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bouncycastle v1.60 (optional)

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slf4j, v1.7.25,

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tomcat-apr, v5.5.23 (optional)

Apache Tomcat

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HttpComponents HttpClient 4.5.12

Apache HttpClient 4.5.12

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jLine 2.14.6

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osgi.core (org.osgi:org.osgi.core:4.3.1 - http://www.osgi.org)


powermock-api-support (org.powermock:powermock-api-support:1.5.6 - http://www.powermock.org/powermock-api/powermock-api-support)
powermock-core (org.powermock:powermock-core:1.5.6 - http://www.powermock.org)
powermock-module-junit4 (org.powermock:powermock-module-junit4:1.5.6 - http://www.powermock.org)
powermock-module-junit4-common (org.powermock:powermock-module-junit4-common:1.5.6 - http://www.powermock.org/powermock-modules/powermock-module-junit4-common)
powermock-reflect (org.powermock:powermock-reflect:1.5.6 - http://www.powermock.org/powermock-reflect)
Spock Framework - Core Module (org.spockframework:spock-core:1.0-groovy-2.3 - http://spockframework.org)
Spring Framework (org.springframework:spring:2.0.6 - http://www.springframework.org)
avalon-framework (avalon-framework:avalon-framework:4.1.3 - no url defined)
log4j (log4j:log4j:1.2.12 - no url defined)
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Changes in Release 20.2 for Oracle SQLcl User's Guide

This section lists the changes for this release.

New Features

New features in this release are:

• The SQLcl extension now supports the use of Liquibase contexts and labels enabling more flexibility in its usage.
  – Job and Directory are new supported DDL types.
  – CreateOracleJob and CreateOracleDirectory are new Liquibase changesets.

• Changes in syntax for the following Liquibase commands: GENOBJECT, GENSHEMA, UPDATE, UPDATESQL, ROLLBACK, DIFF.

• New Liquibase commands exposed in SQLcl:
  – ROLLBACKSQL
  – DBDOC
  – VERSION

• DATABASECHANGELOG_DETAILS is a new view in Liquibase. See DATABASECHANGELOG_DETAILS VIEW

• New load options available: SET LOAD and SET LOADFORMAT

See the LOAD command in Miscellaneous Commands

• A new Property Graph Query Language (PGQL) plug-in for SQLcl.

See PGQL Plug-in for SQLcl
Oracle SQLcl (SQL Developer Command Line) is a Java-based command-line interface for Oracle Database. Using SQLcl, you can execute SQL and PL/SQL statements interactively or as a batch file. SQLcl provides inline editing, statement completion, command recall, and also supports existing SQL*Plus scripts.

Oracle SQLcl is available for download from Oracle Technology Network.

This chapter contains the following topics:

- Alphabetic List of SQLcl Commands
- List of Unsupported SQL*Plus Commands and Features
- Starting and Leaving SQLcl
- Starting Up and Shutting Down a Database
- Entering and Executing Commands
- Manipulating SQL, SQLcl, and PL/SQL Commands
- Formatting Query Results
- Accessing Databases
- Miscellaneous Commands

### 2.1 Alphabetic List of SQLcl Commands

```
@{url | file_name|.ext}} [arg ...]
@@ { url | file_name|.ext } [arg ...]
/ (slash)
ACC[CEPT] variable [NUM[BER] | CHAR | DATE | BINARY_FLOAT | BINARY_DOUBLE] [FOR[MAT] format] [DEF[AULT] default] [PROMPT text | NOPROMPT] [HIDE]
ALIAS [<name>=<SQL statement>; | LOAD [<filename>] | SAVE [<filename>] | LIST [<NAME>] | DROP <name> | DESC <name> <Description String>]
APEX [export <application_id>]
A[PPEND] text
ARCHIVE LOG LIST
BRE[AK] [ON report_element [action [action]]] ...
BRIDGE
BTI[TLE] [printspec [text | variable] ...] | [ON | OFF]
CD [<directory>]
```
Alphabetic List of SQLcl Commands

C[HANGE] sepchar old [sepchar [new [sepchar]]]

CL[EAR] option ...

COL[UMN] [(column | expr) [option ...]]

COMP[UTE] [function [LAB[EL] text] ... OF (expr | column | alias) ... ON (expr | column | alias | REPORT | ROW) ...]

CONN[ECT] [{<logon> | / | proxy} [AS {SYSOPER | SYSDBA | SYSASM}] [edition=value]]

CTAS table new_table

COPY {FROM database | TO database | FROM database TO database} {APPEND | CREATE | INSERT | REPLACE | APPEND_BYTE | CREATE_BYTE | REPLACE_BYTE} destination_table[(column, column, column, ...)] USING query

DDL [object_name [type] [SAVE filename]]

DEF[INE] [variable] | [variable = text]

DEL [n | n m | n * | n LAST | * | * n | * LAST | LAST]

DESC[RIBE] [{[schema.]object[@connect_identifier]}

DISC[ONNECT]

ED[IT] [file_name[.ext]]

EXEC[UTE] statement

(EXIT | QUIT) [SUCCESS | FAILURE | WARNING | n | variable | :BindVariable]

[COMMIT | ROLLBACK]

FIND [<filename>]

FORMAT [BUFFER | RULES <filename> | FILE <input_file> <output_file>]

GET [FILE] file_name[.ext] [LIST | NOLIST]

HELP | ? [topic]

HISTORY [index | FULL | USAGE | SCRIPT | TIME | CLEAR (SESSION)?]

HO[ST] [command]

INFO[RMATION] [{[schema.]object[@connect_identifier]}

I[NPUT] [text]

L[IST] [n | n m | n * | n LAST | * | * n | * LAST | LAST]

LOAD [schema.]table_name[@db_link] file_name

OERR <facility> <error>

PASSW[ORD] [username]

PAU[SE] [text]

PRINT [variable ...]

PRO[MPT] [text]
{QUIT | EXIT} [SUCCESS | FAILURE | WARNING | n | variable | :BindVariable]
[COMMIT | ROLLBACK]
REM[ARK]
REPEAT <iterations> <sleep>
REST [export [<module_name> | <module_prefix>] | modules | privileges | schemas]
R[UN]
SAV[E] [FILE] file_name[.ext] [CRE[A]TE | REP[LACE] | APP[END]]
SCRIPT <script file>
SET system_variable value
SHO[W] [option]
SHUTDOWN [ABORT | IMMEDIATE | NORMAL | TRANSACTIONAL [LOCAL]]
SODA
SPO[OL] [filename[.ext] [CRE[A]TE | REP[LACE] | APP[END]] | OFF | OUT]
SSHTUNNEL <username>@<hostname> -i <identity_file> [-L localPort:Remotehost:RemotePort]
STA[RT] { url | file_name[.ext] } [arg ...]
STARTUP db_options | cdb_options | upgrade_options
STORE {SET} file_name[.ext] [CRE[A]TE | REP[LACE] | APP[END]]
TNSPING <address>
TTI[TLE] [printspec [text | variable] ...] | [ON | OFF]
UNDEF[I]NE variable ...
WHENEVER OSERROR {EXIT [SUCCESS | FAILURE | n | variable | :BindVariable]
[COMMIT | ROLLBACK] | CONTINUE[COMMIT | ROLLBACK | NONE]}
WHENEVER SQLERROR {EXIT [SUCCESS | FAILURE | WARNING | n | variable
| :BindVariable] [COMMIT | ROLLBACK] | CONTINUE [COMMIT | ROLLBACK | NONE]}
WHICH <filename>
XQUERY xquery_statement

Note:
You can use the up and down arrow keys to cycle through the previous 100 statements or scripts.
2.2 List of Unsupported SQL*Plus Commands and Features

**Commands**

- REPHEADER
- REPFOOTER
- TIMING

The TIMING command is replaced by the SET TIMING command.

**System Variables and Environment Settings through the SET Command**

- describe
- flagger
- fullcolname
- logsource
- loboffset
- markup
- recsep
- shiftinout
- sqlterminator
- underline
- xmloptimizationcheck

2.3 Starting and Leaving SQLcl

**Logging In and Logging Out**

Use the following commands to log in to and out of SQLcl.

```
SQLCL [[option] [logon | / NOLOG] [start]]
```

where *option* has the following syntax:

- H[ELP] | -V[ERSION] | [ [-C[OMPATIBILITY] x.y[.z]]] [-L[OGON]] [-NOLOGINTIME] [-R[ESTRICT] {1 | 2 | 3}] [-S[ILENT]] [-AC]

where *logon* has the following syntax:

```
{username[/password] [@connect_identifier] | /} [AS {SYSASM | SYSBACKUP | SYSDBA | SYSDG | SYSOPER | SYSRAC | SYSKM}] [edition=value]
```

and where *start* has the following syntax:

```
@{url | file_name[.ext]} [arg ...]
```

```
(EXIT | QUIT) [SUCCESS | FAILURE | WARNING | n | variable | :BindVariable] [COMMIT | ROLLBACK]
```
Commits or rolls back all pending changes, logs out of Oracle, terminates SQLcl and returns control to the operating system.

{QUIT | EXIT} [SUCCESS | FAILURE | WARNING | n | variable | :BindVariable]

[COMMIT | ROLLBACK]

Commits or rolls back all pending changes, logs out of Oracle, terminates SQLcl and returns control to the operating system.

Setting JVM Options
To set an Oracle Java Virtual Machine (JVM) option in SQLcl, use the following environment variable:

JAVA_TOOL_OPTIONS

The following example shows in Windows, how to change the user interface language in SQLcl to Spanish (es):

c:\SQLDev\sqlcl\20.2\sqlcl\bin>SET JAVA_TOOL_OPTIONS=-Duser.language=es
c:\SQLDev\sqlcl\20.2\sqlcl\bin>sql hr/oracle
Picked up JAVA_TOOL_OPTIONS: -Duser.language=es
SQLcl: Versión 20.2 Production en mar. ago. 25 15:37:58 2020
Copyright (c) 1982, 2020, Oracle. Todos los derechos reservados.
Last Successful login time: Mar Ago 25 2020 15:38:01 -04:00
Conectado a:
Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit
Production

Se ha encontrado login.sql en el CWD. El acceso a la DB está restringido para login.sql.
Ajuste SQLPATH para incluir la ruta y activar la funcionalidad completa.
SQL>

The following example shows how to change the user interface language in SQLcl to French (fr), and also increase the maximum memory available to SQLcl (-Xmx800m):

c:\SQLDev\sqlcl\20.2\sqlcl\bin>SET JAVA_TOOL_OPTIONS=-Duser.language=fr -Xmx800m
c:\SQLDev\sqlcl\20.2\sqlcl\bin>sql hr/oracle
Picked up JAVA_TOOL_OPTIONS: -Duser.language=fr -Xmx800m
Copyright (c) 1982, 2020, Oracle. Tous droits réservés....

2.4 Starting Up and Shutting Down a Database

Starting up and shutting down a database requires DBA privileges.

STARTUP db_options | cdb_options | upgrade_options

where db options has the following syntax:

[FORCE] [RESTRICT] [PFILE=filename] [QUIET] [ MOUNT [dbname] ] | [ OPEN [open_db_options] [dbname] ] | NOMOUNT ]
where `open_db_options` has the following syntax:

```plaintext
READ {ONLY | WRITE [RECOVER]} | RECOVER
```

where `cdb_options` has the following syntax:

```plaintext
root_connection_options | pdb_connection_options
```

where `root_connection_options` has the following syntax:

```plaintext
PLUGGABLE DATABASE pdbname [FORCE] | [RESTRICT] [ OPEN {open_pdb_options}]
```

where `pdb_connection_options` has the following syntax:

```plaintext
[FORCE] | [RESTRICT] [ OPEN {open_pdb_options}]
```

where `open_pdb_options` has the following syntax:

```plaintext
READ WRITE | READ ONLY
```

and where `upgrade_options` has the following syntax:

```plaintext
[PFILE=filename] {UPGRADE | DOWNGRADE} [QUIET]
```

Starts an Oracle Database instance with several options, including mounting and opening a database.

```plaintext
SHUTDOWN [ABORT | IMMEDIATE | NORMAL | TRANSACTIONAL [LOCAL]]
```

Shuts down a currently running Oracle instance, optionally closing and dismounting a database.

### 2.5 Entering and Executing Commands

Use the following commands to execute and collect timing statistics on SQL commands and PL/SQL blocks:

- `/ (slash)`

  Executes the most recently executed SQL command or PL/SQL block which is stored in the SQL buffer. Does not list the command. Use slash (/) at the command prompt or line number prompt in SQLcl command line.

- `EXECUTE` statement

  Executes a single PL/SQL statement or runs a stored procedure.

- `RUN`

  Lists and executes the most recently executed SQLcl command or PL/SQL block which is stored in the SQL buffer. The buffer has no command history list and does not record SQLcl commands.

- `TIMING`

  Timing is only available as a switch.

Use the following command to access the help system:

```plaintext
HELP | ? [topic]
```
Accesses the command-line help system. Enter `HELP INDEX` or `? INDEX` for a list of topics. You can view the Oracle Database Library at [http://www.oracle.com/technology/documentation](http://www.oracle.com/technology/documentation).

Use the following command to execute operating system commands:

```
HO[ST] [command]
```

Executes an operating system command without leaving SQLcl. Enter `HOST` without command to display an operating system prompt. You can then enter multiple operating system commands.

With some operating systems, you can use another character instead of `HOST` such as "!" (UNIX) and "$" (Windows). See the Oracle installation and user's manuals provided for your operating system for details.

Use the following command to recall the history of SQLcl commands:

```
HISTORY [index | FULL | USAGE | SCRIPT | TIME | CLEAR (SESSION)?] | FAILS
```

- Use the Up and Down arrow keys to navigate through history items at the prompt.
- Use the `HISTORY` command to print the history contents.
- History is limited to the last 100 statements.
- `SET HISTORY LIMIT N` allows you to change the default limit, where `N` is the maximum number.
- History is retained between SQLcl sessions.
- By default, the `SHOW`, `HISTORY`, `CONNECT`, and `SET` commands are not saved in history.
- `SET HISTORY BLACKLIST` allows you to set the commands that should not be recorded in history.

### 2.6 Manipulating SQL, SQLcl, and PL/SQL Commands

Use the following commands to edit SQL commands and PL/SQL blocks:

```
APPEND text
```

Adds specified text to the end of the current line in the SQL buffer. To separate `text` from the preceding characters with a space, enter two spaces. To append `text` that ends with a semicolon, end the command with two semicolons (a single semicolon is interpreted as a command terminator).

```
CHANGE sepchar old [sepchar [new [sepchar]]]
```

Changes first occurrence of `old` on the current line of the SQL buffer. The buffer has no command history list and does not record SQLcl commands. You can use any non-alphanumeric character such as "/" or "!" as a `sepchar`. You can omit the space between `CHANGE` and the first `sepchar`.

```
DEL [n | n m | n * | n LAST | * | * n | * LAST | LAST]
```

Deletes one or more lines of the SQL buffer ("*" indicates the current line). You can omit the space between `DEL` and `n` or `*`, but not between `DEL` and `LAST`. Enter `DEL` with no clauses to delete the current line of the buffer. The buffer has no command history list and does not record SQLcl commands.
I[NPUT] [text]

Adds one or more new lines of text after the current line in the SQL buffer. The buffer has no command history list and does not record SQLcl commands.

L[IST] [n | n m | n * | n LAST | * | n * | LAST | LAST]

Lists one or more lines of the most recently executed SQL command or PL/SQL block which is stored in the SQL buffer. Asterisk (*) indicates the current line. You can omit the space between LIST and n or *, but not between LIST and LAST. Enter LIST with no clauses to list all lines.

In SQLcl, you can also use ";" to list all the lines in the SQL buffer. The buffer has no command history list and does not record SQLcl commands.

Use the following commands to run scripts:

@ { url | file_name[.ext] } [arg ...]

Runs the SQLcl statements in the specified script. The script can be called from the local file system or a web server. You can pass values to script variables in the usual way.

@@ { url | file_name[.ext] } [arg ...]

Runs the SQLcl statements in the specified script. This command is almost identical to the @ command. It is useful for running nested scripts because it has the additional functionality of looking for the specified script in the same path or url as the calling script.

REPEAT <iterations> <sleep>

Repeats the current SQL in the buffer at the specified times with sleep intervals. The maximum sleep interval is 120 seconds.

SCRIPT <script file>

Runs the SQLcl statements in the specified script.

STA[RT] { url | file_name[.ext] } [arg ...]

Runs the SQLcl statements in the specified script. The script can be called from the local file system or a web server. You can pass values to script variables in the usual way.

Use the following commands to create and modify scripts:

ED[IT] [file_name[.ext]]

Invokes an operating system text editor on the contents of the specified file or on the contents of the SQL buffer. To edit the buffer contents, omit the file name.

The DEFINE variable _EDITOR can be used to set the editor to use. In SQLcl, _EDITOR can be set to any editor that you prefer. Inline will set the editor to be the SQLcl editor. This supports the following shortcuts:

- ^R - Run the current buffer
- ^W - Go to top of buffer
- ^S - Go to bottom of buffer
- ^A - Go to start of line
• ^E - Go to end of line

FORMAT
• FORMAT BUFFER - formats the script in the SQLcl Buffer
• FORMAT RULES <filename> - Loads SQLDeveloper Formatter rules file to formatter
• FORMAT FILE <input_file> <output_file>

GET file_name[.ext] [LIST | NOLIST]
Loads a SQL statement or PL/SQL block from a file into the SQL buffer. The buffer has no command history list and does not record SQLcl commands.

REMARK

Begins a comment in a script. The REMARK command must appear at the beginning of a line, and the comment ends at the end of the line (a line cannot contain both a comment and a command). SQLcl does not interpret the comment as a command.

SAVE [FILE] file_name[.ext] [CREATE | REPLACE | APPEND]
Saves the contents of the SQL buffer in a script. The buffer has no command history list and does not record SQLcl commands.

STORE {SET} file_name[.ext] [CREATE | REPLACE | APPEND]
Saves attributes of the current SQLcl environment in a file.

WHENEVER OSERROR {EXIT [SUCCESS | FAILURE | n | variable | :BindVariable] [COMMIT | ROLLBACK] | CONTINUE [COMMIT | ROLLBACK | NONE]}
Performs the specified action (exits SQLcl by default) if an operating system error occurs (such as a file writing error).

WHENEVER SQLERROR {EXIT [SUCCESS | FAILURE | WARNING | n | variable | :BindVariable] [COMMIT | ROLLBACK] | CONTINUE [COMMIT | ROLLBACK | NONE]}
Performs the specified action (exits SQLcl by default) if a SQL command or PL/SQL block generates an error.

Use the following commands to write interactive commands:

ACCEPT variable [NUMBER | CHAR | DATE | BINARY_FLOAT | BINARY_DOUBLE] [FORMAT format] [DEFAULT default] [PROMPT text | NOPROMPT] [HIDE]
Reads a line of input and stores it in a given substitution variable.

DEFINE [variable] | [variable = text]
Specifies a substitution variable and assigns a CHAR value to it, or lists the value and variable type of a single variable or all variables.

PAUSE [text]
Displays the specified text then waits for the user to press RETURN.

PROMT [text]
Sends the specified message or a blank line to the user's screen.
UNDEF[INE] variable ...

Deletes one or more substitution variables that you defined either explicitly (with the DEFINE command) or implicitly (with a START command argument).

Use the following commands to create and display bind variables:

PRINT [variable ...]

Displays the current values of bind variables, or lists all bind variables.

Use the following symbols to create substitution variables and parameters for use in scripts:

&

Specifies a parameter in a script you run using the START command. START substitutes values you list after the script name as follows: the first for &1, the second for &2, and so on.

&&user_variable, &&user_variable

Indicates a substitution variable in a SQL or SQLcl command. SQLcl substitutes the value of the specified substitution variable for each substitution variable it encounters. If the substitution variable is undefined, SQLcl prompts you for a value each time an "&" variable is found, and the first time an "&&" variable is found.

. (period)

Terminates a substitution variable followed by a character that would otherwise be part of the variable name.

2.7 Formatting Query Results

Use the following commands to format, store and print your query results.

BREAK [ON report_element [action [action]]] ...

Specifies where changes occur in a report and the formatting action to perform, such as:

• suppressing the display of duplicate values for a given column
• skipping a line each time a given column value changes
• printing computed figures each time a given column value changes or at the end of the report

Enter BREAK with no clauses to list the current BREAK definition.

Where report_element has the following syntax:

{column | expression | ROW | REPORT}

and where action has the following syntax:

[SKI[P] n | [SKI[P]] PAGE] [NODUP[LICATES] | DUP[LICATES]]

BTI[TLE] [printspec [text | variable] ...] | [ON | OFF]

Places and formats a title at the bottom of each report page, or lists the current BTITLE definition. Use one of the following clauses in place of printspec:
Resets or erases the current value or setting for the specified option.

Where \textit{option} represents one of the following clauses:

\begin{itemize}
  \item BRED\textsc{k}s
  \item WORD\textsc{ed}
  \item CASE\textsc{d}
  \item sHIFT\textsc{ed}
  \item sKIP \textsc{d}
  \item sKIP \textsc{d}
  \item \textsc{d}elete
\end{itemize}

\textsc{d}elete \textsc{d}isplay \textsc{d}efaults

\textsc{d}elete \textsc{d}efaults for a given column, such as:

\begin{itemize}
  \item text for the column heading
  \item alignment for the column heading
  \item format for \textsc{d}ata
  \item \textsc{d}eleting \textsc{d}ata
\end{itemize}

\textsc{d}eleting \textsc{d}ata \textsc{d}efaults for a single column or for all columns.

Where \textit{option} represents one of the following clauses:

\begin{itemize}
  \item ALI\textsc{as} \textsc{d}efault
  \item CLE\textsc{ar}
  \item \textsc{d}elete \textsc{d}efaults
  \item FOR\textsc{mat} \textsc{d}efault
  \item HEA\textsc{ding} \textsc{d}efault
  \item JUS\textsc{tify} \textsc{d}efault
  \item LIKE \textsc{d}efault
  \item NEWL\textsc{ine} \textsc{d}efault
  \item NEW\textsc{value} \textsc{d}efault
  \item NOPRI\textsc{nt} \textsc{d}efault
  \item PRI\textsc{nt} \textsc{d}efault
  \item NUL\textsc{l} \textsc{d}efault
  \item OLD\textsc{value} \textsc{d}efault
  \item ON \textsc{d}efault
  \item \textsc{d}efault
\end{itemize}
Note:
Currently only NEW.VALUE variable syntax is supported.

Enter COLUMN [(column | expr) FORMAT format] where the format element specifies the display format for the column.

To change the display format of a NUMBER column, use FORMAT followed by one of the elements in the following table:

<table>
<thead>
<tr>
<th>Element</th>
<th>Examples</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>,</td>
<td>9,999</td>
<td>Displays a comma in the specified position.</td>
</tr>
<tr>
<td>.</td>
<td>99.99</td>
<td>Displays a period (decimal point) to separate the integral and fractional parts of a number.</td>
</tr>
<tr>
<td>$</td>
<td>$9999</td>
<td>Displays a leading dollar sign.</td>
</tr>
<tr>
<td>0</td>
<td>0999 9990</td>
<td>Displays leading or trailing zeros (0).</td>
</tr>
<tr>
<td>9</td>
<td>9999</td>
<td>Displays a value with the number of digits specified by the number of 9s. Value has a leading space if positive, a leading minus sign if negative. Blanks are displayed for leading zeros. A zero (0) is displayed for a value of zero.</td>
</tr>
<tr>
<td>B</td>
<td>B9999</td>
<td>Displays blanks for the integer part of a fixed-point number when the integer part is zero, regardless of zeros in the format model.</td>
</tr>
<tr>
<td>C</td>
<td>C999</td>
<td>Displays the ISO currency symbol in the specified position.</td>
</tr>
<tr>
<td>D</td>
<td>99D99</td>
<td>Displays the decimal character to separate the integral and fractional parts of a number.</td>
</tr>
<tr>
<td>EEEE</td>
<td>9.999EEE</td>
<td>Displays a value in scientific notation (format must contain exactly four “E”s).</td>
</tr>
<tr>
<td>G</td>
<td>G9999</td>
<td>Displays the group separator in the specified positions in the integral part of a number.</td>
</tr>
<tr>
<td>L</td>
<td>L999</td>
<td>Displays the local currency symbol in the specified position.</td>
</tr>
<tr>
<td>MI</td>
<td>9999MI</td>
<td>Displays a trailing minus sign after a negative value. Displays a trailing space after a positive value.</td>
</tr>
<tr>
<td>PR</td>
<td>9999PR</td>
<td>Displays a negative value in &lt;angle brackets&gt;. Displays a positive value with a leading and trailing space.</td>
</tr>
<tr>
<td>RN</td>
<td>RN rn</td>
<td>Displays uppercase Roman numerals. Displays lowercase Roman numerals. Value can be an integer between 1 and 3999.</td>
</tr>
<tr>
<td>S</td>
<td>S9999</td>
<td>Displays a leading minus or plus sign. Displays a trailing minus or plus sign.</td>
</tr>
</tbody>
</table>
### TM

Displays the smallest number of decimal characters possible. The default is TM9. Fixed notation is used for output up to 64 characters, scientific notation for more than 64 characters. Cannot precede TM with any other element. TM can only be followed by a single 9 or E.

### U

Displays the dual currency symbol in the specified position.

---

**COMPUTE [function [LAB[EL] text] ... OF {expr | column | alias} ...] ON {expr | column | alias | REPORT | ROW} ...**

In combination with the **BREAK** command, calculates and prints summary lines using various standard computations. It also lists all COMPUTE definitions. The following table lists valid functions. All functions except NUMBER apply to non-null values only. COMPUTE functions are always executed in the following sequence AVG, COUNT, MINIMUM, MAXIMUM, NUMBER, SUM, STD, VARIANCE.

### Function | Computes | Applies to Datatypes
--- | --- | ---
AVG | Average of non-null values | NUMBER
COUNT | Count of non-null values | All types
MINIMUM | Minimum value | NUMBER, CHAR, NCHAR, VARCHAR2 (VARCHAR), NVARCHAR2 (NCHAR VARYING)
MAXIMUM | Maximum value | NUMBER, CHAR, NCHAR, VARCHAR2 (VARCHAR), NVARCHAR2 (NCHAR VARYING)
NUMBER | Count of rows | All types
SUM | Sum of non-null values | NUMBER
STD | Standard deviation of non-null values | NUMBER
VARIANCE | Variance of non-null values | NUMBER

**SET SQLFORMAT {csv | html | xml | json | ansiconsole | insert | loader | fixed | default}**

Outputs reports in various formats. The **ansiconsole** option formats and resizes the data according to the column widths, for easier readability. The **json** option returns a query in JSON format.

**SET SQLFORMAT DELIMITED <delimiter> <left enclosure> <right enclosure>** allows you to set a custom delimited format.

**SET SQLFORMAT JSON-FORMATTED** returns a query in well formatted JSON output.

**SPO[OL] [filename[.ext]] [CRE[ATE] | REP[LACE] | APP[END]] | OFF | OUT**

Stores query results in a file, or optionally sends the file to a printer. **OFF** stops spooling. **OUT** stops spooling and sends the file to your computer’s default printer. Enter **SPOOL** with no clauses to list the current spooling status. If no file extension is given, the default extension, .lst or .lis, is used.
TTITLE [printspec [text | variable] ...] | [ON | OFF]

Places and formats a specified title at the top of each report page, or lists the current TTITLE definition. The old form of TTITLE is used if only a single word or a string in quotes follows the TTITLE command.

Where printspec represents one or more of the following clauses:

- **BOLD**
- **CENTER**
- **COL n**
- **FORMAT text**
- **LEFT**
- **RIGHT**
- **S[KIP] [n]**
- **TAB n**

### 2.8 Accessing Databases

Use the following commands to access and copy data between tables on different databases:

```sql
CONNECT [{<logon> | / | proxy} [AS {SYSOPER | SYSDBA | SYSASM}] [edition=value]]
```

where **logon** has the following syntax:

```sql
username[/password] [@connect_identifier]
```

where **proxy** has the following syntax:

```sql
proxyuser[username] [/password] [@connect_identifier]
```

**Note:**

The brackets around `username` in `proxy` are required syntax.

Connects a given username to the Oracle Database. If you omit `connect_identifier`, SQLcl connects you to the default database. If you omit `username` and/or `password`, SQLcl prompts you for them. CONNECT followed by a slash (/) connects you using a default (OPS$) logon.

When you run a CONNECT command, the site profile, glogin.sql, and the user profile, login.sql, are processed in that order. CONNECT does not reprompt for username or password if the initial connection does not succeed.

```sql
DISCONNECT
```

Commits pending changes to the database and logs the current user out of Oracle, but does not exit SQLcl. In SQLcl command line, use EXIT or QUIT to log out of Oracle and return control to your computer's operating system.
COPY (FROM database | TO database | FROM database TO database) {APPEND | CREATE | INSERT | REPLACE | APPEND_BYTE | CREATE_BYTE | REPLACE_BYTE} destination_table[(column, column, column, ...)] USING query

where database has the following syntax:

username[/password]@connect_identifier

Copies data from a query to a table in the same or another database. APPEND, CREATE, INSERT or REPLACE specifies how COPY treats the existing copy of the destination table (if it exists). USING query identifies the source table and determines which rows and columns COPY copies from it. COPY supports CHAR, DATE, LONG, NUMBER and VARCHAR2 datatypes.

PASSW[ORD] [username]

Allows you to change a password without displaying it on an input device.

XQUERY xquery_statement

Allows you to run an XQuery from SQLcl.

2.9 Miscellaneous Commands

ALIAS [<name>=<SQL statement>]; | LOAD [<filename>] | SAVE [<filename>] | LIST [<NAME>] | DROP <name> | DESC <name> <Description String>

Alias is a command which allows you to save a SQL, PL/SQL or SQL*Plus script and assign it a shortcut command.

• ALIAS — Print a list of aliases
• ALIAS LIST <alias_name> — List the contents of the alias

The following example shows how to create a simple alias:

SQL> ALIAS action1=select :one from dual;

Note:

Define an alias simply by using the alias keyword followed by a single identifier name followed by an ‘=’. Anything after the ‘=’ will be used as the alias contents. If it is SQL, it will be terminated by ‘;’. If it is PL/SQL, it will be terminated by ‘/’.

APEX

Lists Application Express Applications. Use APEX EXPORT <app id> to export the application which could be combined with spool for writing to a file.

ARCHIVE LOG LIST

Displays information about redo log files.

BRIDGE <targetTableName> as "<jdbcURL>"{(sqlQuery)};
Used mainly to script data move between two connections/schemas. It also includes functionality to dynamically create Oracle tables which "fit" the data being received through JDBC. The following functionality is available:

1. Query tables in other connections
2. Query tables in multiple connections in the same statement
3. Insert data from one connection into another
4. Create a table and insert data into it from another connection

CTAS table new_table

Uses DBMS_METADATA to extract the DDL for the existing table, then modifies that into a create table as select * from.

DDL [object_name [type] [SAVE filename]]

Generates the code to reconstruct the object listed. Use the type option for materialized views. Use the SAVE option to save the DDL to a file.

DESC[RIBE] {{schema.object[&connect_identifier]}}

Lists the column definitions for a table, view or synonym, or the specifications for a function or procedure.

FIND [<filename>]

Searches the SQLPATH and its directories for the specified file name. FIND where <filename> lists all the SQLPATH locations where it finds files matching the specified file name.

INFO[RMATION] {{schema.object[&connect_identifier]}}

Lists more detailed information about the column definitions for a table, view or synonym, or the specifications for a function or procedure.

Note:

INFORMATION+ will show column statistics.

LOAD [schema.]table_name[@db_link] file_name

 Loads a file into a table.

Defaults for file format:

- The columns are delimited by a comma and may optionally be enclosed in double quotes.
- Lines are terminated with standard line terminators for Windows, UNIX, or Mac.
- File is encoded UTF8.

The default load:

- Processes with 50 rows per batch.
- If AUTOCOMMIT is set in SQLcl, a commit is done every 10 batches.
- The load is terminated if more than 50 errors are found.
Use `SET LOADFORMAT [options]` for reading the file (delimiter, enclosures).

Use `SET LOAD [options]` for loading the data (rows per batch, date formats).

`OERR <facility> <error>`

Displays information about errors. Facility is identified by the prefix string in the error message. For example, if you get ORA-7300, “ora” is the facility and “7300” is the error. So you should type “oerr ora 7300”.

`SSHTUNNEL <username>@<hostname> -i <identity_file> [-L localPort:Remotehost:RemotePort]`

Creates a tunnel using standard ssh options such as port forwarding like option -L of the given port on the local host will be forwarded to the given remote host and port on the remote side. It also supports identity files, using the ssh -i option. If passwords are required, they will be prompted for.

`TNSPING <address>`

The TNSPING utility determines whether the listener for a service on an Oracle Net network can be reached successfully.

`WHICH`

Searches the SQLPATH and its directories for the specified file name and prints the name of the first file matching the specified file name in the SQLPATH.

### 2.9.1 REST

REST enables you to export Oracle REST Data Services 3.x services. This is applicable for Oracle REST Data Services release 3.0.5 or later. If you have an earlier version of Oracle REST Data Services, you will need to upgrade. See the Installing Oracle REST Data Services section in Oracle REST Data Services Installation, Configuration, and Development Guide for details.

The options are:

- `REST export` — Export all Oracle REST Data Services 3.x service modules
- `REST export <module_name>` — Export a specific module
- `REST export <module_uri_uri prefix>` — Export a specific module related to the given prefix
- `REST modules` — List the available modules
- `REST privileges` — List the existing privileges
- `REST schemas` — List the available schemas

### 2.9.2 SODA

SODA allows schemaless application development using the JSON data model. The options are:

- `SODA create <collection_name>` — Create a new collection
- `SODA list` — List all the collections
• SODA get <collection_name> [-all | -f | -k | -klist] [{<key> | <k1> <k2> ... | <qbe>}] — List documents the collection. Optional arguments:
  – all: list the keys of all docs in the collection
  – k: list docs matching the specific <key>
  – klist: list docs matching the list of keys
  – f: list docs matching the <qbe>
• SODA insert <collection_name> <json_str | filename> — Insert a new document within a collection
• SODA drop <collection_name> — Delete existing collection
• SODA count <collection_name> [ <qbe> ] — Count number of documents inside collection. Optional parameter <qbe> returns number of matching documents
• SODA replace <collection_name> <oldkey> <new_{str | doc}> — Replace one document with another
• SODA remove <collection_name> [-k | -klist | -f] {<key> | <k1> <k2> ... | <qbe>} — Remove documents from collection. Optional arguments:
  – k: Remove document in collection matching the specific <key>
  – klist: Remove document in collection matching the list <key1> <key2> ...
  – f: Remove document in collection matching <qbe>

2.9.3 SET system_variable value

Sets a system variable to alter the SQLcl environment settings for your current session.

For example, to:
• Set the display width for data
• Customize HTML formatting
• Enable or disable printing of column headings
• Set the number of lines per page

Enter a system variable followed by a value as shown below:

```sql
SET APPIINFO {ON | OFF | text}
SET ARRAYSIZE {15 | n}
SET AUTOCOMMIT {ON | OFF | IMMEDIATE | n}
SET AUTOPRINT {ON | OFF}
SET AUTORECOVERY {ON | OFF}
SET AUTORACE {ON | OFF | TRACEONLY}
SET BLOCKTERMINATOR {. | c | ON | OFF}
SET CLASSIC [ ON | OFF ]
SET CLEAR [ TOP | BOTTOM | SAME ]
SET CLOUDCONFIG [ -proxy=proxyhost:<port> | <wallet.zip location>
SET CMDSEP [ ; | c | ON | OFF]
SET CODESCAN ALL | NONE | SQLINJECTION [ON | OFF]
SET COLSEP {_ | text}
```
Chapter 2

Miscellaneous Commands

SET CONCAT {. | c | ON | OFF}
SET COPYCOMMIT {0 | n}
SET COPYTYPECHECK {ON | OFF}
SET DDL [[ PRETTY | SQLTERMINATOR | CONSTRAINTS | REF_CONSTRAINTS |
| CONSTRAINTS AS ALTER | OID | SIZE_BYTE_KEYWORD | PARTITIONING |
| SEGMENT_ATTRIBUTES | STORAGE | TABLESPACE | SPECIFICATION | BODY |
| FORCE | INSERT | | INHERIT | RESET] {on|off} ] | OFF ]
SET DEFINE {& | c | ON | OFF}
SET ECHO {ON | OFF}
SET EMBEDDED {ON | OFF}
SET ENCODING
SET ERRORLOGGING {ON | OFF} [TABLE [schema.]tablename] [TRUNCATE] [IDENTIFIER identifier]
SET ESCAPE {\ | c | ON | OFF}
SET ESCCHAR (@ | ? | % | $ | OFF)
SET EXITCOMMIT {ON | OFF}
SET FEEDBACK {6 | n | ON | OFF}
SET FLUSH {ON | OFF}
SET HEADING {ON | OFF}
SET HEADSEP { | c | ON | OFF}
SET HISTORY [FAILS [LIMIT [ n | DEFAULT ]] | NOFAILS | BLACKLIST [DEFAULT <command list>?|<command list?>] | LIMIT [n|DEFAULT]]
SET LDAPCON
SET LINESIZE {80 | n}
SET LOAD [options...]
SET LOADFORMAT [DEFAULT, CSV, DELIMITED] [options...]
SET LONG {80 | n}
SET LONGC[HUNKSIZE] {80 | n}
SET MAXROWS (n>1 | DEFAULT)
SET MAXSPoolRowSTRUNCATE [ON | OFF | DEFAULT]
SET NET {ON | OFF | READONLY}
SET NEWPAGE {1 | n | NONE}
SET NOVERWRITE {ON | OFF | WARN}
SET NULL text
SET NUMFORMAT [format]
SET NUM[WIDTH] {10 | n}
SET PAGESIZE {14 | n}
SET PAUSE {ON | OFF | text}
SET RECSEPCHAR { | c}
SET SERVEROUTPUT {PUT} {ON | OFF} [SIZE (n | UNLIMITED)] [FORMAT]
{WRAPPED | WORD_WRAPPED | TRUNCATED}]
SET SHOWMODE {ON | OFF}
SET SQLBLANKLINES {ON | OFF}
SET SQLCO[NINUE] {> | text}
SET SQLFORMAT {csv | html | xml | json | ansiconsole | insert | loader |
| fixed | default}
Allows you to set the DDL transform option on DBMS_METADATA.

SET ENCODING <encoding>

Allows you to set the encoding for the current session. Use SHOW ENCODING to view the encoding set for the current session. Use SHOW ENCODINGS to list the encodings available on your platform.

2.9.4 SHOW option

Shows the value of a SQLcl system variable, or the current SQLcl environment. Enter any system variable set by the SET command in place of system_variable. SHOW SGA can only be used by a DBA user. Use one of the following terms or clauses in place of option:

    system_variable
    ALL
    BTI[TLE]
    CON_ID
    CON_NAME
    CONNECTION
    DDL
    EDITION
    ENCODING
    ENCODINGS
SHOW ENCODING

Shows the encoding which is set for the client.

SHOW ENCODINGS

Shows the available encodings for the client.
This chapter covers the Liquibase feature in SQLcl. It has the following topics:

- About Liquibase in SQLcl
- Requirements for Using Liquibase
- Supported Types
- Supported Liquibase Commands in SQLcl
- DATABASECHANGELOG_DETAILS VIEW
- ChangeSets in Liquibase
- Examples Using Liquibase

3.1 About Liquibase in SQLcl

Liquibase is an open-source database-independent library for tracking, managing and applying database schema changes.

For an understanding of the major concepts in Liquibase, see Major Concepts.

Note:

Liquibase is not available in SQLcl that is part of the SQL Developer installation. To use this feature, you need to download the standalone SQLcl offering.

The Liquibase feature in SQLcl enables you to execute commands to generate a changelog for a single object or for a full schema (changeset and changelogs). You can process these objects manually using SQLcl or through any of the traditional Liquibase interfaces.

With the Liquibase feature in SQLcl, you can:

- Generate and execute single object changelogs
- Generate and execute schema changesets with object dependencies
- Automatically sort a changeset during creation based on object dependencies
- Record all SQL statements for changeset or changelog execution, as it is generated
- Provide full rollback support for changesets and changelogs automatically
3.2 Requirements for Using Liquibase

The two important aspects for using the Liquibase functionality are capturing and deploying objects in an Oracle database.

Capture Objects

To capture an object or a schema, you must have SQLcl 19.2 or later installed.

In this release, you can only capture objects from the schema you are connected to in SQLcl. You also need write permission on the directory in which you save the files.

If you are capturing an entire schema, the user you are connected to must have the privilege to create a table. The DATABASECHANGELOG_EXPORT table is created internally to gather object details and sort them correctly. The created object is automatically excluded from the capture process and destroyed upon capture completion.

Deploy Objects

Liquibase uses the DATABASECHANGELOG table to track the changesets that have been run. The DATABASECHANGELOGLOCK table ensures that only one instance of Liquibase is running at a time. The DATABASECHANGELOG_ACTIONS table tracks the object state and the SQL statements executed during deployment.

- **SQLcl**
  Deploying changes to any database through SQLcl requires the 19.2 release or later and the privilege to create a table. You must have necessary permissions to create any object type through the change that you are deploying.

- **Liquibase**
  If you use Liquibase directly to deploy changesets, you need to have:
  - the extension installed in your Liquibase environment. Add the `dbtools-liquibase.jar` file in `liquibase/lib/ext`.
  - the privileges to create a table and a package.

3.3 Supported Types

DDL types use create or replace syntax. A snapshot of the object is taken before applying the change so automatic rollback to the last known state is supported.

SXML types support automatic alter generation with automatic rollback support.

DDL types have their own change type.

- CONSTRAINT
- DIMENSION
- DIRECTORY
- FUNCTION
- JOB
- OBJECT_GRANT
Chapter 3
Supported Types

- PACKAGE_BODY
- PACKAGE_SPEC
- PROCEDURE
- PUBLIC_SYNONYM
- REF_CONSTRAINT
- SYNONYM
- TRIGGER
- TYPE BODY
- TYPE SPEC

SXML types share the SXML change type.

- AQ_QUEUE
- AQ_QUEUE_TABLE
- AQ_TRANSFORM
- ASSOCIATION
- AUDIT
- AUDIT_OBJ
- CLUSTER
- CONTEXT
- DB_LINK
- DEFAULT_ROLE
- FGA_POLICY
- JOB
- LIBRARY
- MATERIALIZED_VIEW
- MATERIALIZED_VIEW_LOG
- OPERATOR
- PROFILE
- PROXY
- REFRESH_GROUP
- RESOURCE_COST
- RLS_CONTEXT
- RLS_GROUP
- RMGR_CONSUMER_GROUP
- RMGR_INITIAL_CONSUMER_GROUP
- RMGR_PLAN
- RMGR_PLAN_DIRECTIVE
- ROLE
3.4 Supported Liquibase Commands in SQLcl

You can invoke the Liquibase commands in SQLcl with liquibase or lb.

To display a list of all available commands, execute liquibase or lb with no arguments.

- LB GENOBJECT
- LB GENSCHEMA
- LB GENCONTROLFILE
- LB UPDATE
- LB UPDATESQL
- LB ROLLBACK
- LB ROLLBACKSQL
- LB DIFF
- LB DBDOC
- LB CHANGELOGSYNC
- LB CLEARCHECKSUMS
- LB LISTLOCKS
- LB RELEASELOCKS
- LB STATUS
- LB VALIDATE
- LB VERSION
3.4.1 LB GENOBJECT

Generates change logs for APEX, ORDS RESTful Service Modules, or database objects.

**APEX**

**Syntax**

```
lb genobject -type {APEX} -applicationid APPLICATIONID -workspaceid WORKSPACEID
[-instance] [-expWorkspace][-expMinimal] [-expFiles] [-skipExportDate]
[-expPubReports] [-expSavedReports]
    deploymentSystem DEPLOYMENTSYSTEM]
[-expSupportingObjects {Y,N,I}] [-expACLAssignments] [-dir DIR] [-list LIST]
[-changesSince CHANGESSINCE] [-changesBy CHANGESBY] [-nochecksum] [-split]
[-expComponents EXPCOMPONENTS] [-context CONTEXT] [-label LABEL]
```

Generates a change log for APEX objects.

**Named Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>-type {APEX}</td>
<td>Generate output for APEX objects.</td>
<td>-</td>
</tr>
<tr>
<td>-applicationid APPLICATIONID</td>
<td>Specify ID for application to be exported.</td>
<td>-</td>
</tr>
<tr>
<td>-workspaceid WORKSPACEID</td>
<td>Specify workspace ID for all applications to be exported or the workspace to be exported.</td>
<td>-</td>
</tr>
<tr>
<td>-instance</td>
<td>Export all applications.</td>
<td>False</td>
</tr>
<tr>
<td>-expWorkspace</td>
<td>Export workspace identified by -workspaceid or all workspaces if -workspaceid not specified.</td>
<td>False</td>
</tr>
<tr>
<td>-expMinimal</td>
<td>Export only workspace definition, users, and groups.</td>
<td>False</td>
</tr>
<tr>
<td>-expFiles</td>
<td>Export all workspace files identified by -workspaceid.</td>
<td>False</td>
</tr>
<tr>
<td>-skipExportDate</td>
<td>Exclude export date from application export files</td>
<td>False</td>
</tr>
<tr>
<td>-expPubReports</td>
<td>Export all user-saved public interactive reports.</td>
<td>False</td>
</tr>
<tr>
<td>-expSavedReports</td>
<td>Export all user-saved interactive reports.</td>
<td>False</td>
</tr>
<tr>
<td>-expIRNotif</td>
<td>Export all interactive report notifications.</td>
<td>False</td>
</tr>
<tr>
<td>-expTranslations</td>
<td>Export the translation mappings and all text from the translation repository.</td>
<td>False</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
<td>Default</td>
</tr>
<tr>
<td>---------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>-expFeedback</td>
<td>Export team development feedback for all workspaces or identified by -workspaceid.</td>
<td>False</td>
</tr>
<tr>
<td>-expTeamdevdata</td>
<td>Export team development data for all workspaces or identified by -workspaceid.</td>
<td>False</td>
</tr>
<tr>
<td>-deploymentSystem</td>
<td>Specify deployment system for exported feedback.</td>
<td>-</td>
</tr>
<tr>
<td>-expFeedbackSince</td>
<td>Export team development feedback since date in the format YYYYYMDD.</td>
<td>-</td>
</tr>
<tr>
<td>-expOriginalIds</td>
<td>Export emits ids as they were when the application was imported.</td>
<td>False</td>
</tr>
<tr>
<td>-expNoSubscriptions</td>
<td>Does not export references to subscribed components.</td>
<td>False</td>
</tr>
<tr>
<td>-expComments</td>
<td>Export developer comments.</td>
<td>False</td>
</tr>
<tr>
<td>-expSupportingObjects</td>
<td>Export supporting objects. Pass (Y)es, (N)o or (!)nstall to override the default (default: N).</td>
<td>N</td>
</tr>
<tr>
<td>-expACLAssignments</td>
<td>Export ACL User Role Assignments.</td>
<td>False</td>
</tr>
<tr>
<td>-dir</td>
<td>Save all files in the given directory. For example, -dir some/sub/directory.</td>
<td>-</td>
</tr>
<tr>
<td>-list</td>
<td>List all changed applications in the workspace or components in the application.</td>
<td>-</td>
</tr>
<tr>
<td>-changesSince</td>
<td>Expect date parameter (yyyy-mm-dd). Limit -list values to changes since the given date.</td>
<td>-</td>
</tr>
<tr>
<td>-changesBy</td>
<td>Expect string parameter. Limit -list values to changes by the given user.</td>
<td>-</td>
</tr>
<tr>
<td>-nochecksum</td>
<td>Overwrite existing files even if the contents have not changed.</td>
<td>False</td>
</tr>
<tr>
<td>-split</td>
<td>Split applications into multiple files.</td>
<td>False</td>
</tr>
<tr>
<td>-expComponents</td>
<td>Export application components. All remaining parameters must be of form TYPE:ID.</td>
<td>-</td>
</tr>
</tbody>
</table>

**Common Generator Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>-context CONTEXT</td>
<td>Specify changeset contexts to execute</td>
<td>-</td>
</tr>
<tr>
<td>-label LABEL</td>
<td>Filter the changelog using labels</td>
<td>-</td>
</tr>
<tr>
<td>-emit_schema</td>
<td>Include the schema when generating DDL</td>
<td>False</td>
</tr>
<tr>
<td>-fail</td>
<td>Set failOnError value in changeset</td>
<td>False</td>
</tr>
<tr>
<td>-replace</td>
<td>Set replaceIfExists value in changeset</td>
<td>False</td>
</tr>
<tr>
<td>-runonchange</td>
<td>Set runOnChange value in changeset</td>
<td>False</td>
</tr>
</tbody>
</table>
### Parameter Description Default

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>-runalways</td>
<td>Set runAlways value in changeset</td>
<td>False</td>
</tr>
<tr>
<td>-debug</td>
<td>Generate and display additional debug output</td>
<td>False</td>
</tr>
</tbody>
</table>

### Example

SQL> `lb genobject -type apex -applicationid 4900`
Exporting Application 4900
Action successfully completed please review created file f4900.xml

### ORDS RESTful Service Modules

#### Syntax

```
lb genobject -type {ORDS} -name NAME [-noenable] [-noprivs]
[-context CONTEXT] [-label LABEL] [-emit_schema] [-fail]
[-replace] [-runonchange] [-runalways] [-debug]
```

Generates a change log for an ORDS (Oracle REST Data Services) RESTful service module.

### Named Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>-type {ORDS}</td>
<td>Generate output for ORDS module</td>
<td>-</td>
</tr>
<tr>
<td>-name NAME</td>
<td>Module name</td>
<td>-</td>
</tr>
<tr>
<td>-noenable</td>
<td>Dictates whether the enable_schema call is included in the export</td>
<td>True</td>
</tr>
<tr>
<td>-noprivs</td>
<td>Dictates whether Privs is included in the export</td>
<td>True</td>
</tr>
</tbody>
</table>

### Common Generator Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>-context CONTEXT</td>
<td>Specify changeset contexts to execute</td>
<td>-</td>
</tr>
<tr>
<td>-label LABEL</td>
<td>Filter the changelog using labels</td>
<td>-</td>
</tr>
<tr>
<td>-emit_schema</td>
<td>Include the schema when generating DDL</td>
<td>False</td>
</tr>
<tr>
<td>-fail</td>
<td>Set failOnError value in changeset</td>
<td>False</td>
</tr>
<tr>
<td>-replace</td>
<td>Set replaceIfExists value in changeset</td>
<td>False</td>
</tr>
<tr>
<td>-runonchange</td>
<td>Set runOnChange value in changeset</td>
<td>False</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
<td>Default</td>
</tr>
<tr>
<td>-----------------</td>
<td>------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>-runalways</td>
<td>Set runAlways value in changeset</td>
<td>False</td>
</tr>
<tr>
<td>-debug</td>
<td>Generate and display additional debug output</td>
<td>False</td>
</tr>
</tbody>
</table>

### Database Object

### Syntax

```bash
lb genobject -type TYPE -name NAME
[-context CONTEXT] [-label LABEL] [-emit_schema]
```

Generates a change log for a specified database object.

### Named Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-type TYPE</td>
<td>Type of object in the database</td>
</tr>
<tr>
<td>-name NAME</td>
<td>Object name</td>
</tr>
</tbody>
</table>

### Common Generator Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>-context CONTEXT</td>
<td>Specify changeset contexts to execute</td>
<td>-</td>
</tr>
<tr>
<td>-label LABEL</td>
<td>Filter the changelog using labels</td>
<td>-</td>
</tr>
<tr>
<td>-emit_schema</td>
<td>Include the schema when generating DDL</td>
<td>False</td>
</tr>
<tr>
<td>-fail</td>
<td>Set failOnError value in changeset</td>
<td>False</td>
</tr>
<tr>
<td>-replace</td>
<td>Set replaceIfExists value in changeset</td>
<td>False</td>
</tr>
<tr>
<td>-runonchange</td>
<td>Set runOnChange value in changeset</td>
<td>False</td>
</tr>
<tr>
<td>-runalways</td>
<td>Set runAlways value in changeset</td>
<td>False</td>
</tr>
<tr>
<td>-debug</td>
<td>Generate and display additional debug output</td>
<td>False</td>
</tr>
</tbody>
</table>

### Database Object Types Supported

<table>
<thead>
<tr>
<th>Type</th>
<th>Type</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>AQ_QUEUE</td>
<td>AQ_QUEUE_TABLE</td>
<td>AQ_TRANSFORM</td>
</tr>
<tr>
<td>ASSOCIATION</td>
<td>AUDIT</td>
<td>AUDIT_OBJ</td>
</tr>
<tr>
<td>CLUSTER</td>
<td>CONSTRAINT</td>
<td>CONTEXT</td>
</tr>
<tr>
<td>DB_LINK</td>
<td>DEFAULT_ROLE</td>
<td>DIMENSION</td>
</tr>
<tr>
<td>Type</td>
<td>Type</td>
<td>Type</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>FGA_POLICY</td>
<td>FUNCTION</td>
<td>INDEX</td>
</tr>
<tr>
<td>JOB</td>
<td>LIBRARY</td>
<td>MATERIALIZED_VIEW</td>
</tr>
<tr>
<td>MATERIALIZED_VIEW_LOG</td>
<td>OBJECT_GRANT</td>
<td>OPERATOR</td>
</tr>
<tr>
<td>PACKAGE_SPEC</td>
<td>PACKAGE_BODY</td>
<td>PROCEDURE</td>
</tr>
<tr>
<td>PROFILE</td>
<td>PROXY</td>
<td>PUBLIC_SYNONYM</td>
</tr>
<tr>
<td>REF_CONRAINT</td>
<td>REFRESH_GROUP</td>
<td>RESOURCE_COST</td>
</tr>
<tr>
<td>RLS_CONTEXT</td>
<td>RLS_GROUP</td>
<td>RLS_POLICY</td>
</tr>
<tr>
<td>RMGR_CONSUMER_GROUP</td>
<td>RMGR_PLAN</td>
<td>RMGR_PLAN_DIRECTIVE</td>
</tr>
<tr>
<td>ROLE</td>
<td>ROLLBACK_SEGMENT</td>
<td>SEQUENCE</td>
</tr>
<tr>
<td>SYNONYM</td>
<td>TABLE</td>
<td>TABLESPACE</td>
</tr>
<tr>
<td>TRIGGER</td>
<td>TRUSTED_DB_LINK</td>
<td>TYPE</td>
</tr>
<tr>
<td>TYPE_SPEC</td>
<td>TYPE_BODY</td>
<td>USER</td>
</tr>
<tr>
<td>VIEW</td>
<td>XMLSCHEMA XS_USER</td>
<td>XS_ROLE</td>
</tr>
<tr>
<td>XS_ROLESET</td>
<td>XS_ROLE_GRANT</td>
<td>XS_SECURITY_CLASS</td>
</tr>
<tr>
<td>XS_DATA_SECURITY</td>
<td>XS_ACL</td>
<td>XS_ACL_PARAM</td>
</tr>
<tr>
<td>XS_NAMESPACE</td>
<td>RMGR_INTITIAL_CONSUMER_GROUP</td>
<td></td>
</tr>
</tbody>
</table>

### Example

```sql
SQL> lb genobject -type table -name zipcodes
Action successfully completed please review created file zipcodes_table.xml
```

### 3.4.2 LB GENSCHEMA

Generates changelogs and controller file for the connected schema.

#### Syntax

```bash
liquibase(lb) genschema [-noreport] [-synonyms] [-grants]
[-context CONTEXT] [-label LABEL] [-emit_schema]
```

Captures the entire schema that the user is connected to in SQLcl. An XML file is created in the current working directory for each object in the schema, and a controller.xml file is created. The controller file is a change log that includes all files in the proper order to enable the schema to be deployed correctly.

#### Named Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>-noreport</td>
<td>Suppress screen output</td>
<td>True</td>
</tr>
<tr>
<td>-synonyms</td>
<td>Include public synonyms</td>
<td>False</td>
</tr>
<tr>
<td>-grants</td>
<td>Include grants</td>
<td>False</td>
</tr>
</tbody>
</table>
Common Generator Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>-context CONTEXT</td>
<td>Specify changeset contexts to execute</td>
<td>-</td>
</tr>
<tr>
<td>-label LABEL</td>
<td>Filter the changelog using labels</td>
<td>-</td>
</tr>
<tr>
<td>-emit_schema</td>
<td>Include the schema when generating DDL</td>
<td>False</td>
</tr>
<tr>
<td>-fail</td>
<td>Set failOnError value in changeset</td>
<td>False</td>
</tr>
<tr>
<td>-replace</td>
<td>Set replaceIfExists value in changeset</td>
<td>False</td>
</tr>
<tr>
<td>-runonchange</td>
<td>Set runOnChange value in changeset</td>
<td>False</td>
</tr>
<tr>
<td>-runalways</td>
<td>Set runAlways value in changeset</td>
<td>False</td>
</tr>
<tr>
<td>-debug</td>
<td>Generate and display additional debug output</td>
<td>False</td>
</tr>
</tbody>
</table>

Example

SQL> lb genschema
lb genschema
[Type - TYPE_SPEC]: 153 ms
[Type - TYPE_BODY]: 29 ms
[Type - SEQUENCE]: 48 ms
[Type - CLUSTER]: 27 ms
[Type - TABLE]: 36 ms
[Type - MATERIALIZED_VIEW_LOG]: 19 ms
[Type - MATERIALIZED_VIEW]: 6 ms
[Type - VIEW]: 148 ms
[Type - REF_CONSRAINT]: 272 ms
[Type - DIMENSION]: 23 ms
[Type - FUNCTION]: 27 ms
[Type - PROCEDURE]: 64 ms
[Type - PACKAGE_SPEC]: 171 ms
[Type - DB_LINK]: 14 ms
[Type - SYNONYM]: 22 ms
[Type - INDEX]: 202 ms
[Type - TRIGGER]: 51 ms
[Type - PACKAGE_BODY]: 252 ms
[Method loadCaptureTable]: 1864 ms
[Method parseCaptureTableRecords]: 7342 ms
[Method sortCaptureTable]: 30 ms
[Method createExportChangeLogs]: 3 ms

Export Flags Used:
Export Grants false
Export Synonyms false
3.4.3 LB GENCONTROLFILE

Generates a blank controller.xml as a sample.

Syntax

`liquibase(lb) gencontrolfile`

Creates an empty changelog, `master.xml`, with a placeholder to include files in the current working directory. You can use this command when you are creating your own changelog with custom changeset inclusions.

Example

SQL> lb gencontrolfile
Action successfully completed please review created file controller.xml

3.4.4 LB UPDATE

Applies the specified change log using the current connection.

Syntax


Enables you to apply database changes that you and other developers have added to the change log file.

Named Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-changelog CHANGELOG</td>
<td>Specify the changelog file to use</td>
</tr>
</tbody>
</table>

Common Update Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>-context CONTEXT</td>
<td>Specify changeset contexts to execute</td>
<td>-</td>
</tr>
<tr>
<td>-label LABEL</td>
<td>Filter the changelog using labels</td>
<td>-</td>
</tr>
<tr>
<td>-emit_schema</td>
<td>Include the schema when generating DDL</td>
<td>False</td>
</tr>
<tr>
<td>-log</td>
<td>Generate a log of work performed</td>
<td>False</td>
</tr>
<tr>
<td>-debug</td>
<td>Generate and display additional debug output</td>
<td>False</td>
</tr>
</tbody>
</table>
Example

SQL> lb update -changelog zipcodes_table.xml
ScriptRunner
Executed:zipcodes_table.xml::3b128595dbfbc34086c0a18ff38e090529999::Gene rated

3.4.5 LB UPDATESQL

Generates SQL to update the database to the current version.

Syntax


Generates and renders to the screen the SQL statements that would be applied for a specific change log.

Named Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-changelog CHANGELOG</td>
<td>Specify the changelog file to use</td>
</tr>
</tbody>
</table>

Common Generator Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>-context CONTEXT</td>
<td>Specify changeset contexts to execute</td>
<td>-</td>
</tr>
<tr>
<td>-label LABEL</td>
<td>Filter the changelog using labels</td>
<td>-</td>
</tr>
<tr>
<td>-emit_schema</td>
<td>Include the schema when generating DDL</td>
<td>False</td>
</tr>
<tr>
<td>-fail</td>
<td>Set failOnError value in changeset</td>
<td>False</td>
</tr>
<tr>
<td>-replace</td>
<td>Set replaceIfExists value in changeset</td>
<td>False</td>
</tr>
<tr>
<td>-runonchange</td>
<td>Set runOnChange value in changeset</td>
<td>False</td>
</tr>
<tr>
<td>-runalways</td>
<td>Set runAlways value in changeset</td>
<td>False</td>
</tr>
<tr>
<td>-debug</td>
<td>Generate and display additional debug output</td>
<td>False</td>
</tr>
</tbody>
</table>

Example

SQL> lb updatesql -changelog zipcodes_tablev2.xml
-- *********************************************************************
-- Update Database Script
-- Change Log: zipcodes_tablev2.xml
-- Ran at: 6/3/20 12:49 PM
-- Against: JDOE@jdbc:oracle:thin:@localhost:1521/ORCLPDB1
-- Liquibase version: 3.8.9
-- ************************************************************

-- Lock Database
UPDATE JDOE.DATABASECHANGELOGLOCK SET LOCKED = 1, LOCKEDBY = '192.168.1.175 (192.168.1.175)', LOCKGRANTED = TO_TIMESTAMP('2020-06-03 12:49:05.779', 'YYYY-MM-DD HH24:MI:SS.FF') WHERE ID = 1 AND LOCKED = 0;

-- Changeset
zipcodes_tablev2.xml::3595dbfbc34086449c0a18ff38e090529999::Generated
ALTER TABLE "ZIPCODES" ADD ("LON" NUMBER)
/

-- Logging Oracle Extension actions to the Database.
DECLARE
id varchar2(200) := '3595dbfbc34086449c0a18ff38e090529999';
rawAction clob;
rawSxml clob;
myrow varchar2(2000);
action clob := '
';
sxml clob := ' 
';
dep varchar2(200) := '1202945773';
author varchar2(200) := 'Generated';
filename varchar2(200) := 'zipcodes_tablev2.xml';
insertlog varchar2(200) := 'insert into DATABASECHANGELOG_ACTIONS (id,author,filename,sql,sxml,deployment_id) values (:id,:author,:filename,:action,:sxml,:dep) returning rowid into :out';
updateaction varchar2(200) := 'update DATABASECHANGELOG_ACTIONS set sql = sql ||:action where rowid = :myrow ';
updatesxml varchar2(200) := 'update DATABASECHANGELOG_ACTIONS set sxml = sxml ||:sxml where rowid = :myrow ';
BEGIN
action := utl_raw.cast_to_varchar2(utl_encode.base64_decode(utl_raw.cast_to_raw(q'{QUxURVIgVEFCTEUgIlpJUENPREVTIiBBREQgKCJMT04iIE5VTUJFUikKLwogIC0tIE9SQS0zOTM0MTogQ2Fubm90IGNvbnZlcnQgYW4gZXhpc3RpbmcgY29sdW1uIGludG8gYW4gaWRlbnRpdHkgY29sdW1uLgov}')));
sxml := utl_raw.cast_to_varchar2(utl_encode.base64_decode(utl_raw.cast_to_raw(q'{PD94bWwgdmVyc2lvbj0iMS4wIiBlbmNvZGluZz0iVVRGLTgiIHN0YW5kYWxvbmU9Im5vIj8+PFRBQkxFIHhtbG5zP少不了
2Fubm90IGNvbnZlcnQgYW4gZXhpc3RpbmcgY29sdW1uIGludG8gYW4gaWRlbnRpdHkgY29sdW1uLgov}')));

-- Supported Liquibase Commands in SQLcl

Chapter 3
Chapter 3
Supported Liquibase Commands in SQLcl

3-14
execute immediate insertlog using id,author,filename,action,sxml,dep
returning into myrow;
end;
/
--;

INSERT INTO JDOE.DATABASECHANGELOG (ID, AUTHOR, FILENAME, DATEEXECUTED,
ORDEREXECUTED, MD5SUM, DESCRIPTION,
COMMENTS, EXECTYPE, CONTEXTS, LABELS, LIQUIBASE, DEPLOYMENT_ID) VALUES
('3595dbfbc34086449c0a18ff38e090529999',
'Generated', 'zipcodes_tablev2.xml', SYSTIMESTAMP, 2,
'8:5262bd1c3989555295b5641b82868158',
'createSxmlObject objectName=ZIPCODES, ownerName=JDOE, ', 'EXECUTED',
NULL, NULL, '3.8.9', '1202945773');

-- Release Database Lock
UPDATE JDOE.DATABASECHANGELOGLOCK SET LOCKED = 0, LOCKEDBY = NULL,
LOCKGRANTED = NULL WHERE ID = 1;

3.4.6 LB ROLLBACK

Rolls back the state requested.

Syntax

liquibase(lb) rollback -changelog CHANGELOG [-context CONTEXT]
[-debug] (-count COUNT | -date DATE)

Rolls back changes starting from the last change applied using the input change log. The count can be higher than the changes in the change log. 999, which is the maximum size, rolls back all the changes.

Named Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-changelog CHANGELOG</td>
<td>Specify the changelog file to use</td>
</tr>
</tbody>
</table>

Rollback Style Options

Select one of the following options:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-count COUNT</td>
<td>Number of changes to apply</td>
</tr>
<tr>
<td>-date DATE</td>
<td>Date to roll back to</td>
</tr>
</tbody>
</table>
Common Update Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-context CONTEXT</code></td>
<td>Specify changeset contexts to execute</td>
<td>-</td>
</tr>
<tr>
<td><code>-label LABEL</code></td>
<td>Filter the changelog using labels</td>
<td>-</td>
</tr>
<tr>
<td><code>-emit_schema</code></td>
<td>Include the schema when generating DDL</td>
<td>False</td>
</tr>
<tr>
<td><code>-fail</code></td>
<td>Set failOnError value in changeset</td>
<td>False</td>
</tr>
<tr>
<td><code>-replace</code></td>
<td>Set replaceIfExists value in changeset</td>
<td>False</td>
</tr>
<tr>
<td><code>-runonchange</code></td>
<td>Set runOnChange value in changeset</td>
<td>False</td>
</tr>
<tr>
<td><code>-runalways</code></td>
<td>Set runAlways value in changeset</td>
<td>False</td>
</tr>
<tr>
<td><code>-log</code></td>
<td>Generate a log of work performed</td>
<td>False</td>
</tr>
<tr>
<td><code>-debug</code></td>
<td>Generate and display additional debug output</td>
<td>False</td>
</tr>
</tbody>
</table>

Example

```
lb rollback -changelog zipcodes_tablev2.xml -count 100
ScriptRunner
Executed:zipcodes_tablev2.xml::3595dbfbc34086449c0a18ff38e090529999::Generated
```

3.4.7 LB ROLLBACKSQL

Writes SQL to roll back the database to the state requested.

Syntax

```
liquibase(lb) rollbacksql -changelog CHANGELOG [-context CONTEXT]
(-count COUNT | -date DATE)
```

Named Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-changelog CHANGELOG</code></td>
<td>Specify the changelog file to use</td>
</tr>
</tbody>
</table>

Rollback Style Options

Select one of the following options:
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-count COUNT</td>
<td>Number of changes to apply</td>
</tr>
<tr>
<td>-date DATE</td>
<td>Date to roll back to</td>
</tr>
</tbody>
</table>

### Common Update Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>-label LABEL</td>
<td>Filter the changelog using labels</td>
<td>-</td>
</tr>
<tr>
<td>-context CONTEXT</td>
<td>Specify changeset contexts to execute</td>
<td>-</td>
</tr>
<tr>
<td>-emit_schema</td>
<td>Include the schema when generating DDL</td>
<td>False</td>
</tr>
<tr>
<td>-fail</td>
<td>Set failOnError value in changeset</td>
<td>False</td>
</tr>
<tr>
<td>-replace</td>
<td>Set replaceIfExists value in changeset</td>
<td>False</td>
</tr>
<tr>
<td>-runonchange</td>
<td>Set runOnChange value in changeset</td>
<td>False</td>
</tr>
<tr>
<td>-runalways</td>
<td>Set runAlways value in changeset</td>
<td>False</td>
</tr>
<tr>
<td>-debug</td>
<td>Generate and display additional debug output</td>
<td>-</td>
</tr>
</tbody>
</table>

### Example

```
lb rollbacksql -changelog zipcodes_tablev2.xml -count 100
```

```sql
-- ******************************************************************************
--  Rollback 100 Change(s) Script
--  ******************************************************************************
--  Change Log: zipcodes_tablev2.xml
--  Ran at: 6/3/20 12:55 PM
--  Against: JDOE@jdbc:oracle:thin:@localhost:1521/ORCLPDB1
--  Liquibase version: 3.8.9
--  ******************************************************************************

-- Lock Database
UPDATE JDOE.DATABASECHANGELOGLOCK SET LOCKED = 1, LOCKEDBY = '192.168.1.175 (192.168.1.175)',
   LOCKGRANTED = TO_TIMESTAMP('2020-06-03 12:55:19.175', 'YYYY-MM-DD
HH24:MI:SS.FF')
WHERE ID = 1 AND LOCKED = 0;

-- Rolling Back ChangeSet:
zipcodes_tablev2.xml::3595dbfbc34086449c0a18ff38e090529999::Generated
ALTER TABLE "JDOE"."ZIPCODES" DROP ("LON");
delete from DATABASECHANGELOG_actions where id = '3595dbfbc34086449c0a18ff38e090529999' and
3.4.8 LB DIFF

Writes a description of differences between two databases to standard output.

Syntax

liquibase(lb) diff -url URL -user USER -pass PASS [-noreport]

Displays differences between the current connection and the specified database. When the report is true, the output will be in the form of a text report. When the report is false, which is the default, the output will be in the form of a change log.

The destination URL format is HOST:PORT:SID or HOST:PORT/SERVICE.

Named Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>-url URL</td>
<td>JDBC URL for destination database</td>
<td>-</td>
</tr>
<tr>
<td>-user USER</td>
<td>Destination user</td>
<td>-</td>
</tr>
<tr>
<td>-pass PASS</td>
<td>Destination password</td>
<td>-</td>
</tr>
<tr>
<td>-noreport</td>
<td>Results output as a changelog, not a text report</td>
<td>True</td>
</tr>
</tbody>
</table>

Example

lb diff -url localhost:1521/ORCLPDB1 -user hr -password hr

Action successfully completed please review created file diffResult.txt

!more diffResult.txt

Reference Database: JDOE @ jdbc:oracle:thin:@localhost:1521/ORCLPDB1
(Default Schema: JDOE)
Comparison Database: HR @ jdbc:oracle:thin:@localhost:1521/ORCLPDB1
(Default Schema: HR)
Compared Schemas: JDOE -> HR
Product Name: EQUAL
Product Version: EQUAL
Chapter 3

Supported Liquibase Commands in SQLcl
Changed Foreign Key(s): NONE

Missing Index(s):
  PK_DATABASECHANGELOGLOCK UNIQUE ON JDOE.DATABASECHANGELOGLOCK(ID)
  SYS_C00122620 UNIQUE ON JDOE.DATABASECHANGELOG_ACTIONS(ID, AUTHOR, FILENAME, SEQUENCE)
  SYS_C00122637 UNIQUE ON JDOE.ZIPCODES(ID)

Unexpected Index(s): NONE

Changed Index(s): NONE

Missing Primary Key(s):
  PK_DATABASECHANGELOGLOCK on JDOE.DATABASECHANGELOGLOCK(ID)
  SYS_C00122620 on JDOE.DATABASECHANGELOG_ACTIONS(ID, AUTHOR, FILENAME, SEQUENCE)
  SYS_C00122637 on JDOE.ZIPCODES(ID)

Unexpected Primary Key(s): NONE

Changed Primary Key(s): NONE

Missing Sequence(s): NONE

Unexpected Sequence(s): NONE

Changed Sequence(s): NONE

Missing Table(s):
  DATABASECHANGELOG
  DATABASECHANGELOGLOCK
  DATABASECHANGELOG_ACTIONS
  ZIPCODES

Unexpected Table(s): NONE

Changed Table(s): NONE

Missing Unique Constraint(s): NONE

Unexpected Unique Constraint(s): NONE

Changed Unique Constraint(s): NONE

Missing View(s):
  DATABASECHANGELOGDETAILS

Unexpected View(s): NONE

Changed View(s): NONE

SQL> lb diff -url localhost:1521/ORCLPDB1 -user hr -password hr - noreport

Action successfully completed please review created file diffResult.xml

diffResult.xml
  !more diffResult.xml

<?xml version="1.1" encoding="UTF-8" standalone="no"?>
<databaseChangeLog xmlns="http://www.liquibase.org/xml/ns/dbchangelog"
xmlns:ext="http://www.liquibase.org/xml/ns/dbchangelog-ext"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.liquibase.org/xml/ns/dbchangelog-ext"
http://www.liquibase.org/xml/ns/dbchangelog/dbchangelog-ext.xsd"
http://www.liquibase.org/xml/ns/dbchangelog http://www.liquibase.org/xml/ns/dbchange
http://www.liquibase.org/xml/ns/dbchangelog/dbchangelog-3.8.xsd">
  <changeSet author="jdoe (generated)" id="1591203948991-1">
    <createTable tableName="DATABASECHANGELOG_ACTIONS">
      <column name="ID" type="VARCHAR2(255 BYTE)"
        constraints nullable="false"/>
    </column>
    <column name="SEQUENCE" type="NUMBER">
      </column>
  </createTable>
</changeSet>
</databaseChangeLog>
<createView fullDefinition="true" viewName="DATABASECHANGELOG_DETAILS">
  CREATE OR REPLACE FORCE VIEW DATABASECHANGELOG_DETAILS (DEPLOYMENT_ID, ID, AUTHOR, FILENAME, SQL, SXML, DATEEXECUTED, EXECTYPE, MD5SUM, DESCRIPTION, COMMENTS, LIQUIBASE, CONTEXTS, LABELS) AS SELECT da.deployment_id, da.id, da.author, da.filename, da.sql, da.sxml, d.dateexecuted, d.exectype, d.md5sum, d.description, d.comments, d.liquibase, d.contexts, d.labels FROM databasechangelog d LEFT JOIN databasechangelog_actions da ON d.id = da.id AND d.author = da.author AND d.filename = da.filename ORDER BY 1,7
</createView>

<createIndex indexName="SYS_C00122620" tableName="DATABASECHANGELOG_ACTIONS" unique="true">
  SELECT ID, AUTHOR, FILENAME, SEQUENCE FROM DATABASECHANGELOG_ACTIONS
</createIndex>
3.4.9 LB DBDOC

Generates Javadoc-like documentation based on the current database and change log.

Syntax

liquibase(lb) dbdoc -changelog CHANGELOG -dir DIR [-context CONTEXT] [-label LABEL]

Named Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-changelog CHANGELOG</td>
<td>Specify the changelog file to use</td>
</tr>
<tr>
<td>-dir DIR</td>
<td>Saves all files in the given directory, example,</td>
</tr>
<tr>
<td></td>
<td>-dir some/sub/directory</td>
</tr>
</tbody>
</table>

Common Update Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-context CONTEXT</td>
<td>Specify the changeset contexts to execute</td>
</tr>
<tr>
<td>-label LABEL</td>
<td>Filter the changelog using labels</td>
</tr>
</tbody>
</table>

Example

SQL> lb dbdoc -changelog states_table.xml -dir ./doc
SQL> !ls -l ./doc
    total 56
    drwxr-xr-x 3 jdoe staff  96 Jun 3 13:25 authors
-rw-r--r-- 1 jdoe staff  449 Jun 3 13:25 authors.html
-rw-r-xr-x 3 jdoe staff  96 Jun 3 13:25 changelogs
-rw-r--r-- 1 jdoe staff  474 Jun 3 13:25 changelogs.html
-rw-r-xr-x 31 jdoe staff 992 Jun 3 13:25 columns
-rw-r--r-- 1 jdoe staff  555 Jun 3 13:25 currenttables.html
-rw-r--r-- 1 jdoe staff  899 Jun 3 13:25 globalnav.html
-rw-r--r-- 1 jdoe staff  769 Jun 3 13:25 index.html
-rw-r--r-- 1 jdoe staff  445 Jun 3 13:25 overview-summary.html
-rw-r-xr-x  4 jdoe staff  128 Jun 3 13:25 pending
-rw-r-xr-x  3 jdoe staff  96 Jun 3 13:25 recent
-rw-r--r--  1 jdoe staff 1202 Jun 3 13:25 stylesheet.css
-rw-r-xr-x  4 jdoe staff  128 Jun 3 13:25 tables

Figure 3-1 shows the index page that is created by the DBDOC command. It enables you to navigate the various details of the changelog used to produce the document.
3.4.10 LB CHANGELOGSYNC

 Writes the SQL statements to mark all changes in the change log as executed in the database to a file.

 **Syntax**

 `liquibase(lb) changelogsync -changelog CHANGELOG`

 **Named Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-changelog</td>
<td>Specifying the changelog file to use</td>
</tr>
</tbody>
</table>

**Example**

```
SQL> lb changelogsync -changelog zipcodes_table.xml
-- *********************************************************************
-- SQL to add all changesets to database history table
-- *********************************************************************
```
3.4.11 LB CLEARCHECKSUMS

Removes current checksums from the database. For the next update, changesets that have already been deployed will have their checksums recomputed, and changesets that have not been deployed will be deployed.

Syntax

liquibase(lb) clearchecksums -changelog CHANGELOG

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-changelog CHANGELOG</td>
<td>Specify the changelog file to use</td>
</tr>
</tbody>
</table>

Example

SQL> lb clearchecksums -changelog zipcodes_table.xml

3.4.12 LB LISTLOCKS

Lists who currently has locks on the database change log.
Syntax

liquibase(lb) listlocks -changelog CHANGELOG

Named Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-changelog CHANGELOG</td>
<td>Specify the changelog file to use</td>
</tr>
</tbody>
</table>

Example

SQL> lb listlocks -changelog zipcodes_table.xml
No locks currently in use

3.4.13 LB RELEASELOCKS

Releases all locks on the database change log.

Syntax

liquibase(lb) releaselocks -changelog CHANGELOG

Named Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-changelog CHANGELOG</td>
<td>Specify the changelog file to use</td>
</tr>
</tbody>
</table>

Example

SQL> lb releaselocks -changelog zipcodes_table.xml

3.4.14 LB STATUS

Outputs a list of change sets that have not been applied.

Syntax

liquibase(lb) status -changelog CHANGELOG

Checks the status of the change log using the current connection. This shows if the change log has been applied and the result of the change log.

Named Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-changelog CHANGELOG</td>
<td>Specify the changelog file to use</td>
</tr>
</tbody>
</table>
Example

SQL> lb status -changelog zipcodes_table.xml

1 change sets have not been applied to
JDOE@jdbc:oracle:thin:@localhost:1521/ORCLPDB1
zipcodes_table.xml::e6568d24910039bf3d4241e7edff5ec82612c60f::Generated

3.4.15 LB VALIDATE

Checks the changelog for errors.

Syntax

liquibase(lb) validate -changelog CHANGELOG

Named Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-changelog CHANGELOG</td>
<td>Specify the changelog file to use</td>
</tr>
</tbody>
</table>

Example

lb validate -changelog zipcodes_table.xml
No issues were found in file zipcodes_table.xml, validation passed

3.4.16 LB VERSION

Display product version information.

Syntax

liquibase(lb) version

Example

SQL> lb version

Liquibase version:   3.8.9
Extension Version:   2.0.0.0

3.4.17 LB HELP

Lists the available Liquibase commands.

Syntax

liquibase(lb) help command
Type a command with no options for help on a specific command.

Example

SQL> lb help
usage: lb COMMAND ...

Commands:
The following commands are available within the liquibase feature.
lb help COMMAND for command specific help

<table>
<thead>
<tr>
<th>COMMAND</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>genobject</td>
<td>Generate change log for a specific database object</td>
</tr>
<tr>
<td>genschema</td>
<td>Generate changelogs and controller for connected schema</td>
</tr>
<tr>
<td>gencontrolfile</td>
<td>Remove locks held by changelog</td>
</tr>
<tr>
<td>update</td>
<td>Updates database to current version</td>
</tr>
<tr>
<td>updateSQL</td>
<td>Generates SQL to update database to current version</td>
</tr>
<tr>
<td>rollback</td>
<td>Rolls back the state requested</td>
</tr>
<tr>
<td>rollbackSQL</td>
<td>Writes SQL to roll back the database to the state requested</td>
</tr>
<tr>
<td>diff</td>
<td>Writes description of differences between two databases to standard out.</td>
</tr>
<tr>
<td>dbdoc</td>
<td>Generates Javadoc-like documentation based on current database and change log.</td>
</tr>
<tr>
<td>changelogSync</td>
<td>Mark all changes as executed in the database.</td>
</tr>
<tr>
<td>clearchecksums</td>
<td>Removes current checksums from database.</td>
</tr>
<tr>
<td>listlocks</td>
<td>Lists who currently has locks on the database changelog.</td>
</tr>
<tr>
<td>releaselocks</td>
<td>Releases all locks on the database changelog.</td>
</tr>
<tr>
<td>status</td>
<td>Outputs list of unrun change sets.</td>
</tr>
<tr>
<td>validate</td>
<td>Checks the changelog for errors.</td>
</tr>
<tr>
<td>version</td>
<td>Display product version information</td>
</tr>
</tbody>
</table>

3.5 DATABASECHANGELOG_DETAILS VIEW

DATABASECHANGELOG_DETAILS is a view that consolidates information from the
DATABASECHANGELOG and DATABASECHANGELOG_ACTIONS tables for easier
reporting and troubleshooting.

This view enables a better understanding of the status and work performed by each
change applied to the database. The SQL column shows the actual SQL that was run
in the database. The SXML column shows the state of the object prior to the change
being applied.

Example

SQL> desc DATABASECHANGELOG_DETAILS

<table>
<thead>
<tr>
<th>Name</th>
<th>Null?</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEPLOYMENT_ID</td>
<td></td>
<td>VARCHAR2(10)</td>
</tr>
</tbody>
</table>
3.6 ChangeSets in Liquibase

The following table lists the changeSets and provides a description for each of them. To learn more about changeSets, see <changeSet> tag.

<table>
<thead>
<tr>
<th>ChangeSet</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CreateOracleConstraint</td>
<td>Creates a constraint from SQL.</td>
</tr>
<tr>
<td>CreateOracleDirectory</td>
<td>Creates a directory from SQL.</td>
</tr>
<tr>
<td>CreateOracleFunction</td>
<td>Creates a function from SQL.</td>
</tr>
<tr>
<td>CreateOracleGrant</td>
<td>Creates a grant from SQL.</td>
</tr>
<tr>
<td>CreateOraclePackageBody</td>
<td>Creates a package body from SQL.</td>
</tr>
<tr>
<td>CreateOracleJob</td>
<td>Creates a DBMS_Scheduler job from SQL.</td>
</tr>
<tr>
<td>CreateOraclePackageSpec</td>
<td>Creates a package specification from SQL.</td>
</tr>
<tr>
<td>CreateOracleProcedure</td>
<td>Creates a procedure from SQL.</td>
</tr>
<tr>
<td>CreateOraclePublicSynonym</td>
<td>Creates a public synonym from SQL.</td>
</tr>
<tr>
<td>CreateOracleRefConstraint</td>
<td>Creates a referential constraint from SQL.</td>
</tr>
<tr>
<td>CreateOracleSynonym</td>
<td>Creates a synonym from SQL.</td>
</tr>
<tr>
<td>CreateOracleTrigger</td>
<td>Creates a trigger from SQL.</td>
</tr>
<tr>
<td>CreateOracleTypeBody</td>
<td>Creates a type body from SQL.</td>
</tr>
<tr>
<td>CreateOracleTypeSpec</td>
<td>Creates a type spec from SQL.</td>
</tr>
<tr>
<td>CreateSxmlObject</td>
<td>Creates a function from SQL.</td>
</tr>
<tr>
<td>DropOracleConstraint</td>
<td>Drops a constraint.</td>
</tr>
<tr>
<td>DropOracleFunction</td>
<td>Drops a function.</td>
</tr>
<tr>
<td>DropOracleGrant</td>
<td>Drops a grant.</td>
</tr>
<tr>
<td>DropOraclePackageBody</td>
<td>Drops a package body.</td>
</tr>
<tr>
<td>DropOraclePackageSpec</td>
<td>Drops a package specification.</td>
</tr>
<tr>
<td>DropOracleProcedure</td>
<td>Drops a procedure.</td>
</tr>
<tr>
<td>DropOracleRefConstraint</td>
<td>Drops a referential constraint.</td>
</tr>
<tr>
<td>DropOracleTrigger</td>
<td>Drops a trigger.</td>
</tr>
<tr>
<td>DropOracleTypeBody</td>
<td>Drops a type body.</td>
</tr>
<tr>
<td>DropOracleTypeSpec</td>
<td>Drops a type specification.</td>
</tr>
<tr>
<td>DropOracleSynonym</td>
<td>Drops a synonym.</td>
</tr>
</tbody>
</table>
### ChangeSet

<table>
<thead>
<tr>
<th>ChangeSet</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DropSxmlObject</td>
<td>Drops an SXML object. If the object was created through createSxmlObject, this rolls back the object to the last state. If not created, the object is just dropped. This is primarily used internally for SXML object handling.</td>
</tr>
<tr>
<td>RunOracleScript</td>
<td>Executes a SQL script using the SQLcl engine and therefore supports all SQLcl commands. Supports script, file, and URL sources. See Execute Custom SQL with RunOracleScript</td>
</tr>
</tbody>
</table>

### 3.7 Examples Using Liquibase

Some examples of using the Liquibase functionality for database change management tasks:

- Capture and Deploy an Object
- Capture and Deploy a Schema
- Generate the Master Control File
- Capture and Deploy a Schema and then Upgrade it and Redeploy
- Execute Custom SQL with RunOracleScript

#### 3.7.1 Capture and Deploy an Object

To deploy the EMPLOYEES table from HR to HR2:

> **Note:**

The syntax for the GENOBJECT command has changed. See LB GENOBJECT

1. Connect to HR.

   ```sql
   SQL> connect hr/hr
   Connected.
   ```

2. Capture the object.

   ```sql
   SQL> lb genobject -type table -name employees
   Action successfully completed please review created file employees_table1.xml
   ```

3. Connect to the other user.

   ```sql
   SQL> connect hr2/hr2
   Connected.
   ```
4. Ensure the object does not already exist.

   SQL> drop table employees
   Table EMPLOYEES dropped.

5. Create the object in the current schema.

   \[ Note: \]
   As the schema name has changed, you must set include schema to false or it will try and create the object in the hr schema.

   SQL> lb update -changelog employees_table.xml
   ScriptRunner Executed:/Users/jdoe/Documents/lbtest/v2/employees_table.xml::6486f968-93fe-4e1c-ac59-17ef392e1423::Generated

6. Verify the object was created.

   SQL> desc employees
   ---- ----- ------
   EMPLOYEE_ID       NOT NULL    NUMBER(6)
   FIRST_NAME                    VARCHAR2(20)
   LAST_NAME         NOT NULL    VARCHAR2(25)
   EMAIL             NOT NULL    VARCHAR2(25)
   PHONE_NUMBER                  VARCHAR2(20)
   HIRE_DATE         NOT NULL    DATE
   JOB_ID            NOT NULL    VARCHAR2(10)
   SALARY                        NUMBER(8,2)
   COMMISSION_PCT                NUMBER(2,2)
   MANAGER_ID                    NUMBER(6)
   DEPARTMENT_ID                 NUMBER(4)

3.7.2 Capture and Deploy a Schema

To capture the HR schema and reproduce it in the HR2 schema:

   sql.exe hr/hr@pdb1

   SQL> lb genschema
   [Type - TYPE_SPEC]:                          107 ms
   [Type - TYPE_BODY]:                           80 ms
   [Type - SEQUENCE]:                            26 ms
   [Type - CLUSTER]:                             25 ms
   [Type - TABLE]:                              721 ms
   [Type - MATERIALIZED_VIEW_LOG]:               18 ms
   [Type - MATERIALIZED_VIEW]:                    9 ms
   [Type - VIEW]:                                81 ms
   [Type - REF_CONSTRAINT]:                     128 ms
   [Type - DIMENSION]:                           14 ms
   [Type - FUNCTION]:                            43 ms
setup the hr2 user --

drop user hr2 cascade;
cREATE USER hr2 IDENTIFIED BY hr2;
grant connect, resource, create view to hr2;
ALTER USER hr2 QUOTA UNLIMITED ON USERS;
ALTER USER hr2 QUOTA UNLIMITED ON SYSAUX;

SQL> drop user hr2 cascade;
User HR2 dropped.

SQL> create user hr2 identified by hr2;
User HR2 created.

SQL> grant connect, resource, create view to hr2;
Grant succeeded.

SQL> alter user hr2 quota unlimited on users;
User HR2 altered.

SQL> alter user hr2 quota unlimited on sysysaux;
User HR2 altered.

SQL> connect hr2/hr2
Connected.

SQL> lb update -changelog controller.xml
ScriptRunner
Executed: person_typ_type_spec.xml::32492b89db4b0e2a115caa3e7e6c3d29c11fa
1db::Generated
ScriptRunner
Executed: emp_person_typ_type_spec.xml::cb314e652bc79126fa0a2b5261720d157
28c7e04::Generated
ScriptRunner
Executed: people_typ_type_spec.xml::cc5c2298290e3ce2dc1563da82dd9ea33a76
8c8::Generated
SQL> tables

TABLES
___________________________
DATABASECHANGELOG
DATABASECHANGELOGLOCK
DATABASECHANGELOG_ACTIONS
COUNTRIES
REGIONS
LOCATIONS
DEPARTMENTS
JOBS
EMPLOYEES
JOB_HISTORY

10 rows selected.

3.7.3 Generate the Master Control File

SQL> lb gencontrolfile
Action successfully completed please review created file controller.xml

SQL> !more controller.xml
<?xml version="1.0" encoding="UTF-8"?>
<databaseChangeLog
 xmlns="http://www.liquibase.org/xml/ns/dbchangelog"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
 xsi:schemaLocation="http://www.liquibase.org/xml/ns/dbchangelog
 http://www.liquibase.org/xml/ns/dbchangelog/dbchangelog-3.1.xsd">
 <include file="{filename.xml}"/>
</databaseChangeLog>

3.7.4 Capture and Deploy a Schema and then Upgrade it and Redeploy

The steps are:

1. Migrate the HR schema to the HR2 schema, then modify the HR schema and update HR2.

   setup the hr2 user --
   drop user hr2 cascade;
   create user hr2 identified by hr2;
   grant connect,resource, create view to hr2;
   alter user hr2 quota unlimited on users;
   alter user hr2 quota unlimited on sysaux;

   SQL> drop user hr2 cascade;
   User HR2 dropped.
SQL> create user hr2 identified by hr2;
User HR2 created.

SQL> grant connect,resource, create view to hr2;
Grant succeeded.

SQL> alter user hr2 quota unlimited on users;
User HR2 altered.

SQL> alter user hr2 quota unlimited on sysaux;
User HR2 altered.

SQL> connect hr2/hr2
Connected.

SQL> mkdir v1

SQL> cd v1
SQL> connect hr/hr
Connected.

SQL> lb genschema

[Type - TYPE_SPEC]:                          185 ms
[Type - TYPE_BODY]:                           84 ms
[Type - SEQUENCE]:                            41 ms
[Type - CLUSTER]:                              38 ms
[Type - TABLE]:                                702 ms
[Type - MATERIALIZED_VIEW_LOG]:               20 ms
[Type - MATERIALIZED_VIEW]:                   10 ms
[Type - VIEW]:                                  85 ms
[Type - REF_CONSTRAINT]:                     142 ms
[Type - DIMENSION]:                            21 ms
[Type - FUNCTION]:                              45 ms
[Type - PROCEDURE]:                            52 ms
[Type - PACKAGE_SPEC]:                         30 ms
[Type - DB_LINK]:                               18 ms
[Type - SYNONYM]:                                30 ms
[Type - INDEX]:                                 125 ms
[Type - TRIGGER]:                               31 ms
[Type - PACKAGE_BODY]:                          39 ms
[Type - JOB]:                                  19 ms
[Method loadCaptureTable]:                   1717 ms
[Method parseCaptureTableRecords]:            6243 ms
[Method sortCaptureTable]:                    42 ms
[Method createExportChangeLogs]:              1 ms

Export Flags Used:
Export Grants          false
Export Synonyms        false

2. Modify the HR schema.

SQL> ALTER TABLE DEPARTMENTS ADD (COLUMN1 VARCHAR2(20) );
Table DEPARTMENTS altered.

SQL> ALTER TABLE COUNTRIES ADD (COLUMN1 VARCHAR2(20) );
Table COUNTRIES altered.

SQL> ALTER TABLE LOCATIONS ADD (COLUMN1 VARCHAR2(20) );
Table LOCATIONS altered.

SQL> CREATE OR REPLACE PROCEDURE PROCEDURE2 (PARAM1 IN VARCHAR2, PARAM2 IN VARCHAR2, PARAM3 IN VARCHAR2, PARAM4 IN VARCHAR2) AS BEGIN NULL; END PROCEDURE2;
Procedure PROCEDURE2 compiled

3. Make a change to the v2 directory.

SQL> cd ..
SQL> !mkdir v2
SQL> cd v2

4. Export v2 of the HR schema.

SQL> lb genschema
[Type - TYPE_SPEC]: 102 ms
[Type - TYPE_BODY]: 74 ms
[Type - SEQUENCE]: 26 ms
[Type - CLUSTER]: 25 ms
[Type - TABLE]: 534 ms
[Type - MATERIALIZED_VIEW_LOG]: 13 ms
[Type - MATERIALIZED_VIEW]: 10 ms
[Type - VIEW]: 78 ms
[Type - REF_CONSTRAINT]: 119 ms
[Type - DIMENSION]: 15 ms
[Type - FUNCTION]: 44 ms
[Type - PROCEDURE]: 46 ms
[Type - PACKAGE_SPEC]: 25 ms
[Type - DB_LINK]: 14 ms
[Type - SYNONYM]: 24 ms
[Type - INDEX]: 100 ms
[Type - TRIGGER]: 25 ms
[Type - PACKAGE_BODY]: 34 ms
[Type - JOB]: 14 ms
[Method loadCaptureTable]: 1322 ms
[Method parseCaptureTableRecords]: 5452 ms
[Method sortCaptureTable]: 37 ms
[Method createExportChangeLogs]: 0 ms
Export Flags Used:
Export Grants false
Export Synonyms false

To import v1, change back to the v1 directory and connect as HR2.

SQL> cd ..
SQL> connect hr2/hr2
Connected.
5. Now import the capture into the HR2 schema.

```sql
SQL> lb update -changelog controller.xml
ScriptRunner
Executed:person_typ_type_spec.xml::f9d8cb37f8030674b1d0060b054254a28f96dd51::Generated
ScriptRunner
Executed:emp_person_typ_type_spec.xml::c4bf9def8fc164a6c0a7be69c178466::Generated
ScriptRunner
Executed:people_typ_type_spec.xml::6a98e2a2ec56a7a6b716a14804081f8760ce78::Generated
ScriptRunner
Executed:dept_persons_typ_type_spec.xml::e250a6757e4e023a30c1b9f458149e4da0a66::Generated
ScriptRunner
Executed:employee_type_type_spec.xml::aa2ef7c172e6df08e4082af139f4c6ed6e146::Generated
ScriptRunner
Executed:person_typ_type_body.xml::bd29fd1d0827b70ae4b6d4781eeb9a69f7caf956::Generated
ScriptRunner
Executed:departments_seq_sequence.xml::ea03838db9dc0613a5128090c9388f1b8dc8a1::Generated
ScriptRunner
Executed:locations_seq_sequence.xml::2aba6107a95a977632161be9ca920bd836f18::Generated
ScriptRunner
Executed:employees_seq_sequence.xml::2379ab3cbf7b8f52f6596fa16479bb6cf721::Generated
ScriptRunner
Executed:countries_table.xml::8e87e94fd74b172dc76d950216057827e2e3f83::Generated
ScriptRunner
Executed:countries_comments.xml::8797a740e38cf7da36b6ba4aa5497cfd6b457::Generated
```

6. Check a table to verify.

```sql
SQL> show user
USER is "HR2"

SQL> desc departments

<table>
<thead>
<tr>
<th>Name</th>
<th>Null?</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEPARTMENT_ID</td>
<td>NOT NULL</td>
<td>NUMBER(4)</td>
</tr>
<tr>
<td>DEPARTMENT_NAME</td>
<td>NOT NULL</td>
<td>VARCHAR2(30)</td>
</tr>
<tr>
<td>MANAGER_ID</td>
<td></td>
<td>NUMBER(6)</td>
</tr>
<tr>
<td>LOCATION_ID</td>
<td></td>
<td>NUMBER(4)</td>
</tr>
</tbody>
</table>
```

7. Switch to v2 and import the capture.

```sql
SQL> cd v2
SQL> lb update -changelog controller.xml
```
Verify that you are on v2.

SQL> desc departments

Name                  Null?         Type
__________________ ___________ _______________
DEPARTMENT_ID        NOT NULL     NUMBER(4)
DEPARTMENT_NAME      NOT NULL     VARCHAR2(30)
MANAGER_ID                       NUMBER(6)
LOCATION_ID                       NUMBER(4)
COLUMN1                           NUMBER

3.7.5 Execute Custom SQL with RunOracleScript

Create a RunOracleScript changeset where the source can be a script, a link to a file, or a URL. The changeset in this example shows how to create a table and use PL/SQL variables in the script.

### SCRIPT - STRING EXAMPLE ###

```xml
<?xml version="1.0" encoding="UTF-8"?>
<databaseChangeLog
 xmlns="http://www.liquibase.org/xml/ns/dbchangelog"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
 xmlns:n0="http://www.oracle.com/xml/ns/dbchangelog-ext"
 xsi:schemaLocation="http://www.liquibase.org/xml/ns/dbchangelog
 http://www.liquibase.org/xml/ns/dbchangelog/dbchangelog-3.6.xsd">
 <changeSet id="runScriptString" author="jdoe">
   <n0:runOracleScript objectName="myScript" ownerName="JDOE" sourceType="STRING">
     <n0:source><![CDATA[DEFINE table_name = RUNNERSTRING;create table &&table_name (id number);]]></n0:source>
   </n0:runOracleScript>
 </changeSet>
</databaseChangeLog>
```
SQL> tables
no rows selected

SQL> lb update -changelog stringscript.xml
ScriptRunner Executed:stringscript.xml::runScriptString::jdoe

SQL> tables
TABLES

DATABASECHANGELOGLOCK
DATABASECHANGELOG
DATABASECHANGELOG_ACTIONS
RUNNERSTRING

### SCRIPT - FILE EXAMPLE ###

filescript.xml

---

```xml
<?xml version="1.0" encoding="UTF-8"?>
<databaseChangeLog
    xmlns="http://www.liquibase.org/xml/ns/dbchangelog"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:n0="http://www.oracle.com/xml/ns/dbchangelog-ext"
    xsi:schemaLocation="http://www.liquibase.org/xml/ns/dbchangelog
http://www.liquibase.org/xml/ns/dbchangelog/dbchangelog-3.6.xsd">
    <changeSet id="RunScriptFile" author="jdoe">
        <n0:runOracleScript objectName="myScript" ownerName="JDOE"
sourceType="FILE">
            <![CDATA[/Volumes/SSD/work/sqlcl/scriptFILE.sql]]>
        </n0:runOracleScript>
    </changeSet>
</databaseChangeLog>
---

scriptFILE.sql

CREATE TABLE RUNNERFILE (id number)

SQL> tables
TABLES
SQL> lb update -changelog filescript.xml
ScriptRunner Executed:/Volumes/SSD/work/sqlcl/
filescript.xml::RunScriptFile::jdoe

SQL> tables
TABLES

### SCRIPT - URL EXAMPLE ###

urlscript.xml

```xml
<?xml version="1.0" encoding="UTF-8"?>
<databaseChangeLog
    xmlns="http://www.liquibase.org/xml/ns/dbchangelog"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:n0="http://www.oracle.com/xml/ns/dbchangelog-ext"
    <changeSet id="RunScriptUrl" author="jdoe">
        <n0:runOracleScript objectName="myScript" ownerName="JDOE"
                           sourceType="URL">
            <n0:source><![CDATA[file:///Volumes/SSD/work/sqlcl/scriptURL.sql]]></n0:source>
        </n0:runOracleScript>
    </changeSet>
</databaseChangeLog>
```

**scriptURL.sql**

```
CREATE TABLE RUNNERURL (id number)
```

SQL> tables
TABLES

DATABASECHANGELOGLOCK
DATABASECHANGELOG
DATABASECHANGELOG_ACTIONS
RUNNERSTRING
RUNNERFILE
Chapter 3
Examples Using Liquibase

DATABASECHANGELOG
DATABASECHANGELOG_ACTIONS
RUNNERSTRING
RUNNERFILE

SQL> lb update -changelog urlscript.xml
ScriptRunner Executed:/Volumes/SSD/work/sqlcl/
urlscript.xml::RunScriptUrl::jdoe

SQL> tables
TABLES

DATABASECHANGELOGLOCK
DATABASECHANGELOG
DATABASECHANGELOG_ACTIONS
RUNNERSTRING
RUNNERFILE
RUNNERURL
Property Graph Query Language (PGQL) is a graph pattern-matching query language for the property graph data model. The PGQL plug-in enables execution and translation of PGQL statements from the command line in SQLcl.

The PGQL plug-in for SQLcl is available with Oracle Graph Server and Client Release 20.3 and later releases.

See Also:
Property Graph Query Language for more information about PGQL.

This chapter covers the following topics:

- Downloading and Installing
- About PGQL Commands
- Examples

4.1 Downloading and Installing

You can download the plug-in either from Oracle Software Delivery Cloud (search for "Oracle Graph Server and Client") or from Oracle Graph Server and Client Downloads.

To install the PGQL plug-in for SQLcl, you need to unzip the downloaded plug-in into the `lib/ext` directory of your local SQLcl installation.

4.2 About PGQL Commands

To run PGQL statements against a database, start SQLcl and then turn on PGQL mode by using the following command:

```
pql auto on;
```

After PGQL mode is turned on, all subsequent SELECT, INSERT, UPDATE, DELETE, CREATE, and DROP statements are considered as PGQL statements.

You can also provide different arguments when turning on PGQL mode:

```
pql auto on [args]
```

The possible arguments are:
• graph <graph_name>: Make queries run against the specified graph.
• execute: Turn on PGQL execution.
• executeonly: Turn on PGQL execution and do not show PGQL-to-SQL translation.
• translate: Show PGQL-to-SQL translation.
• translateonly: Show PGQL-to-SQL translation and turn off PGQL execution.
• parallel <parallel>: Run (or translate) PGQL queries using the specified parallel value.
• dynamic_sampling <dynamic_sampling>: Run (or translate) PGQL queries using the specified dynamic sampling value.

By default, the graph value is not set, PGQL execution is turned on, and PGQL to SQL translation is turned off. The default value for parallel is 0, and the default value for dynamic_sampling is 6.

To run SQL statements again, turn PGQL mode off:

pgql auto off;

To reset all parameters to their default values, turn PGQL mode off and then turn on again.

### 4.3 Examples

This section provides some examples:

- Turn On PGQL Mode
- Create a Property Graph and Execute a Query
- Define a Graph Parameter
- Show SQL Translation Using Parallel Value 2
- Turn Off PGQL Mode

**Turn On PGQL Mode**

This example turns PGQL mode on. The PGQL prompt appears when PGQL is enabled.

```
SQL> pgql auto on;

PGQL Auto enabled for graph=[null], execute=[true], translate=[false]
```

**Create a Property Graph and Execute a Query**

This example creates a property graph and executes a query against the newly created "scott_hr" graph.

```
PGQL> CREATE PROPERTY GRAPH scott_hr
    2    VERTEX TABLES {
    3        emp KEY(empno) LABEL Employee
```
4 PROPERTIES ARE ALL COLUMNS EXCEPT (deptno),
5 dept KEY(deptno) LABEL Department
6 PROPERTIES (deptno, dname)
7 )
8 EDGE TABLES(
9 emp AS works_for
10 SOURCE KEY (empno) REFERENCES emp
11 DESTINATION KEY (deptno) REFERENCES dept
12 NO PROPERTIES
13 );

Graph created

PGQL> column name format a15;
PGQL> SELECT e.ename AS name
2 FROM MATCH (e:Employee) ON scott_hr
3 ORDER BY e.ename
4 LIMIT 4;

<table>
<thead>
<tr>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADAMS</td>
</tr>
<tr>
<td>ALLEN</td>
</tr>
<tr>
<td>BLAKE</td>
</tr>
<tr>
<td>CLARK</td>
</tr>
</tbody>
</table>

Define a Graph Parameter

You can define a graph parameter to run all PGQL queries against a particular graph. This example sets graph to scott_hr. Note that the query does not need an ON clause.

PGQL> pgql auto on graph scott_hr;

PGQL Auto enabled for graph=[SCOTT_HR], execute=[true], translate=[false]

PGQL> column department format a20;
PGQL> column employees format a10;
PGQL> SELECT d.dname AS department, COUNT(e) AS employees
2 FROM MATCH (e:Employee) -[:works_for]-> (d:Department)
3 GROUP BY d
4 ORDER BY employees
5 LIMIT 3;

<table>
<thead>
<tr>
<th>DEPARTMENT</th>
<th>EMPLOYEES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCOUNTING</td>
<td>3</td>
</tr>
<tr>
<td>RESEARCH</td>
<td>5</td>
</tr>
<tr>
<td>SALES</td>
<td>6</td>
</tr>
</tbody>
</table>
Show SQL Translation Using Parallel Value 2

This example shows the SQL translation of a PGQL query using a parallel value of 2. Note that the SQL translation has a hint using the defined parallel value.

```
SQL> pgql auto on translateonly parallel 2;
PGQL Auto enabled for graph=[null], execute=[false], translate=[true]
PGQL> SELECT id(n) FROM MATCH (n) ON scott_hr;
SELECT /*+ parallel(2) */ * FROM(SELECT 7 AS "id(n)$T",
to_nchar(T0$0.VID,'TM9','NLS_Numeric_Characters=',') AS "id(n)$V",
T0$0.VID AS "id(n)$VN",
to_timestamp_tz(null) AS "id(n)$VT"
FROM "SCOTT".SCOTT_HRVD T0$0);
```

Turn Off PGQL Mode

This example shows how to turn PGQL mode off.

```
PGQL> pgql auto off;
PGQL Auto disabled
SQL>
```