Examples

The following returns the names of all the Oracle-supported languages in Italian.

```
DECLARE
   CURSOR c1 IS
     SELECT value FROM V$NLS_VALID_VALUES
     WHERE parameter = 'LANGUAGE'
  ORDER BY value;
  retval NVARCHAR2(100);
BEGIN
   FOR item IN c1 LOOP
     retval := UTL_I18N.GET_TRANSLATION (TO_NCHAR(item.value), 'italian');
   END LOOP;
END;
```

MAP_CHARSET Function

This function maps a character set to another character set.

It maps the following:

- An Oracle character set name to an IANA character set name.
- An IANA character set name to an Oracle character set name.
- An Oracle character set to an e-mail safe character set name.

Syntax

```
UTL_I18N.MAP_CHARSET(
   charset   IN VARCHAR2,
   context   IN PLS_INTEGER DEFAULT GENERIC_CONTEXT,
   flag      IN PLS_INTEGER DEFAULT ORACLE_TO_IANA)
RETURN VARCHAR2;
```

Parameters

Table 291-19 MAP_CHARSET Function Parameters

Parameter	Description
charset	Specifies the character set name to be mapped. The mapping is case-insensitive.
context	GENERIC_CONTEXT | MAIL_CONTEXT GENERIC_CONTEXT: The mapping is between an Oracle character set name and an IANA character set name. This is the default value. MAIL_CONTEXT: The mapping is between an Oracle character set name and an email safe character set name.
flag	• ORACLE_TO_IANA | IANA_TO_ORACLE if GENERIC_CONTEXT is set ORACLE_TO_IANA: Map from an Oracle character set name to an IANA character set name. This is the default. IANA_TO_ORACLE: Map from an IANA character set name to an Oracle character set name. • MAIL_GENERIC | MAIL_WINDOWS if MAIL_CONTEXT is set MAIL_GENERIC: Map from an Oracle character set name to an email safe character set name on a non-Windows platform. MAIL_WINDOWS: Map from an Oracle character set name to an email safe character set name on a Windows platform.

Usage Notes

An e-mail safe character set is an Oracle character set that is commonly used by applications when they submit e-mail messages. The character set is usually used to convert contents in the database character set to e-mail safe contents. To specify the character set name in the mail header, you should use the corresponding IANA character set name obtained by calling the MAP_CHARSET function with the ORACLE_TO_IANA option, providing the e-mail safe character set name as input.

For example, no e-mail client recognizes message contents in the WE8DEC character set, whose corresponding IANA name is DEC-MCS. If WE8DEC is passed to the MAP_CHARSET function with the MAIL_CONTEXT option, then the function returns WE8ISO8859P1. Its corresponding IANA name, ISO-8859-1, is recognized by most e-mail clients.

The steps in this example are as follows:

1. Call the `MAP_CHARSET` function with the `MAIL_CONTEXT | MAIL_GENERIC` option with the database character set name, `WE8DEC`. The result is `WE8ISO8859P1`.
2. Convert the contents stored in the database to `WE8ISO8859P1`.
3. Call the `MAP_CHARSET` function with the `ORACLE_TO_IANA | GENERIC_CONTEXT` option with the e-mail safe character set, `WE8ISO8859P1`. The result is `ISO-8859-1`.
4. Specify `ISO-8859-1` in the mail header when the e-mail message is submitted.

The function returns a character set name if a match is found. If no match is found or if the flag is invalid, then it returns `NULL`.

> **Note:**
>
> Many Oracle character sets can map to one e-mail safe character set. There is no function that maps an e-mail safe character set to an Oracle character set name.

Examples

Generic Context

```
UTL_I18N.MAP_CHARSET('iso-8859-1',UTL_I18N.GENERIC_CONTEXT,UTL_I18N.IANA_TO_ORACLE)
```

This returns `'WE8ISO8859P1'`.

Context

```
UTL_I18N.MAP_CHARSET('WE8DEC', utl_i18n.mail_context,  utl_i18n.mail_generic)
```

This returns `'WE8ISO8859P1'`.

> **See Also:**
>
> *Oracle Database Globalization Support Guide* for a list of valid Oracle character sets

MAP_FROM_SHORT_LANGUAGE Function

This function maps an Oracle short language name to an Oracle language name.

Syntax

```
UTL_I18N.MAP_FROM_SHORT_LANGUAGE (
   language           IN VARCHAR2 CHARACTER SET ANY_CS)
RETURN VARCHAR2;
```

Parameters

Table 291-20 MAP_FROM_SHORT_LANGUAGE Function Parameters

Parameter	Description
language	Specifies a valid short language name. It is case-insensitive.

Usage Notes

If the user specifies an invalid language name, then the function returns a NULL string.

Examples

Returns the default linguistic sort name for the customer with the ID of 9000. Note that the table customers is from the oe user in the Common Schema. Because the customer's language preference is stored using a short language name, you need to convert to a full language name by calling the GET_DEFAULT_LINGUISTIC_SORT procedure.

```
DECLARE
   short_n VARCHAR2(10);
   ling_n VARCHAR2(50);
BEGIN
   SELECT nls_language INTO short
   FROM customers WHERE customer_id = 9000;
   ling_n := UTL_I18N.GET_DEFAULT_LINGUISTIC_SORT (
   UTL_I18N.MAP_FROM_SHORT_LANGUAGE(short_n));
   DBMS_OUTPUT.PUT_LINE(ling_n);
END;
/
```

MAP_LANGUAGE_FROM_ISO Function

This function returns an Oracle language name from an ISO locale name.

Syntax

```
UTL_I18N.MAP_LANGUAGE_FROM_ISO(
  isolocale IN VARCHAR2)
RETURN VARCHAR2;
```

Parameters

Table 291-21 MAP_LANGUAGE_FROM_ISO Function Parameters

Parameter	Description
isolocale	Specifies the ISO locale. The mapping is case-insensitive.

Usage Notes

If the user specifies an invalid locale string, then the function returns a NULL string.

If the user specifies a locale string that includes only the language (for example, en_ instead of en_US), then the function returns the default language name for the specified language (for example, American).

Examples

```
UTL_I18N.MAP_LANGUAGE_FROM_ISO('en_US')
```

This returns `'American'`.

> **See Also:**
>
> *Oracle Database Globalization Support Guide* for a list of valid Oracle languages

MAP_LOCALE_TO_ISO Function

This function returns an ISO locale name from an Oracle language name and an Oracle territory name.

A valid string must include at least one of the following: a valid Oracle language name or a valid Oracle territory name.

Syntax

```
UTL_I18N.MAP_LOCALE_TO_ISO (
   ora_language   IN VARCHAR2,
   ora_territory  IN VARCHAR2)
 RETURN VARCHAR2;
```

Parameters

Table 291-22 MAP_LOCALE_TO_ISO Function Parameters

Parameter	Description
`ora_language`	Specifies an Oracle language name. It is case-insensitive.
ora_territory	Specifies an Oracle territory name. It is case-insensitive.

Usage Notes

If the user specifies an invalid string, then the function returns a `NULL` string.

Examples

```
UTL_I18N.MAP_LOCALE_TO_ISO('American','America')
```

This returns `'en_US'`.

> **See Also:**
>
> *Oracle Database Globalization Support Guide* for a list of valid Oracle languages and territories

MAP_TERRITORY_FROM_ISO Function

This function returns an Oracle territory name from an ISO locale.

Syntax

```
UTL_I18N.MAP_TERRITORY_FROM_ISO (
  isolocale IN VARCHAR2)
 RETURN VARCHAR2;
```

Parameters

Table 291-23 MAP_TERRITORY_FROM_ISO Function Parameters

Parameter	Description
`isolocale`	Specifies the ISO locale. The mapping is case-insensitive.

Usage Notes

If the user specifies an invalid locale string, then the function returns a `NULL` string.

If the user specifies a locale string that includes only the territory (for example, `_fr` instead of `fr_fr`), then the function returns the default territory name for the specified territory (for example, `France`).

Examples

```
UTL_I18N.MAP_TERRITORY_FROM_ISO('en_US')
```

This returns '`America`'.

> **See Also:**
>
> *Oracle Database Globalization Support Guide* for a list of valid Oracle territories

MAP_TO_SHORT_LANGUAGE Function

This function maps an Oracle language name to an Oracle short language name.

Syntax

```
UTL_I18N.MAP_TO_SHORT_LANGUAGE (
   language    IN VARCHAR2 CHARACTER SET ANY_CS)
RETURN VARCHAR2;
```

Parameters

Table 291-24 MAP_TO_SHORT_LANGUAGE Function Parameters

Parameter	Description
`language`	Specifies a valid full language name. It is case-insensitive.

Usage Notes

If the user specifies an invalid language name, then the function returns a `NULL` string.

Examples

Returns the short language name for the language.

```
DECLARE  retval VARCHAR2(100);BEGIN  retval :=
UTL_I18N.MAP_TO_SHORT_LANGUAGE('american');  DBMS_OUTPUT.PUT_LINE(retval);END;/US
```

RAW_TO_CHAR Functions

This function converts `RAW` data from a valid Oracle character set to a `VARCHAR2` string in the database character set.

The function is overloaded. The different forms of functionality are described along with the syntax declarations.

Syntax

Buffer Conversion:

```
UTL_I18N.RAW_TO_CHAR(
   data          IN RAW,
   src_charset   IN VARCHAR2 DEFAULT NULL)
 RETURN VARCHAR2;
```

Piecewise conversion converts raw data into character data piece by piece:

```
UTL_I18N.RAW_TO_CHAR (
   data            IN RAW,
   src_charset     IN VARCHAR2 DEFAULT NULL,
   scanned_length  OUT PLS_INTEGER,
   shift_status    IN OUT PLS_INTEGER)
RETURN VARCHAR2;
```

Parameters

Table 291-25 RAW_TO_CHAR Function Parameters

Parameter	Description
`data`	Specifies the `RAW` data to be converted to a `VARCHAR2` string
`src_charset`	Specifies the character set that the `RAW` data was derived from. If src_charset is `NULL`, then the database character set is used.
`scanned_length`	Specifies the number of bytes of source data scanned
`shift_status`	Specifies the shift status at the end of the scan. The user must set it to `SHIFT_IN` the first time it is called in piecewise conversion. **Note:** ISO 2022 character sets use escape sequences instead of shift characters to indicate the encoding method. `shift_status` cannot hold the encoding method information that is provided by the escape sequences for the next function call. As a result, this function cannot be used to reconstruct ISO 2022 character from raw data in a piecewise way unless each unit of input can be guaranteed to be a closed string. A closed string begins and ends in a 7-bit escape state.

Usage Notes

If the user specifies an invalid character set, `NULL` data, or data whose length is 0, then the function returns a `NULL` string.

Examples

Buffer Conversion

```
UTL_I18N.RAW_TO_CHAR(hextoraw('616263646566C2AA'), 'utf8')
```

This returns the following string in the database character set:

```
'abcde'||chr(170)
```

Piecewise Conversion

```
UTL_I18N.RAW_TO_CHAR(hextoraw('616263646566C2AA'),'utf8',shf,slen)
```

This expression returns the following string in the database character set:

```
'abcde'||chr(170)
```

It also sets `shf` to `SHIFT_IN` and `slen` to `8`.

The following example converts data from the Internet piece by piece to the database character set.

```
rvalue RAW(1050);
  nvalue VARCHAR2(1024);
  conversion_state  PLS_INTEGER = 0;
  converted_len   PLS_INTEGER;
  rtemp  RAW(10) = '';
  conn   utl_tcp.connection;
  tlen PLS_INTEGER;

  ...
  conn := utl_tcp.open_connection ( remote_host => 'localhost',
                                    remote_port => 2000);
  LOOP
      tlen := utl_tcp.read_raw(conn, rvalue, 1024);
      rvalue := utl_raw.concat(rtemp, rvalue);
      nvalue := utl_i18n.raw_to_char(rvalue, 'JA16SJIS', converted_len,
conversion_stat);
      if (converted_len < utl_raw.length(rvalue) )
      then
        rtemp := utl_raw.substr(rvalue, converted_len+1);
      else
        rtemp := '';
      end if;
      /* do anything you want with nvalue */
      /* e.g htp.prn(nvalue); */
    END LOOP;
    utl_tcp.close_connection(conn);
  EXCEPTION
    WHEN utl_tcp.end_of_input THEN
      utl_tcp.close_connection(conn);
END;
```

RAW_TO_NCHAR Functions

This function converts `RAW` data from a valid Oracle character set to an `NVARCHAR2` string in the national character set.

The function is overloaded. The different forms of functionality are described along with the syntax declarations.

Syntax

Buffer Conversion:

```
UTL_I18N.RAW_TO_NCHAR (
   data         IN RAW,
   src_charset  IN VARCHAR2 DEFAULT NULL)
 RETURN NVARCHAR2;
```

Piecewise conversion converts raw data into character data piece by piece:

```
UTL_I18N.RAW_TO_NCHAR (
   data            IN RAW,
   src_charset      IN VARCHAR2 DEFAULT NULL,
   scanned_length   OUT PLS_INTEGER,
   shift_status     IN OUT PLS_INTEGER)
 RETURN NVARCHAR2;
```

Parameters

Table 291-26 RAW_TO_NCHAR Function Parameters

Parameter	Description
`data`	Specifies the `RAW` data to be converted to an `NVARCHAR2` string
`src_charset`	Specifies the character set that the `RAW` data was derived from. If `src_charset` is `NULL`, then the database character set is used.
`scanned_length`	Specifies the number of bytes of source data scanned
`shift_status`	Specifies the shift status at the end of the scan. The user must set it to `SHIFT_IN` the first time it is called in piecewise conversion. **Note:** ISO 2022 character sets use escape sequences instead of shift characters to indicate the encoding method. `shift_status` cannot hold the encoding method information that is provided by the escape sequences for the next function call. As a result, this function cannot be used to reconstruct ISO 2022 character from raw data in a piecewise way unless each unit of input can be guaranteed to be a closed string. A closed string begins and ends in a 7-bit escape state.

Usage Notes

If the user specifies an invalid character set, `NULL` data, or data whose length is 0, then the function returns a `NULL` string.

Examples

Buffer Conversion

```
UTL_I18N.RAW_TO_NCHAR(hextoraw('616263646566C2AA'),'utf8')
```

This returns the following string in the national character set:

```
'abcde'||chr(170)
```

Piecewise Conversion

```
UTL_I18N.RAW_TO_NCHAR(hextoraw('616263646566C2AA'),'utf8', shf, slen)
```

This expression returns the following string in the national character set:

```
'abcde'||chr(170)
```

It also sets `shf` to `SHIFT_IN` and `slen` to `8`.

The following example converts data from the Internet piece by piece to the national character set.

```
rvalue RAW(1050);
  nvalue NVARCHAR2(1024);
  converstion_state  PLS_INTEGER = 0;
  converted_len   PLS_INTEGER;
  rtemp  RAW(10) = '';
  conn   utl_tcp.connection;
  tlen PLS_INTEGER;

  ...
  conn := utl_tcp.open_connection ( remote_host => 'localhost',
                                    remote_port => 2000);
  LOOP
      tlen := utl_tcp.read_raw(conn, rvalue, 1024);
      rvalue := utl_raw.concat(rtemp, rvalue);
      nvalue := utl_i18n.raw_to_nchar(rvalue, 'JA16SJIS', converted_len,
conversion_stat);
      if (converted_len < utl_raw.length(rvalue) )
      then
        rtemp := utl_raw.substr(rvalue, converted_len+1);
      else
        rtemp := '';
      end if;
      /* do anything you want with nvalue */
      /* e.g htp.prn(nvalue); */
    END LOOP;
    utl_tcp.close_connection(conn);
  EXCEPTION
    WHEN utl_tcp.end_of_input THEN
      utl_tcp.close_connection(conn);
  END;
```

STRING_TO_RAW Function

This function converts a `VARCHAR2` or `NVARCHAR2` string to another valid Oracle character set and returns the result as `RAW` data.

Syntax

```
UTL_I18N.STRING_TO_RAW(
   data          IN VARCHAR2 CHARACTER SET ANY_CS,
   dst_charset   IN VARCHAR2 DEFAULT NULL)
RETURN RAW;
```

Parameters

Table 291-27 STRING_TO_RAW Function Parameters

Parameter	Description
data	Specifies the VARCHAR2 or NVARCHAR2 string to convert.
dst_charset	Specifies the destination character set. If dst_charset is NULL, then the database character set is used for CHAR data and the national character set is used for NCHAR data.

Usage Notes

If the user specifies an invalid character set, a NULL string, or a string whose length is 0, then the function returns a NULL string.

Examples

```
DECLARE
    r raw(50);
    s varchar2(20);
  BEGIN
    s:='abcdef'||chr(170);
    r:=utl_i18n.string_to_raw(s,'utf8');
    dbms_output.put_line(rawtohex(r));
  end;
/
```

This returns a hex value of '616263646566C2AA'.

TRANSLITERATE Function

This function performs script transliteration.

Syntax

```
UTL_I18N.TRANSLITERATE (
  data IN VARCHAR2 CHARACTER SET ANY_CS,
  name IN VARCHAR2)
RETURN VARCHAR2 CHARACTER SET data%CHARSET;
```

Parameters

Table 291-28 TRANSLITERATE Function Parameters

Parameter	Description
data	Specifies the data to be converted. Either CHAR or NCHAR datatype can be specified.
name	Specifies the transliteration name string. For a list of valid names, see Table 291-29.

Constants

Table 291-29 TRANSLITERATE Function Constants

Constant Name	Value	Description
ARABIC_LATIN_ISO233	'arabic_latin_iso233'	Converts Arabic characters to Latin characters.
CYR_ASCII_ICAO9303	'cyr_ascii_ICAO9303'	Converts Cyrillic characters to ASCII characters.
CYR_BG_ASCII_ICAO9303	'cyr_bg_ascii_ICAO9303'	Converts Cyrillic Bulgaria characters to ASCII characters.
CYR_BY_ASCII_ICAO9303	'cyr_by_ascii_ICAO9303'	Converts Cyrillic Belarus characters to ASCII characters.
CYR_MK_ASCII_ICAO9303	'cyr_mk_ascii_ICAO9303'	Converts Cyrillic North Macedonia characters to ASCII characters.
CYR_RS_ASCII_ICAO9303	'cyr_rs_ascii_ICAO9303'	Converts Cyrillic Serbia characters to ASCII characters.
CYR_UA_ASCII_ICAO9303	'cyr_ua_ascii_ICAO9303'	Converts Cyrillic Ukraine characters to ASCII characters.
CYRILLIC_LATIN_ISO9	'cyrillic_latin_iso9'	Converts Cyrillic characters to Latin characters.
FWKATAKANA_HIRAGANA	'fwkatakana_hiragana'	Converts only fullwidth Katakana characters to fullwidth Hiragana characters.
FWKATAKANA_HWKATAKANA	'fwkatakana_hwkatakana'	Converts only fullwidth Katakana characters to halfwidth Katakana characters.
GREEK_LATIN_ISO843	'greek_latin_iso843'	Converts Greek characters to Latin characters.
HEBREW_LATIN_ISO259	'hebrew_latin_iso259'	Converts Hebrew characters to Latin characters.
HIRAGANA_FWKATAKANA	'hiragana_fwkatakana'	Converts only fullwidth Hiragana characters to fullwidth Katakana characters.
HIRAGANA_HWKATAKANA	'hiragana_hwkatakana'	Converts only fullwidth Hiragana characters to halfwidth Katakana characters.
HWKATAKANA_FWKATAKANA	'hwkatakana_fwkatakana'	Converts only halfwidth Katakana characters to fullwidth Katakana characters.
HWKATAKANA_HIRAGANA	'hwkatakana_hiragana'	Converts only halfwidth Katakana characters to fullwidth Hiragana characters.
KANA_FWKATAKANA	'kana_fwkatakana'	Converts any type of Kana character to a fullwidth Katakana character.
KANA_HIRAGANA	'kana_hiragana'	Converts any type of Kana character to a fullwidth Hiragana character.
KANA_HWKATAKANA	'kana_hwkatakana'	Converts any type of Kana character to a halfwidth Katakana character.
LATIN_ASCII_DIN91379	'latin_ascii_din91379'	Converts Latin characters to ASCII characters.
MODERN_HEBREW_LATIN_ISO259_2	'modern_hebrew_latin_iso259_2'	Converts Modern Hebrew characters to Latin Characters.

Usage Notes

- The user must provide the input data for transliteration in NFC form.

- The function returns the converted string.

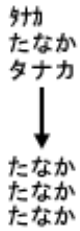
Examples

Given a table `japanese_emp`, containing an `NVARCHAR2` column `ename`, the following statement can be used to normalize all the kana names in `ename` to hiragana:

```
UPDATE japanese_emp
   SET ename = UTL_I18N.TRANSLITERATE (ename, 'kana_hiragana');
```

The following figure shows how this output might look.

Figure 291-1 Loading Locale-Specific Data to the Database



The following statement normalizes one kana name to hiragana:

```
DECLARE
   Name  japanese_emp.ename%TYPE;
   Eno   CONSTANT  NUMBER(4) := 1;
BEGIN
   SELECT ename INTO name FROM japanese_emp WHERE enumber = eno;
   name := UTL_I18N.TRANSLITERATE(name, UTL_I18N.KANA_HIRAGANA);
   UPDATE japanese_emp SET ename = name WHERE enumber = eno;
EXCEPTION
   WHEN  UTL_I18N.UNSUPPORTED_TRANSLITERATION THEN
   DBMS_OUTPUT.PUT_LINE('transliteration not supported');
END;
/
```

UNESCAPE_REFERENCE Function

This function returns a string from an input string that contains character references. It decodes each character reference to the corresponding character value.

> **See Also:**
>
> "ESCAPE_REFERENCE Function" for more information about escape sequences

Syntax

```
UTL_I18N.UNESCAPE_REFERENCE (
   str IN VARCHAR2 CHARACTER SET ANY_CS)
 RETURN VARCHAR2 CHARACTER SET str%CHARSET;
```

Parameters

Table 291-30 UNESCAPE_REFERENCE Function Parameters

Parameter	Description
`str`	Specifies the input string

Usage Notes

If the user specifies a `NULL` string or a string whose length is 0, then the function returns a `NULL` string. If the function fails, then it returns the original string.

Examples

```
UTL_I18N.UNESCAPE_REFERENCE('hello &lt; &#xe5;')
```

This returns `'hello <'||chr(229)`.

VALIDATE_CHARACTER_ENCODING Functions

This function validates the character encoding of VARCHAR2, NVARCHAR2, CLOB, and NCLOB data. The validation is based on the database character set for VARCHAR2 and CLOB data and national character set for NVARCHAR2 and NCLOB data.

For Unicode character sets, such as AL32UTF8, AL16UTF16, AL16UTF16LE, UTF8, and UTFE, any byte sequences mapped to the following Unicode code points are considered invalid:

- Unpaired surrogate code point
- Non-character code point

In addition, any irregular or illegal UTF-8 byte sequence is considered invalid for AL32UTF8 and UTF8 character sets.

The `VALIDATE_CHARACTER_ENCODING` function is overloaded. One function is for validating VARCHAR2 and NVARCHAR2 data, while the other function is for validating CLOB and NCLOB data.

- **Validating VARCHAR2 and NVARCHAR2 data**

  A VARCHAR2 or NVARCHAR2 byte or its byte sequence is considered invalid for a character set, if it does not map to any of the characters defined in the character set.

- **Validating CLOB and NCLOB data**

  A LOB character is considered invalid for a character set if a byte (in case of a single-byte database character set) or a byte pair (in case of UTF-16 encoding used with a multibyte database character set) corresponding to the encoding of the LOB character does not map to any of the characters defined in the character set.

Syntax

This function validates VARCHAR2 and NVARCHAR2 data:

```
UTL_I18N.VALIDATE_CHARACTER_ENCODING (
   data IN VARCHAR2 CHARACTER SET ANY_CS)
RETURN PLS_INTEGER;
```

This function validates CLOB and NCLOB data:

```
UTL_I18N.VALIDATE_CHARACTER_ENCODING (
   lob_loc IN CLOB CHARACTER SET ANY_CS)
RETURN PLS_INTEGER;
```

Parameters

Table 291-31 VALIDATE_CHARACTER_ENCODING Function Parameters

Parameter	Description
`data`	VARCHAR2 or NVARCHAR2 data to validate.
`lob_loc`	CLOB or NCLOB data to validate.

Usage Notes

This function returns the offset of the first invalid byte for the VARCHAR2 or NVARCHAR2 data. It returns the offset of the first invalid character for the CLOB or NCLOB data. It returns 0, if all the bytes in the character data are valid. It returns `NULL`, if the value of the parameter `data` or `lob_loc` is `NULL`.

Examples

This example validates the character encoding of NVARCHAR2 and CLOB data where the database character set is AL32UTF8 while the national character set is AL16UTF16.

```
CREATE TABLE temp(col1 NVARCHAR2(20), col2 CLOB);
INSERT INTO temp VALUES(UNISTR('foo\D800bar'), UNISTR('foo\D800bar'));
COMMIT;
SELECT UTL_I18N.VALIDATE_CHARACTER_ENCODING(col1) invalid_offset_column1,
       UTL_I18N.VALIDATE_CHARACTER_ENCODING(col2) invalid_offset_column2
FROM temp;
```

The query returns:

```
INVALID_OFFSET_COLUMN1 INVALID_OFFSET_COLUMN2
---------------------- ----------------------
                     7                      4
```

Here, the surrogate code point `U+D800` is invalid. The number 7 is returned as `INVALID_OFFSET_COLUMN1`, because for `col1`, `'foo'` is encoded in 6 bytes in NVARCHAR2 and the invalid code point `U+D800` starts at offset 7. The number 4 is returned as `INVALID_OFFSET_COLUMN2`, because for `col2`, `'foo'` is encoded in 3 UTF-16 code points in CLOB and the invalid code point `U+D800` starts at offset 4.