

Oracle® SQLcl

User's Guide



Release 24.1

F94889-01

April 2024

The Oracle logo, consisting of a solid red square with the word "ORACLE" in white, uppercase, sans-serif font centered within it.

ORACLE®

Oracle SQLcl User's Guide, Release 24.1

F94889-01

Copyright © 2019, 2024, Oracle and/or its affiliates.

Primary Author: Celin Cherian

This software and related documentation are provided under a license agreement containing restrictions on use and disclosure and are protected by intellectual property laws. Except as expressly permitted in your license agreement or allowed by law, you may not use, copy, reproduce, translate, broadcast, modify, license, transmit, distribute, exhibit, perform, publish, or display any part, in any form, or by any means. Reverse engineering, disassembly, or decompilation of this software, unless required by law for interoperability, is prohibited.

The information contained herein is subject to change without notice and is not warranted to be error-free. If you find any errors, please report them to us in writing.

If this is software, software documentation, data (as defined in the Federal Acquisition Regulation), or related documentation that is delivered to the U.S. Government or anyone licensing it on behalf of the U.S. Government, then the following notice is applicable:

U.S. GOVERNMENT END USERS: Oracle programs (including any operating system, integrated software, any programs embedded, installed, or activated on delivered hardware, and modifications of such programs) and Oracle computer documentation or other Oracle data delivered to or accessed by U.S. Government end users are "commercial computer software," "commercial computer software documentation," or "limited rights data" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, the use, reproduction, duplication, release, display, disclosure, modification, preparation of derivative works, and/or adaptation of i) Oracle programs (including any operating system, integrated software, any programs embedded, installed, or activated on delivered hardware, and modifications of such programs), ii) Oracle computer documentation and/or iii) other Oracle data, is subject to the rights and limitations specified in the license contained in the applicable contract. The terms governing the U.S. Government's use of Oracle cloud services are defined by the applicable contract for such services. No other rights are granted to the U.S. Government.

This software or hardware is developed for general use in a variety of information management applications. It is not developed or intended for use in any inherently dangerous applications, including applications that may create a risk of personal injury. If you use this software or hardware in dangerous applications, then you shall be responsible to take all appropriate fail-safe, backup, redundancy, and other measures to ensure its safe use. Oracle Corporation and its affiliates disclaim any liability for any damages caused by use of this software or hardware in dangerous applications.

Oracle®, Java, MySQL, and NetSuite are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

Intel and Intel Inside are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. AMD, Epyc, and the AMD logo are trademarks or registered trademarks of Advanced Micro Devices. UNIX is a registered trademark of The Open Group.

This software or hardware and documentation may provide access to or information about content, products, and services from third parties. Oracle Corporation and its affiliates are not responsible for and expressly disclaim all warranties of any kind with respect to third-party content, products, and services unless otherwise set forth in an applicable agreement between you and Oracle. Oracle Corporation and its affiliates will not be responsible for any loss, costs, or damages incurred due to your access to or use of third-party content, products, or services, except as set forth in an applicable agreement between you and Oracle.

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc>.

Contents

Preface

Audience	ix
Documentation Accessibility	ix
Conventions	ix

1 Changes in Release 24.1 for Oracle SQLcl User's Guide

2 Using Oracle SQLcl

2.1	Alphabetic List of SQLcl Commands	2-2
2.1.1	Defining Parameters in SQLcl Scripts Using the ARGUMENT Command	2-4
2.1.2	CODESCAN Command	2-6
2.2	List of Unsupported SQL*Plus Commands and Features	2-7
2.3	Starting and Leaving SQLcl	2-8
2.4	Connecting to a Database	2-9
2.4.1	KERBEROS Connection Type	2-12
2.4.2	NAME Connection Type	2-13
2.4.3	OCI Connection Type	2-14
2.4.4	Oracle Connection Type	2-14
2.4.5	OREST Connection Type	2-16
2.4.6	RADIUS Connection Type	2-17
2.4.7	SOCKS Connection Type	2-18
2.4.8	THIRD Connection Type	2-19
2.4.9	WALLET Connection Type	2-20
2.5	Managing Stored Connections	2-21
2.5.1	List Connections	2-21
2.5.2	Show Connections	2-22
2.5.3	Test Connections	2-22
2.5.4	Import Connections	2-23
2.5.4.1	SECRET Command	2-24
2.5.5	Clone Connections	2-25
2.6	Starting Up and Shutting Down a Database	2-26

2.7	Entering and Executing Commands	2-27
2.8	Manipulating SQL, SQLcl, and PL/SQL Commands	2-28
2.9	Formatting Query Results	2-31
2.10	Accessing Databases	2-35
2.11	Miscellaneous Commands	2-36
2.11.1	REST	2-38
2.11.2	SODA	2-38
2.11.3	MODELER	2-39
2.11.4	DG (Data Guard)	2-41
2.11.5	AQ (Advanced Queuing)	2-41
2.11.5.1	Create a Queue Table	2-42
2.11.5.2	Alter a Queue Table	2-43
2.11.5.3	Drop a Queue Table	2-44
2.11.5.4	Create a Queue	2-44
2.11.5.5	Alter a Queue	2-45
2.11.5.6	Drop a Queue	2-46
2.11.5.7	Create a Sharded Queue	2-46
2.11.5.8	Alter a Sharded Queue	2-48
2.11.5.9	Drop a Sharded Queue	2-49
2.11.5.10	Create an Exception Queue	2-50
2.11.5.11	Create a Transactional Event Queue	2-50
2.11.5.12	Alter a Transactional Event Queue	2-52
2.11.5.13	Drop a Transactional Event Queue	2-54
2.11.5.14	Create an EQ Exception Queue	2-54
2.11.5.15	Start a Queue	2-54
2.11.5.16	Stop a Queue	2-55
2.11.5.17	Add a Subscriber	2-56
2.11.5.18	Alter a Subscriber	2-57
2.11.5.19	Remove a Subscriber	2-58
2.11.5.20	Enqueue	2-58
2.11.5.21	Dequeue	2-60
2.11.6	SET system_variable value	2-64
2.11.7	SHOW option	2-66
2.12	Loading a File	2-67
2.12.1	LOAD Command	2-67
2.12.1.1	SET LOAD Command	2-71
2.12.1.2	SET LOADFORMAT Command	2-74
2.13	Calling Oracle Cloud Infrastructure REST APIs Using the OCI Command	2-75
2.14	Running Tasks in the Background	2-77
2.14.1	Jobs Command	2-78
2.14.1.1	Cancel Jobs	2-78

2.14.1.2	Log Jobs	2-79
2.14.1.3	Delete Jobs	2-79
2.14.2	Wait4 Command	2-80

3 Using Liquibase

3.1	About Liquibase in SQLcl	3-1
3.2	Requirements for Using Liquibase	3-2
3.3	Supported Types	3-3
3.4	Supported Liquibase Commands in SQLcl	3-4
3.4.1	calculate-checksum	3-7
3.4.2	changelog-sync	3-9
3.4.3	changelog-sync-sql	3-10
3.4.4	changelog-sync-to-tag	3-11
3.4.5	changelog-sync-to-tag-sql	3-13
3.4.6	clear-checksums	3-14
3.4.7	data	3-15
3.4.8	db-doc	3-17
3.4.9	diff	3-18
3.4.10	diff-changeLog	3-20
3.4.11	drop-all	3-22
3.4.12	future-rollback-count-sql	3-24
3.4.13	future-rollback-from-tag-sql	3-25
3.4.14	future-rollback-sql	3-26
3.4.15	generate-apex-object	3-28
3.4.16	generate-changelog	3-31
3.4.17	generate-controlfile	3-33
3.4.18	generate-db-object	3-33
3.4.19	generate-ords-module	3-35
3.4.20	generate-ords-schema	3-36
3.4.21	generate-schema	3-36
3.4.22	history	3-38
3.4.23	list-locks	3-39
3.4.24	mark-next-changeset-ran	3-40
3.4.25	mark-next-changeset-ran-sql	3-41
3.4.26	release-locks	3-42
3.4.27	rollback	3-43
3.4.28	rollback-count	3-45
3.4.29	rollback-count-sql	3-46
3.4.30	rollback-sql	3-48
3.4.31	rollback-to-date	3-49

3.4.32	rollback-to-date-sql	3-51
3.4.33	snapshot	3-52
3.4.34	status	3-54
3.4.35	tag	3-55
3.4.36	tag-exists	3-56
3.4.37	unexpected-changesets	3-57
3.4.38	update	3-58
3.4.39	update-count	3-60
3.4.40	update-count-sql	3-62
3.4.41	update-sql	3-63
3.4.42	update-testing-rollback	3-64
3.4.43	update-to-tag	3-65
3.4.44	update-to-tag-sql	3-67
3.4.45	validate	3-68
3.4.46	version	3-70
3.5	Using SQLcl Liquibase Functionality with Open-Source Liquibase	3-70
3.6	Dynamic Object Transformation with SQLcl Liquibase and DBMS_METADATA Oracle Database Package	3-75
3.7	Liquibase Open-Source Changesets with SQLcl Liquibase	3-84
3.8	DATABASECHANGELOG_DETAILS VIEW	3-88
3.9	ChangeSets in Liquibase	3-89
3.10	Tips for Liquibase Settings	3-90
3.10.1	How to Exclude Table Properties When Deploying Changelogs to a New Environment	3-90
3.10.2	Create Database Objects in a Schema Different From the Connected Schema	3-93
3.11	Important 23.4 Update with Liquibase Changelog Files	3-95
3.12	Known Issues	3-98
3.13	Examples Using Liquibase	3-99
3.13.1	Review SQL	3-99
3.13.2	Capture and Deploy an Object	3-99
3.13.3	Capture and Deploy a Schema	3-100
3.13.4	Execute Custom SQL with RunOracleScript	3-101

4 Using Cloud Storage

4.1	Using DBMS_CLOUD for Authentication	4-1
4.2	Creating the OCI profile for OCI Authentication	4-4
4.3	About the Cloud Storage Command Options	4-4
4.4	Examples	4-5

5 Using Data Pump

5.1	Getting Started	5-1
5.1.1	Prerequisites	5-1
5.1.2	Usage	5-3
5.2	Data Pump Command Syntax and Arguments	5-4
5.3	Use Cases	5-12
5.4	Tips and Troubleshooting	5-14

6 Using the Cloud Premigration Advisor Tool

6.1	Overview	6-1
6.2	Prerequisites	6-2
6.3	About the MIGRATEADVISOR Command	6-3
6.4	Examples	6-6
6.5	Tips and Troubleshooting	6-8

7 Using the PGQL Plug-in

7.1	Downloading and Installing	7-1
7.2	About PGQL Commands	7-1
7.3	Examples	7-2

A SQL Performance Troubleshooting

B Third-Party License Information

B.1	ANTLR4 Java Runtime 4.13.1	B-1
B.2	Apache Mina SSHD-contrib 2.12	B-1
B.3	Apache Mina SSHD-osgi 2.12.0	B-9
B.4	Apache Mina SSHD-putty 2.12	B-18
B.5	Apache Mina SSHD-scp 2.12	B-25
B.6	Apache Mina SSHD-sftp 2.12	B-33
B.7	Google Guava 33.0.0	B-40
B.8	HttpComponents Http Client 5.3.1	B-46
B.9	HttpComponentsCore 5.2.4	B-54
B.10	jackson-annotations 2.16.1	B-57
B.11	jackson-core 2.16.1	B-60
B.12	jackson-jr-objects 2.16.1	B-63
B.13	jackson-jr-stree 2.16.1	B-66
B.14	jakarta.json-api 2.1.3	B-69

B.15	Jansi 2.4.1	B-80
B.16	jLine 3.25.1	B-83
B.17	liquibase-core 4.26.0	B-86
B.18	OCI SDK for Java 3.33.0	B-94
B.19	StringTemplate 4.3.4	B-125
B.20	Eclipse Parsson	B-126

Preface

This guide provides usage information about Oracle SQLcl (SQL Developer Command Line), a Java-based command-line interface for Oracle Database.

Audience

This guide is intended for those using Oracle SQLcl.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc>.

Access to Oracle Support

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info> or visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs> if you are hearing impaired.

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

1

Changes in Release 24.1 for *Oracle SQLcl User's Guide*

This section lists the changes for this release.

New Features

New features in this release are:

- New commands related to running SQLcl tasks in the background.
See [Running Tasks in the Background](#)
- Updated Liquibase commands
See [Supported Liquibase Commands in SQLcl](#)

2

Using Oracle 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.

Note:

- To run SQLcl, you need to install Oracle Java 11 or later versions. If the Java version is less than 11, then the SQLcl installation fails with the following error message: Error: A JNI error has occurred, please check your installation and try again Exception in thread "main" java.lang.UnsupportedClassVersionError:.. Check the Java version using the `java -version` command.
- On Windows, Java is searched for in the following directories:
 - For SQLcl (sql.exe):
`..\..\jdk\jre\bin;%JAVA_HOME%\bin;%PATH%;%ORACLE_HOME%\jdk\jre\bin`
 - For SQLcl installed with Oracle Database:
`%JAVA_HOME%\bin;%PATH%;..\jdk\jre\bin;%ORACLE_HOME%\jdk\jre\bin`
- If the Java file is not found in those directories, Java is searched for in the registry, the minimum version (version more than or equal to) being 11.0.9.
- JavaScript is not included with Oracle Java 14 and later versions. It is recommended to download and install [GraalVM](#), and then install JavaScript on GraalVM by using the command `gu install js` (see [Getting Started with GraalVM JavaScript](#)).

This chapter contains the following topics:

- [Alphabetic List of SQLcl Commands](#)
- [List of Unsupported SQL*Plus Commands and Features](#)
- [Starting and Leaving SQLcl](#)
- [Connecting to a Database](#)
- [Managing Stored Connections](#)
- [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](#)
- [Loading a File](#)
- [Calling Oracle Cloud Infrastructure REST APIs Using the OCI Command](#)
- [Running Tasks in the Background](#)

2.1 Alphabetic List of SQLcl Commands

```
@{url | file_name[.ext]} [arg ...]
@@ { url | file_name[.ext] } [arg ...]
/ (slash)
ACC[EPT] variable [NUM[BER] | CCHAR | DATE | BINARY_FLOAT | BINARY_DOUBLE]
[FOR[MAT] format] [DEF[AULT] default] [PROMPT text | NOPR[OMPT]] [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
ARG[UMENT] OPTIONS
BRE[AK] [ON report_element [action [action]]] ...
BRIDGE
BTI[TLE] [printspectext | variable] ... | [ON | OFF]
CD [<directory>]
C[HANGE] sepchar old [sepchar [new [sepchar]]]
CL[EAR] option ...
CODESCAN
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]]
CONNMGR
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]}
DG
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[ATE] | REP[LACE] | APP[END]]
SCRIPT <script file>
SECRET See SECRET Command
```

```

SET system_variable value

SHO[W] [option]

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

SODA

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

SSTUNNEL <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[ATE] | REP[LACE] | APP[END]]

TNSPING <address>

TTI[TLE] [printspect [text | variable] ...] | [ON | OFF]

UNDEF[INE] 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.

2.1.1 Defining Parameters in SQLcl Scripts Using the ARGUMENT Command

The `ARGUMENT` command enables you to define SQL*Plus parameters that are passed to SQLcl scripts. This command adds a `DEFINE` for the parameter if the parameter does not exist.

Parameters are passed by position to scripts where they are assigned a number starting with one for each position. Therefore, to supply a value for parameter 1, use argument 1 [options]; for parameter 2, use argument 2 [options], and so on. See [Passing Parameters through the START Command](#) in the *Oracle SQL*Plus User's Guide* for more information.

Syntax

```
argument|arg OPTIONS
```

Use the `SET PARAMETERPOLICY` command to control parameter retention. The parameter retention applies to all parameters whether defined using this command or not.

When `SET PARAMETERPOLICY` is `SHARE` (default), defined variables retain their values until you:

- Enter a new `DEFINE` command referencing the variable.
- Enter an `UNDEFINE` command referencing the variable.
- Enter an `ACCEPT` command referencing the variable.
- Reference the variable in the `NEW_VALUE` or `OLD_VALUE` clause of a `COLUMN` command and then reference the column in a `SELECT` command.
- Exit SQLcl.

When `SET PARAMETERPOLICY` is `ISOLATE`:

- Parameter settings are saved and undefined at the start of the script.
- On return from the script, the saved parameters are restored.
- Parameter settings in called scripts do not affect the containing script.

The `SET PARAMETERPOLICY` command must be specified before the script is called. If `SET PARAMETERPOLICY` is set to `ISOLATE` within a script, parameters are removed on return. Parameters cannot be reset as the values were not saved at the start of the script.

Options

Option	Description
Required	
<code>arg_num</code>	The position of the parameter relative to 1.
<code>action {default prompt}</code>	The argument action to take when a parameter is not already defined. <ul style="list-style-type: none"> • <code>prompt</code>: Prompts the user for the parameter value and sets it. • <code>default</code>: Sets the default value.
<code>action_value</code>	The value to specify for the parameter or the string for prompting the user for the value. Values containing spaces must be enclosed in double quotes.
Optional	
<code>comment {comment}</code>	Associate a comment with the parameter. {comment} - Associate the comment value specified with the parameter.
<code>comment_value</code>	The comment to associate with the parameter. Values containing spaces must be enclosed in double quotes.

Examples

Example 1 - The following example uses the `ARGUMENT` command to define two parameters in a script (`script.sql`).

```
script.sql:
prompt 'Give value for 1 or prompt for it: &1'
prompt 'Give value for 99 or prompt for it: &99'

Connected to:
Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 - Production
Version 19.3.0.0.0
SQL> arg 99 default 99_set
/* 99 shared with script.sql */

SQL> @script.sql
Enter value for 1: x
'Give value for 1 or prompt for it: x'
'Give value for 99 or prompt for it: 99_set'
SQL> exit
Disconnected from Oracle Database 19c Enterprise Edition Release
19.0.0.0.0 - Production
Version 19.3.0.0.0
```

Example 2 - The following example illustrates how the `SET PARAMETERPOLICY ISOLATE` is used to redefine parameters every time the script is called.

```
SQL> set parameterpolicy isolate
SQL> arg 99 default 99_set
/* 99 is not passed to the script, so prompted for */

SQL> @script.sql
Enter value for 1: x2
'Give value for 1 or prompt for it: x2'
Enter value for 99: x99
'Give value for 99 or prompt for it: x99'
/* 99 restored - set back to the original value when script.sql
finishes */

SQL> define 99
DEFINE 99          = "99_set" (CHAR)
```

2.1.2 CODESCAN Command

This command identifies issues with the code using the Trivadis Coding Guidelines, which is available on GitHub.

Syntax

```
codescan { -path dir | -format {json|text} | -ignore ruleNo | -output
file | -settings file }
```


where

- `-path` checks SQL, PLS and PLB files in the directory for SQL Best Practice violations and generates a report of the issues found.
- `-format` formats the output as structured JSON. For example:

```
[ {"file": "/private/tmp/tst.sql", "warnings": [
    {line:35, pos:15, ruleNo:"G-1050",
    msg:"Avoid using literals in your code" },...]... ]].
```

- `-output` saves the report in a new file.
- `-ignore` skips specified rule checks.
- `-settings` imports CODESCAN settings from the JSON file. Currently, only the `ignore` attribute is supported, example, `{"ignored":["G-1050", "G-4010"]}`.

Set Codescan

Controls warning messages that are triggered for SQLcl command line code quality issues.

Syntax

```
set codescan {ON | OFF}
```

where `ON` turns on warnings for SQL and PL/SQL best practice violations. The default is `OFF`.

Example

```
SQL>set codescan on
SQL>BEGIN
  BEGIN
    null;
  END;
END;
/
```

SQL best practice warning (1,7): G-1010: Try to label your sub blocks

PL/SQL procedure successfully completed.

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

Note:

Startup and Login Scripts

When you start SQLcl, it looks for a `startup.sql` script. This script is run only once during the program's runtime.

For every connection, SQLcl looks for a `login.sql` file. This file is run for every connection created.

The `Show Login` command displays the location of the `login.sql` file and verifies whether the file exists or not.

Logging In and Logging Out

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

```
SQL [[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 | SYSDBG | 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: Versi3n 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 est3 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  
SQLcl : version 20.2 Production sur mar. ao3t 25 15:57:21 2020  
Copyright (c) 1982, 2020, Oracle. Tous droits r3serv3s....
```

2.4 Connecting to a Database

You can connect to a database using the `CONNECT` command.

Syntax

```
conn[ect] {OPTIONS} {PARAMETERS}
```

The options specified automatically determine the kind of connection required, such as whether it is a traditional client-server connection or a wallet-based cloud connection. You can override this by using options that specify a particular connection type. For example, specify `-wallet` to use the wallet connection type.

The connection types supported in SQLcl are:

- KERBEROS
- NAME
- OCI
- ORACLE
- OREST
- RADIUS
- SOCKS
- THIRD
- WALLET

To see the help description for `CONNECT`, enter:

```
help connect
```

To see examples for `CONNECT` in help, enter:

```
help connect examples
```

To see help for `WALLET` connection type, enter:

```
help connect wallet
```

To see examples for `OREST`, enter:

```
help connect orest examples
```

Options

Option	Description
<code>-cloudconfig, cc</code>	Specifies the wallet to use to establish the connection.
<code>-edition, ed</code>	Specifies the Oracle database edition. This is an alternative to providing it in the connection spec parameter.
<code>-kerberos, ker</code>	Specifies a Kerberos connection type.
<code>-krb5_config, krb5c</code>	Specifies a non-default Kerberos configuration file. This property is specified only when SQLcl is started.
<code>-krb5ccname, krb5cc</code>	Specifies a non-default Kerberos credential file.
<code>-name, n</code>	Specifies a Name connection type.

Option	Description
-oci	Specifies an OCI connection type.
-oracle, o	Specifies an Oracle connection type.
-orest, or	Specifies a REST connection type.
-password, pw	Specifies the password. This is an alternative to providing it in the connection spec parameter.
-proxy, p	Specifies the network proxy to use.
-radius, rad	Specifies a RADIUS connection type.
-replace, rp	Specifies that the saved connection details must replace any existing connection with the same name. Requires the <code>-save</code> option.
-rest, rt	Specifies that the connection should be established using REST.
-role, r	Specifies the database role. This is an alternative to providing it in the connection spec parameter.
-save, sa	Specifies a name to save the connection details for a successful connection.
-savepwd, sv	Specifies that passwords must be saved with the connection details. By default, passwords are not saved. Requires the <code>-save</code> option.
-socks s	Specifies a SOCKS proxy connection type.
-socksproxy sp	Specifies the SOCKS proxy.
-third, t	Specifies a third-party database connection type.
-url	Specifies the URL. This is an alternative to providing it in the connection spec parameter.
-user, u	Specifies the user name. This is an alternative to providing it in the connection spec parameter.
-wallet, w	Specifies a wallet connection type.
-verbose, v	Requests output of diagnostic information about the connection.

Parameters

Parameter	Description
<code><connectionspec></code>	Provides the connection specification for the target database.

Examples

To connect to an Oracle database:

```
SQL> CONNECT user/password@url
```

To connect to an Oracle database using the SYSDBA role:

```
SQL> CONNECT user/password@url as sysdba
```

To save a connection after opening it:

```
SQL> CONNECT -SAVE myconn scott@localhost:1521/orcl
```

2.4.1 KERBEROS Connection Type

Connect to a database using Kerberos authentication. The connection spec parameter has the following form:

```
[/][@<url>]
```



Note:

Currently, only Kerberos connections using `[/][@<url>]` are supported in SQLcl. Active Directory is not supported in this release.

See [Enabling Kerberos Authentication](#) in *Oracle Database Security Guide* for more information about Kerberos authentication in Oracle Database.

Options

Option	Description
-kerberos, ker	Specifies a KERBEROS connection type.
-krb5_config, krb5c	Specifies a non-default Kerberos configuration file. This property is specified only when SQLcl is started. These can be passed in by using the relevant -D system property name or environmental variables.
-krb5ccname, krb5cc	Specifies a non-default Kerberos credential file.
-url	Specifies the URL. This is an alternative to providing it in the connection spec parameter.
-role, r	Specifies the database role. This is an alternative to providing it in the connection spec parameter.
-edition, ed	Specifies the Oracle database edition. This is an alternative to providing it in the connection spec parameter.
-verbose, v	Requests output of diagnostic information about the connection.

Parameters

Parameter	Description
<code><connections-spec></code>	Provides the connection specification for the target database.

Example

To connect to a database using KERBEROS:

```
SQL> CONNECT -kerberos /@myhost:1521/mySERVICE
```

See Also:

[Support for Kerberos](#) for troubleshooting information

2.4.2 NAME Connection Type

Connect to a database using a stored connection definition. Stored connections are identified using a unique connection name. For more information about stored connections, see [Managing Stored Connections](#).

Options

Option	Description
<code>-name, n</code>	Specifies a connection type using a stored connection definition.
<code>-user, u</code>	Specifies the user name. This is an alternative to providing it in the connection spec parameter.
<code>-url</code>	Specifies the URL. This is an alternative to providing it in the connection spec parameter.
<code>-password, pw</code>	Specifies the password. This is an alternative to providing it in the connection spec parameter.
<code>-role, r</code>	Specifies the database role. This is an alternative to providing it in the connection spec parameter.
<code>-edition, ed</code>	Specifies the Oracle database edition. This is an alternative to providing it in the connection spec parameter.
<code>-verbose, v</code>	Requests output of diagnostic information about the connection.

Parameters

Parameter	Description
<code><connections-spec></code>	Provides the connection specification for the target database.

Examples

To connect using a stored connection:

```
SQL> CONNECT -name my_connection
```

To connect using a stored connection as a different user:

```
SQL> CONNECT -name myuser/mypassword@my_connection
```

or

```
SQL> CONNECT -name myuser@my_connection
```

2.4.3 OCI Connection Type

Connect to a database using OCI. Before connecting to OCI, it is necessary to specify the profile to use. For example, OCI PROFILE frankfurt.

The connection spec parameter has the following form:

```
ocid1.databasesconnection.<id>.
```

Options

Option	Description
-oci	Specifies an OCI connection type.
-rest, rt	Specifies that the connection should be established using REST.
-proxy, p	Specifies the network proxy to use.
-verbose, v	Requests output of diagnostic information about the connection.

Parameters

Parameter	Description
<connections-spec>	Provides the connection specification for the target database.

Example

To connect using an OCID:

```
SQL> CONNECT ocid1.databasesconnection.oc1.xxxyyyyzz.aabbccd
```

2.4.4 Oracle Connection Type

Connect to a database using Oracle Relational Database Management System.

The connection spec parameter has the following form:

```
<username>[/<password>][@<url>][as <role>][edition= <edition>]
```

where

- <username> may be <proxyuser>[<username>] if a proxy user is required. Note that the brackets around user name are required syntax.
- The <url> can take either of the following forms:

```
//<host>:<port>/<service>  
<host>:<port>/<service>
```

or it may be a TNS name or an LDAP specification.

Options

Option	Description
-oracle, o	Specifies an Oracle connection type.
-user, u	Specifies the user name. This is an alternative to providing it in the connection spec parameter.
-password, pw	Specifies the password. This is an alternative to providing it in the connection spec parameter.
-url	Specifies the URL. This is an alternative to providing it in the connection spec parameter.
-role, r	Specifies the database role. This is an alternative to providing it in the connection spec parameter.
-edition, ed	Specifies the Oracle database edition. This is an alternative to providing it in the connection spec parameter.
-verbose, v	Requests output of diagnostic information about the connection.

Parameters

Parameter	Description
<connections-spec>	Provides the connection specification for the target database.

Example

To connect using EZCONNECT:

```
SQL> CONNECT myuser/passwd@myhost:1521/my-service
```

2.4.5 OREST Connection Type

Connect to a database using REST. The connection spec parameter has the form:

```
<username>[/<password>][@<url>][as <role>][edition= <edition>]
```

The <url> can take the form:

```
http://<host>:<port>/ords/<schema>
```

Options

Option	Description
-orest, or	Specifies a connection type that uses REST.
-user, u	Specifies the user name. This is an alternative to providing it in the connection spec parameter.
-password, pw	Specifies the password. This is an alternative to providing it in the connection spec parameter.
-url	Specifies the URL. This is an alternative to providing it in the connection spec parameter.
-role, r	Specifies the database role. This is an alternative to providing it in the connection spec parameter.
-edition, ed	Specifies the Oracle database edition. This is an alternative to providing it in the connection spec parameter.
-verbose, v	Requests output of diagnostic information about the connection.

Parameters

Parameter	Description
<connections-spec>	Provides the connection specification for the target database.

Example

To connect using REST:

```
SQL> CONNECT myuser/passwd@http://myhost:9213/ords/myschema
```

2.4.6 RADIUS Connection Type

Connect to a database using RADIUS authentication. The connection spec parameter has the form:

```
[<username>][/<password>][@<url>]
```

RADIUS can also be configured to authenticate using *<number>* from two-factor authentication:

```
[<username>][/<password>][<number from device or command>][@<url>]
```



Note:

Challenge response two-factor authentication for RADIUS is not supported in this release.

See [Configuring RADIUS Authentication](#) in *Oracle Database Security Guide* for more information about RADIUS authentication.

Options

Option	Description
-radius, rad	Specifies a RADIUS connection type.
-user, u	Specifies the user name. This is an alternative to providing it in the connection spec parameter.
-password, pw	Specifies the password. This is an alternative to providing it in the connection spec parameter.
-url	Specifies the URL. This is an alternative to providing it in the connection spec parameter.
-role, r	Specifies the database role. This is an alternative to providing it in the connection spec parameter.
-edition, ed	Specifies the Oracle database edition. This is an alternative to providing it in the connection spec parameter.
-verbose, v	Requests output of diagnostic information about the connection.

Parameters

Parameter	Description
<connections-spec>	Provides the connection specification for the target database.

Example

To connect using RADIUS:

```
SQL> CONNECT -radius myuser/passwd@myhost:1521/myervice
```

See Also:

- [Support for RADIUS](#) for troubleshooting information

2.4.7 SOCKS Connection Type

Connect to a database using a SOCKS proxy. Before connecting, set up the proxy process on the local machine by using the `ssh` command. For example:

```
ssh -N -D 127.0.0.1:1087  
opc@123.456.789.120.
```

The connection spec parameter has the form:

```
[<username>][/<password>][@<url>]
```

Options

Option	Description
-socks s	Specifies a SOCKS connection type.
-socksproxy sp	Specifies the socks proxy.
-cloudconfig, cc	Specifies the wallet to establish the connection.
-proxy, p	Specifies the network proxy to use.
-user, u	Specifies the user name. This is an alternative to providing it in the connection spec parameter.
-password, pw	Specifies the password. This is an alternative to providing it in the connection spec parameter.
-url	Specifies the URL. This is an alternative to providing it in the connection spec parameter.
-role, r	Specifies the database role. This is an alternative to providing it in the connection spec parameter.
-edition, ed	Specifies the Oracle database edition. This is an alternative to providing it in the connection spec parameter.
-verbose, v	Requests output of diagnostic information about the connection.

Parameters

Parameter	Description
<code><connections-spec></code>	Provides the connection specification for the target database.

Example

To set the SOCKS and wallet properties and then connect:

```
SQL> SET socksproxy socks5h://localhost:1080
SQL> SET cloudconfig mywallet.zip
SQL> CONNECT myuser/passwd@mycloudtns
```

Alternatively, do it using one command:

```
SQL> CONNECT -socksproxy socks5h://localhost:1080 -cloudconfig mywallet.zip
myuser/passwd@mycloudtns
```

2.4.8 THIRD Connection Type

Connect to a third-party database. You need to add the appropriate driver jar to `<sqlcl-root>/lib/drivers/`. For example, for MYSQL you can download `mysql-connector-java-8.0.30.jar`.

The connection spec parameter is specific to the database but generally takes the form:

```
<username>[/<password>]@jdbc:<dbtype>://<host>:<port>
```

Options

Option	Description
<code>-third, t</code>	Specifies a THIRD connection type.
<code>-user, u</code>	Specifies the user name. This is an alternative to providing it in the connection spec parameter.
<code>-password, pw</code>	Specifies the password. This is an alternative to providing it in the connection spec parameter.
<code>-url</code>	Specifies the URL. This is an alternative to providing it in the connection spec parameter.
<code>-role, r</code>	Specifies the database role. This is an alternative to providing it in the connection spec parameter.
<code>-edition, ed</code>	Specifies the Oracle database edition. This is an alternative to providing it in the connection spec parameter.
<code>-verbose, v</code>	Requests output of diagnostic information about the connection.

Parameters

Parameter	Description
<code><connections-spec></code>	Provides the connection specification for the target database.

Example

To connect to MySQL:

```
SQL> CONNECT myuser/passwd@jdbc:mysql://myhost:9906
```

2.4.9 WALLET Connection Type

Connect to a database using a wallet. The connection spec parameter has the form:

```
[<username>][/<password>][@<url>]
```

Options

Option	Description
<code>-wallet, w</code>	Specifies a WALLET connection type.
<code>-cloudconfig, cc</code>	Specifies the wallet to establish the connection.
<code>-proxy, p</code>	Specifies the network proxy to use.
<code>-user, u</code>	Specifies the user name. This is an alternative to providing it in the connection spec parameter.
<code>-password, pw</code>	Specifies the password. This is an alternative to providing it in the connection spec parameter.
<code>-url</code>	Specifies the URL. This is an alternative to providing it in the connection spec parameter.
<code>-role, r</code>	Specifies the database role. This is an alternative to providing it in the connection spec parameter.
<code>-edition, ed</code>	Specifies the Oracle database edition. This is an alternative to providing it in the connection spec parameter.
<code>-verbose, v</code>	Requests output of diagnostic information about the connection.

Parameters

Parameter	Description
<code><connections-spec></code>	Provides the connection specification for the target database.

Example

To set the wallet property and then connect:

```
SQL> SET cloudconfig mywallet.zip
SQL> CONNECT myuser/passwd@mycloudtns
```

Alternatively, do it using one command:

```
SQL> CONNECT -cloudconfig mywallet.zip myuser/passwd@mycloudtns
```

2.5 Managing Stored Connections

Persistent connections can be managed with the `CONNMGR` command. Persistent connections are referenced by a connection name. Connections may store a user name. If a user name is stored, a password may also be stored. Passwords are stored in a secure wallet. If a password is not stored, it is provided when prompted to create the connection. A stored connection may describe a connection in a variety of formats, including basic host name, port and service name values or a TNS name and a cloud configuration.

To add a stored connection, see [NAME Connection Type](#) .

To save a stored connection, see the options `-save`, `-savepwd`, and `-replace` in [Connecting to a Database](#).

Syntax

```
connmgr|cm {SUBCOMMAND}
```

where `SUBCOMMAND` can be any one of the following:

- **LIST**: Lists the available connection names.
- **SHOW**: Shows the details for a connection.
- **TEST**: Tests a connection.
- **IMPORT**: Imports one or more connection definitions from a file exported from SQL Developer.
- **CLONE**: Clones an existing connection.

To see the help information, enter:

```
help connmgr [examples]
```

2.5.1 List Connections

List the names of the connections.

Syntax

```
connmgr|cm list
```

Example

To list the names of connections, enter:

```
SQL> CONNMGR LIST
```

2.5.2 Show Connections

Shows the details for a connection, including the connection URL and the user name (if stored). Additional details are displayed depending on the stored connection description.

Syntax

```
connmgr|cm show {PARAMETERS}
```

Parameters

Parameter	Description
<i><name></i>	The name of the connection. Connection names are case-sensitive.

Example

To show the details for `MyConnection`:

```
SQL> CONNMGR SHOW MyConnection
```

2.5.3 Test Connections

A test connection is opened and then closed. This test connection does not affect the current SQLcl connection. The credentials stored with the connection are used for the test. If no password is stored, the user is prompted for the password. If the `-user` option is used, the provided user is tested instead. A password will need to be provided when prompted.

Syntax

```
connmgr|cm test {OPTIONS} {PARAMETERS}
```

Options

Option	Description
<code>-user, -u</code>	Specify a user name instead of using the one stored with the connection definition. Case-sensitive user names are quoted to preserve case.

Parameters

Parameter	Description
<name>	The name of the connection. Connection names are case-sensitive.

Example

To test the connection `MyConnection` for user name `SCOTT`:

```
SQL> CONNMGR TEST MyConnection
SQL> CONNMGR TEST -USER SCOTT MyConnection
```

2.5.4 Import Connections

Import one or more connections to the common connection store.

Connect files may contain encrypted passwords and other credentials.

When importing connections with encrypted passwords, the encryption key is required to decrypt the passwords. The encryption key may be provided with the import command by first securing it with a secret. For more information about using a secret, see [SECRET Command](#). If no key is provided with the import command, a prompt is displayed to request the key.

The passwords can be removed from imported connections by specifying the `-strip_passwords` option.

Syntax

```
connmgr|cm import {OPTIONS} {PARAMETERS}
```

Options

Option	Description
<code>-duplicates d dups</code>	<p>{ignore rename replace}</p> <p>Indicates how to handle imported connections whose names match an existing connection.</p> <ul style="list-style-type: none"> • IGNORE: Skips the duplicate connections. • RENAME: Renames the duplicate connections by appending a unique number to the end of the name. • REPLACE: Replaces the existing connection with the new connection.

Option	Description
-key	The public name of a secret that protects the encryption key used to encrypt passwords in the file.
-strip_passwords s strip	Indicates that encrypted passwords be stripped from imported connections.

 **Note:**

If the encryption key is invalid, the connections are imported with the passwords removed.

Parameters

Parameter	Description
<i>path</i>	A single file or directory containing one or more connections to import. If the path is an archive file, the archive is checked for a single connection definition. If the path is a JSON file, it is checked for legacy connection definitions. If the path is a directory, it is checked for more archives containing connection definitions.

Example

To create a secret for the encryption key and specify the secret name when importing connections from a file:

```
SQL> SECRET SET mySecret <encryption key>
SQL> CONNMGR IMPORT -KEY mySecret myconns.json
```

2.5.4.1 SECRET Command

This command is used to securely store secret values in memory. The Connection Manager (`connmgr`) commands enable the use of the secret name to identify secure values such as passwords and encryption keys. Using the secret name in this way ensures that secure values are not displayed on the command line and do not persist in command history. Secure values cannot be retrieved with the `SECRET` command.

Syntax

```
secret {SUBCOMMAND}
```

where the subcommands are:

- [Set](#)
- [List](#)
- [Unset](#)

Set

Sets a name for a secret value. The secret name can be used with commands that support secure values.

Syntax

```
secret set {PARAMETERS}
```

Parameters

Parameter	Description
<i>secret_name</i>	The public name that can be used to represent a secure value.
<i>secret_value</i>	The protected secret value that is associated with the secret name.

List

Lists the currently stored secret names.

Syntax

```
secret list
```

Unset

Removes the secret value for the secret name.

Syntax

```
secret unset <secret_name>
```

where *secret_name* is the public name used to represent a secret value.

Example

Set a name for a secret value and use it to import connections.

```
SQL> secret set my_name myEncryptionKey  
secret my_name stored  
SQL> connmgr import -encryption_key my_name conns.json
```

2.5.5 Clone Connections

Clones an existing connection. By default, the credentials stored with the original connection are used for the new connection. To change the user name, the `-user` option can be used. If the user changes, a password prompt is displayed unless the `-nopwd` option is used

Syntax

```
connmgr|cm clone {OPTIONS} {PARAMETERS}
```

Options

Option	Description	Default
-original, -o	The name of the source connection being cloned.	Required
-nopwd	Whether to create the connection without a stored password.	-
-user, -u	The user name to store with the connection. If no user name is specified, you may be prompted to provide one when using the connection, depending on the authentication configuration.	-

Parameters

Parameter	Description
<name>	The name of the connection. Connection names are case-sensitive.

Example

To clone an existing connection:

```
SQL> CONNMGR CLONE -original original_name newname
SQL> CONNMGR CLONE -original original_name -user newuser newname
```

2.6 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:

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

where *cdb_options* has the following syntax:

```
root_connection_options | pdb_connection_options
```

where *root_connection_options* has the following syntax:

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

where *pdb_connection_options* has the following syntax:

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

where *open_pdb_options* has the following syntax:

```
READ_WRITE | READ ONLY
```

and where *upgrade_options* has the following syntax:

```
[PFFILE=filename] {UPGRADE | DOWNGRADE} [QUIET]
```

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

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

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

2.7 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.

```
EXEC[UTE] statement
```

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

```
R[UN]
```

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.

```
TIMI [NG]
```

Timing is only available as a switch.

Use the following command to access the help system:

```
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>.

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.

You can use the `_RC` variable to return the exit status of the command executed with HOST.

 **Note:**

When connecting to a database using bequeath protocol (where a client connection is passed directly to a dedicated server process without going through the listener), the `_RC` variable is not automatically updated. Set `bequeath_detach=yes` in the `sqlnet.ora` configuration file to update the `_RC` variable.

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 FILTER` allows you to set the commands that should not be recorded in history.

2.8 Manipulating SQL, SQLcl, and PL/SQL Commands

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

```
A[PPEND] 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).

```
C[HANGE] 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.

REM[ARK]

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.

SAV[E] [FILE] *file_name* [.ext] [CRE[ATE] | REP[LACE] | APP[END]]

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] [CRE[ATE] | REP[LACE] | APP[END]]

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:

ACC[EPT] *variable* [NUM[BER] | CHAR | DATE | BINARY_FLOAT | BINARY_DOUBLE] [FOR[MAT] *format*] [DEF[AULT] *default*] [PROMPT *text* | NOPR[OMPT]] [HIDE]

Reads a line of input and stores it in a given substitution variable.

DEF[INE] [*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.

PAU[SE] [*text*]

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

PRO[MPT] [*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:

```
&n
```

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.

2.9 Formatting Query Results

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

```
BRE[AK] [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*:

```
BOLD
```

```

CE[ENTER]
COL n
FORMAT text
LE[FT]
R[IGHT]
S[KIP] [n]
TAB n

```

CL[EAR] *option* ...

Resets or erases the current value or setting for the specified option.

Where *option* represents one of the following clauses:

```

BRE[AKS]
BUFF[ER]
COL[UMNS]
COMP[UTES]
CONTEXT
SCR[EEN]
SQL
TIMI[NG]

```

COL[UMN] [{*column* | *expr*} [*option* ...]]

Specifies display attributes for a given column, such as:

- text for the column heading
- alignment for the column heading
- format for NUMBER data
- wrapping of column data

Also lists the current display attributes for a single column or for all columns.

Where *option* represents one of the following clauses:

```

ALI[AS] alias
CLE[AR]
ENTMAP {ON | OFF}
FOR[MAT] format
HEA[DING] text
JUS[TIFY] {L[EFT] | C[ENTER] | R[IGHT]}
LIKE {expr | alias}
NEWL[INE]
NEW_V[ALUE] variable
NOPRI[NT] | PRI[NT]
NUL[L] text
OLD_V[ALUE] variable
ON | OFF
WRA[PPED] | WOR[D_WRAPPED] | TRU[NCATED]

```

**Note:**

Currently only `NEW_V[ALUE]` 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:

Element	Examples	Description
, (comma)	9,999	Displays a comma in the specified position.
. (period)	99.99	Displays a period (decimal point) to separate the integral and fractional parts of a number.
\$	\$9999	Displays a leading dollar sign.
0	0999 9990	Displays leading or trailing zeros (0).
9	9999	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.
B	B9999	Displays blanks for the integer part of a fixed-point number when the integer part is zero, regardless of zeros in the format model.
C	C999	Displays the ISO currency symbol in the specified position.
D	99D99	Displays the decimal character to separate the integral and fractional parts of a number.
EEEE	9.999EEEE	Displays a value in scientific notation (format must contain exactly four "E"s).
G	9G999	Displays the group separator in the specified positions in the integral part of a number.
L	L999	Displays the local currency symbol in the specified position.
MI	9999MI	Displays a trailing minus sign after a negative value. Displays a trailing space after a positive value.
PR	9999PR	Displays a negative value in <angle brackets>. Displays a positive value with a leading and trailing space.
RN rn	RN rn	Displays uppercase Roman numerals. Displays lowercase Roman numerals. Value can be an integer between 1 and 3999.
S	S9999 9999S	Displays a leading minus or plus sign. Displays a trailing minus or plus sign.

Element	Examples	Description
TM	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	U9999	Displays the dual currency symbol in the specified position.

COMP[UTE] [*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
COU[NT]	Count of non-null values	All types
MIN[IMUM]	Minimum value	NUMBER, CHAR, NCHAR, VARCHAR2 (VARCHAR), NVARCHAR2 (NCHAR VARYING)
MAX[IMUM]	Maximum value	NUMBER, CHAR, NCHAR, VARCHAR2 (VARCHAR), NVARCHAR2 (NCHAR VARYING)
NUM[BER]	Count of rows	All types
SUM	Sum of non-null values	NUMBER
STD	Standard deviation of non-null values	NUMBER
VAR[IANCE]	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 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.

TTI[TLE] [*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 *printspect* represents one or more of the following clauses:

```
BOLD
CE[NTER]
COL n
FORMAT text
LE[FT]
R[IGHT]
S[KIP] [n]
TAB n
```

2.10 Accessing Databases

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

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

where *logon* has the following syntax:

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

where *proxy* has the following syntax:

```
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.

```
DISC[ONNECT]
```

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.

2.11 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[RMIATION] {[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.

```
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.

Other commands are:

- [REST](#)

- SODA
- MODELER
- DG (Data Guard)
- AQ (Advanced Queuing)
- SET *system_variable value*
- SHOW *option*

2.11.1 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_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

2.11.2 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>`

2.11.3 MODELER

The `MODELER` command provides a command-line interface for Oracle SQL Developer Data Modeler features.

The options available are:

- `modeler help <command>` — Displays help information about the specified modeler command.
- `modeler ddl <parameters>` — Generates the Data Definition Language statements from the selected Data Modeler design.
- `modeler report <parameters>` — Generates the report from the selected Data Modeler design.

MODELER DDL

Generates the Data Definition Language statements from the selected Data Modeler design.

Syntax

```
MODELER DDL -design <file> -relmodel <name> [-outputfile <name>]
```

Parameters

Parameter	Description
<code>-design (d) <file></code>	Full path to the design's file name.
<code>-relmodel (rm) <name></code>	Name of the relational model.
<code>-dbsite (ds) <name></code>	(Optional) Name of the physical model database site. If this is not specified, then the default relational database management system site for the provided relational model is used.
<code>-outputfile (o) <file></code>	Full path to the output file for the generated DDL content.
<code>-systemTypesDir (td) <path></code>	Full path to the system types directory.
<code>-settingsFile (s) <file></code>	Full path to the exported Data Modeler settings file.
<code>-ddlConfigFile (c) <file></code>	Full path to the exported DDL configuration file.

Example

```
modeler ddl -design "C:/Designs/SH.dmd" -relmodel "SH" -outputfile "C:/
DDL.sql"
```

MODELER REPORT

Generates the report from the selected Data Modeler design.

Syntax

```
MODELER REPORT -design <file> -type <type> [-title <name>] -filename
<name> -outputpath <path>
```

Parameters

Parameter	Description
-design (d) <file>	Full path to the design's file name.
-type (tp)	Specify the type of report. Available types are: Tables, TableViews, TablesAndViews, Entities, EntityViews, EntitiesAndViews, Domains.
-filename (f) <name>	Name of the generated HTML file.
-outputpath (o) <path>	Full path to the folder for the generated HTML content. The report file is put in that folder and a "css" sub-directory with the CSS files used is created.
-relmodel (rm) <name>	Name of the relational model (for Tables and Table Views only).
-title (tt) <name>	(Optional) Title of the report.
-standardTemplate (st) <name>	Name of the template for a standard report, defining the set of report sections to include (optional). If this is not specified, all report sections are included.
-customTemplate (ct) <name>	(Optional) Name of the template for a custom report.
-reportConfTemplate (c) <name>	(Optional) Name of the template that defines the set of objects and subviews to include in the report.
-companyname (cn) <name>	(Optional) Name of the company.
-systemTypesDir (td) <path>	Full path to the system types directory.
-settingsFile (s) <file>	Full path to the exported Data Modeler settings file.

Example

```
modeler report -design "C:/Designs/SH.dmd" -type "Tables" -filename
"SHTablesReport" -outputpath "C:/Reports"
```

2.11.4 DG (Data Guard)

Enables you to manage Oracle Data Guard broker for Oracle Database release 21c only.

See [Data Guard Commands](#) in *Oracle Data Guard Broker* for information about Data Guard commands and parameters.

2.11.5 AQ (Advanced Queuing)

The AQ command in SQLcl enables you to access the Oracle Database Advanced Queuing functionality to create queues and queue tables, enqueue and dequeue messages, add and remove subscribers, and manage transactional event queues (TxEventQ).

Prerequisites

This command requires the ADMIN role.

You must have some working knowledge of Advanced Queuing and Transactional Event Queues and be familiar with the concepts, which are explained in the [Oracle Database Advanced Queuing and Transactional Event Queues User's Guide](#).

Supported Commands

You can run Advanced Queuing commands in SQLcl using `aq`.

To view the help information for Advanced Queuing, enter `aq help`.

- [Create a Queue Table](#)
- [Alter a Queue Table](#)
- [Drop a Queue Table](#)
- [Create a Queue](#)
- [Alter a Queue](#)
- [Drop a Queue](#)
- [Create a Sharded Queue](#)
- [Alter a Sharded Queue](#)
- [Drop a Sharded Queue](#)
- [Create an Exception Queue](#)
- [Create a Transactional Event Queue](#)
- [Alter a Transactional Event Queue](#)
- [Drop a Transactional Event Queue](#)
- [Create an EQ Exception Queue](#)
- [Start a Queue](#)
- [Stop a Queue](#)
- [Add a Subscriber](#)
- [Alter a Subscriber](#)

- [Remove a Subscriber](#)
- [Enqueue](#)
- [Dequeue](#)

Example

The following example uses Advanced Queuing commands in SQLcl to create a queue, start the queue, add a subscriber to the queue, enqueue a message and then dequeue it.

```
--Create a queue named demo2 with multiple consumers and payload type
JSON
SQL> aq createteq -name demo2 -mul true -pt JSON

--Show the queue properties
SQL> select name, qid, queue_type, enqueue_enabled, dequeue_enabled,
sharded, queue_category, recipients from user_queues;

--Start the queue demo2
SQL> aq startq -name demo2
SQL> select name, qid, queue_type, enqueue_enabled, dequeue_enabled,
sharded, queue_category, recipients from user_queues;

--Add subscriber named Bob to queue demo2
SQL> aq add subscriber -queue demo2 -name bob;

--Enqueue message "hello" to queue demo2
SQL> aq enq -name demo2 -p {"message":"hello"};

--Commit the message (send)
SQL> commit;

--Dequeue from queue demo2 by subscriber named Bob using NEXT_MESSAGE
navigation after waiting for 2 seconds
SQL> aq deq -name demo2 -nav NEXT_MESSAGE -consumer_name bob -wait 2;
```

2.11.5.1 Create a Queue Table

Syntax

```
AQ CREATE QUEUE TABLE/CREATEQT -n[ame] table_name
[-pay[load_type] {JSON | RAW | [schema.]type_name}]
[-sto[rage_clause] string]
[-sort[_list] string]
[-mul[tiple_consumers] {NO | YES}]
[-com[ment] string]
[-primary[_instance] number]
[-secondary[_instance] number]
[-secure {YES | NO}]
[-repl[ication_mode] {NONE | REPLICATION}]
```

Parameters

Parameter	Description	Default
-name, -n	<name> Name of a queue table to create.	-
-payload_type, -pt	[OBJECT NAME TYPE NAME JSON] Type of the user data stored.	JSON
-storage_clause, -sto	<storage_clause>Storage parameter. The storage parameter is included in the CREATE TABLE statement when the queue table is created. The storage parameter can be made up of any combinations of the following parameters: PCTFREE, PCTUSED, INITTRANS, MAXTRANS, TABLESPACE, LOB, and a table storage clause.	NULL
-sort_list, -sort	<sort_list> The columns to be used as the sort key in ascending order. This parameter has the following format: 'sort_column_1,sort_column_2' The allowed column names are priority, enq_time, and commit_time.	ENQ_TIME
-multiple_consumers, -mul	[TRUE FALSE] TRUE: Queues created in the table can only have one consumer for each message. FALSE: Queues created in the table can have multiple consumers for each message.	False
-comment, -c	<comment> User-specified description of the queue table.	NULL
-primary_instance, -primary	<primary_instance> The primary owner of the queue table. Queue monitor scheduling and propagation for the queues in the queue table are done in this instance.	0
-secondary_instance, -secondary	<secondary_instance> The queue table fails over to the secondary instance if the primary instance is not available.	0
-secure, -sec	[TRUE FALSE] TRUE: Use the queue table for secure queues. Secure queues are queues for which AQ agents must be associated explicitly with one or more database users.	False
-replication_mode, -repl	[0:NONE 1:REPLICATION_MODE]	0:NONE

2.11.5.2 Alter a Queue Table

Syntax

```
AQ ALTER QUEUE TABLE/ALTERQT -n[ame] table_name
  [-com[ment] string]
  [-primary[_instance] number]
  [-secondary[_instance] number]
  [-repl[ication_mode] {NONE | REPLICATION}]
```

Parameters

Parameter	Description	Default
-name, -n	<name> Name of a queue table to alter.	-
-comment, -c	<comment> User-specified description of the queue table.	NULL
-primary_instance, -primary	<primary_instance> The primary owner of the queue table. Queue monitor scheduling and propagation for the queues in the queue table are done in this instance.	0
-secondary_instance, -secondary	<secondary_instance> The queue table fails over to the secondary instance if the primary instance is not available.	0
-replication_mode, -repl	[0:NONE 1:REPLICATION_MODE]	0:NONE

2.11.5.3 Drop a Queue Table

Syntax

```
AQ DROP QUEUE TABLE/DROPQT -n[ame] table_name
  [-for[ce] {NO | YES}]
```

Parameters

Parameter	Description	Default
-name, -n	<name> Name of a queue table to drop.	-
-force, -f	[TRUE FALSE] TRUE: All queues in the table are stopped and dropped automatically. FALSE: The operation does not succeed if there are any queues in the table.	False

2.11.5.4 Create a Queue

Syntax

```
AQ CREATE QUEUE/CREATEQ -n[ame] queue_name
  -tab[le_name] [schema.]table_name
  [-type {NORMAL | EXCEPTION}]
  [-max[_retries] number]
  [-retry[_delay] number]
  [-retention[_time] number]
  [-com[ment] string]
```

Parameters

Parameter	Description	Default
-name, -n	<name> Name of a queue to create.	-
-table_name, -tab	[schema].<table_name> Name of the queue table that will contain the queue.	-
-type, -t	[0:NORMAL QUEUE 1:EXCEPTION QUEUE] Specifies whether the queue being created is an exception queue or a normal queue.	0:NORMAL QUEUE
-max_retries, -max	<max_retries number> A message is moved to an exception queue if RETRY_COUNT is greater than MAX_RETRIES. RETRY_COUNT is incremented when the application issues a rollback after executing the dequeue.	5
-retry_delay, -retry	<retry_delay number> Delay time, in seconds, before this message is scheduled for processing again after an application rollback.	0
-comment, -c	<comment> User-specified description of the queue table.	NULL
-retention_time, -rtime	<retention_time number> [-1:INFINITE] means the message is retained forever. Number of seconds that a message is retained in the queue table after being dequeued from the queue.	0

2.11.5.5 Alter a Queue

Syntax

```
AQ ALTER QUEUE/ALTERQ -n[ame] queue_name
  [-max[_retries] number]
  [-retry[_delay] number]
```

```
[-retention[_time] number]
[-com[ment] string]
```

Parameters

Parameter	Description	Default
-name, -n	<name> Name of a queue to alter.	-
-max_retries, -max	<max_retries number> A message is moved to an exception queue if RETRY_COUNT is greater than MAX_RETRIES. RETRY_COUNT is incremented when the application issues a rollback after executing the dequeue.	NULL - current value will not be altered.
-retry_delay, -retry	<retry_delay number> Delay time, in seconds, before this message is scheduled for processing again after an application rollback.	NULL - current value will not be altered.
-retention_time, -rtime	<retention_time number> [-1:INFINITE] means the message is retained forever. Number of seconds that a message is retained in the queue table after being dequeued from the queue.	0
-comment, -c	<comment> User-specified description of the queue table.	NULL

2.11.5.6 Drop a Queue

Syntax

```
AQ DROP QUEUE/DROPQ -n[ame] queue_name
```

Parameters

Parameter	Description	Default
-name, -n	<name> Name of a queue to drop.	-

2.11.5.7 Create a Sharded Queue

Syntax

```
AQ CREATE SHARDED QUEUE/CREATESQ -n[ame] queue_name
[-sto[rage_clause] string]
[-mul[tiple_consumers] {NO | YES}]
[-max[_retries] number]
[-com[ment] string]
```



```

[-payload_type] {JSON | RAW | [schema.]type_name}}
[-retry_delay] number]
[-retention_time number]
[-sort_list] {PRIORITY,ENQ_TIME | ENQ_TIME}}
[-cache_hint] {AUTO | UNCACHED | CACHED }}
[-retention_type string]
[-replication_mode] NONE]

```

Parameters

Parameter	Description	Default
-name, -n	<name> Name of a queue table to create.	-
-storage_clause, -sto	<storage_clause>Storage parameter. The storage parameter is included in the CREATE TABLE statement when the queue table is created. The storage parameter can be made up of any combinations of the following parameters: PCTFREE, PCTUSED, INITRANS, MAXTRANS, TABLESPACE, LOB, and a table storage clause.	NULL
-multiple_consumers, -mul	[TRUE FALSE] TRUE: Queues created in the table can only have one consumer for each message. FALSE: Queues created in the table can have multiple consumers for each message.	False
-comment, -c	<comment> User-specified description of the queue table.	NULL
-payload_type, -pt	[OBJECT_NAME TYPE_NAME JSON JMS] Type of the user data stored.	JMS
-retry_delay, -retry	<retry_delay number> Delay time, in seconds, before this message is scheduled for processing again after an application rollback.	0
-retention_time, -rtime	<retention_time number> [-1:INFINITE] means the message is retained forever. Number of seconds that a message is retained in the queue table after being dequeued from the queue.	0
-sort_list, -sort	<sort_list> The columns to be used as the sort key in ascending order. This parameter has the following format: 'sort_column_1,sort_column_2' The allowed column names are priority, enq_time, and commit_time.	PRIORITY,ENQ_TIME

Parameter	Description	Default
-cache_hint, -cache	[1:AUTO 2:CACHED 3:UNCACHED] Specifies a hint to sharded queue whether to cache messages or not. User can specify following: <ul style="list-style-type: none"> [1:AUTO]: Message cache does best effort based on available memory. [2:CACHED]: Message cache will cache messages and give preference to those queues with CACHED hint. 	1:AUTO
-retention_type, -rtype	[0: DEQUEUE_TIME] The retention time starts after a subshard is dequeued by all the subscribers. If a new subscriber seeks back before or to this subshard, then the retention clock is reset.	0:DEQUEUE_TIME
-replication_mode, -repl	[0:NONE 1:REPLICATION_MODE]	0:NONE

2.11.5.8 Alter a Sharded Queue

Syntax

```
AQ ALTER SHARDED QUEUE/ALTERSQ -n[ame] queue_name
[-max[_retries] number]
[-com[ment] string]
[-retry[_delay] number]
[-retention_time number]
[-cache[_hint] {AUTO | UNCACHED | CACHED}]
[-retention_type string]
[-repl[ication_mode] NONE]
```

Parameters

Parameter	Description	Default
-name, -n	<name> Name of a queue to alter.	-
-max_retries, -max	<max_retries number> A message is moved to an exception queue if RETRY_COUNT is greater than MAX_RETRIES. RETRY_COUNT is incremented when the application issues a rollback after executing the dequeue.	NULL - current value will not be altered.
-comment, -c	<comment> User-specified description of the queue table.	NULL
-retry_delay, -retry	<retry_delay number> Delay time, in seconds, before this message is scheduled for processing again after an application rollback.	0

Parameter	Description	Default
<code>-retention_time, -rtime</code>	<p><retention_time number></p> <p>[-1:INFINITE] means the message is retained forever.</p> <p>Number of seconds that a message is retained in the queue table after being dequeued from the queue.</p>	0
<code>-sort_list, -sort</code>	<p><sort_list></p> <p>The columns to be used as the sort key in ascending order. This parameter has the following format: 'sort_column_1,sort_column_2' The allowed column names are priority, enq_time, and commit_time.</p>	PRIORITY,ENQ_TIME
<code>-cache_hint, -cache</code>	<p>[1:AUTO 2:CACHED 3:UNCACHED]</p> <p>Specifies a hint to sharded queue whether to cache messages or not. User can specify following:</p> <ul style="list-style-type: none"> [1:AUTO]: Message cache does best effort based on available memory. [2:CACHED]: Message cache will cache messages and give preference to those queues with CACHED hint. 	1:AUTO
<code>-retention_type, -rtype</code>	<p>[0: DEQUEUE_TIME]</p> <p>The retention time starts after a subshard is dequeued by all the subscribers. If a new subscriber seeks back before or to this subshard, then the retention clock is reset.</p>	0:DEQUEUE_TIME
<code>-replication_mode, -repl</code>	<p>[0:NONE 1:REPLICATION_MODE]</p>	0:NONE

2.11.5.9 Drop a Sharded Queue

Syntax

```
AQ DROP SHARDED QUEUE/DROPSQ -n[ame] queue_name
[-for[ce] {NO | YES}]
```

Parameters

Parameter	Description	Default
<code>-name, -n</code>	<name> Name of a queue table to drop.	-
<code>-force, -f</code>	<p>[TRUE FALSE]</p> <p>TRUE: The sharded queue is dropped even if the queue is not stopped.</p> <p>FALSE: The sharded queue is not dropped even if the queue is not stopped.</p>	False

2.11.5.10 Create an Exception Queue

Syntax

```
AQ CREATE EXCEPTION QUEUE/CREATEEQ -n[ame] queue_name
  -sharded[_queue_name] [schema.]queue_name
```

Parameters

Parameter	Description	Default
-name, -n	<name> Name of a queue to create.	NULL
-sharded_queue_name, -sharded	[schema].<name> The name of the sharded queue.	FALSE

2.11.5.11 Create a Transactional Event Queue



Note:

This command is only available for Oracle Database release 21c and later versions.

Syntax

```
AQ CREATE TRANSACTIONAL EVENT QUEUE/CREATETEQ -n[ame] queue_name
  [-sto[rage_clause] string]
  [-mul[tiple_consumers] {NO | YES}]
  [-max[_retries] number]
  [-com[ment] string]
  [-pay[load_type] {JSON | RAW | JMS | [schema.]type_name}]
  [-retry[_delay] number]
  [-retention_time number]
  [-sort[_list] {PRIORITY,ENQ_TIME | ENQ_TIME}]
  [-cache[_hint] {AUTO | UNCACHED | CACHED}]
  [-retention_type string]
  [-repl[ication_mode] NONE]
```

Parameters

Parameter	Description	Default
-name, -n	<name> Name of a queue to create.	-

Parameter	Description	Default
-storage_clause,-sto	<storage_clause>Storage parameter. The storage parameter is included in the CREATE TABLE statement when the queue table is created. The storage parameter can be made up of any combinations of the following parameters: PCTFREE, PCTUSED, INITRANS, MAXTRANS, TABLESPACE, LOB, and a table storage clause.	NULL
-multiple_consumers,-mul	[TRUE FALSE] TRUE: Queues created in the table can only have one consumer for each message. FALSE: Queues created in the table can have multiple consumers for each message.	False
-max_retries,-max	<max_retries number> A message is moved to an exception queue if RETRY_COUNT is greater than MAX_RETRIES. RETRY_COUNT is incremented when the application issues a rollback after executing the dequeue.	5
-comment,-c	<comment> User-specified description of the queue table.	NULL
-payload_type,-pt	[OBJECT NAME TYPE NAME JSON JMS] Type of the user data stored.	JMS
-retry_delay,-retry	<retry_delay number> Delay time, in seconds, before this message is scheduled for processing again after an application rollback.	0
-retention_time,-rtime	<retention_time number> [-1:INFINITE] means the message is retained forever. Number of seconds that a message is retained in the queue table after being dequeued from the queue.	0
-sort_list,-sort	<sort_list> The columns to be used as the sort key in ascending order. This parameter has the following format: 'sort_column_1,sort_column_2' The allowed column names are priority, enq_time, and commit_time.	PRIORITY,ENQ_TIME

Parameter	Description	Default
<code>-cache_hint, -cache</code>	[1:AUTO 2:CACHED 3:UNCACHED] Specifies a hint to sharded queue whether to cache messages or not. User can specify following: <ul style="list-style-type: none"> [1:AUTO]: Message cache does best effort based on available memory. [2:CACHED]: Message cache will cache messages and give preference to those queues with CACHED hint. 	1:AUTO
<code>-retention_type, -rtype</code>	[0: DEQUEUE_TIME] The retention time starts after a subshard is dequeued by all the subscribers. If a new subscriber seeks back before or to this subshard, then the retention clock is reset.	0:DEQUEUE_TIME
<code>-replication_mode, -repl</code>	[0:NONE 1:REPLICATION_MODE]	0:NONE

2.11.5.12 Alter a Transactional Event Queue



Note:

This command is only available for Oracle Database release 21c and later versions.

Syntax

```
AQ ALTER TRANSACTIONAL EVENT QUEUE/ALTERTEQ -n[ame] queue_name
[-max[_retries] number]
[-com[ment] string]
[-retry[_delay] number]
[-retention_time number]
[-cache[_hint] {AUTO | UNCACHED | CACHED}]
[-retention_type string]
[-repl[ication_mode] NONE]
```

Parameters

Parameter	Description	Default
<code>-name, -n</code>	<name> Name of a queue to alter.	-

Parameter	Description	Default
<code>-max_retries, -max</code>	<p><max_retries number></p> <p>A message is moved to an exception queue if <code>RETRY_COUNT</code> is greater than <code>MAX_RETRIES</code>.</p> <p><code>RETRY_COUNT</code> is incremented when the application issues a rollback after executing the dequeue.</p>	NULL - current value will not be altered.
<code>-comment, -c</code>	<p><comment></p> <p>User-specified description of the queue table.</p>	NULL
<code>-retry_delay, -retry</code>	<p><retry_delay number></p> <p>Delay time, in seconds, before this message is scheduled for processing again after an application rollback.</p>	0
<code>-retention_time, -rtime</code>	<p><retention_time number></p> <p>[-1: INFINITE] means the message is retained forever.</p> <p>Number of seconds that a message is retained in the queue table after being dequeued from the queue.</p>	0
<code>-sort_list, -sort</code>	<p><sort_list></p> <p>The columns to be used as the sort key in ascending order. This parameter has the following format: 'sort_column_1,sort_column_2' The allowed column names are priority, enq_time, and commit_time.</p>	PRIORITY,ENQ_TIME
<code>-cache_hint, -cache</code>	<p>[1:AUTO 2:CACHED 3:UNCACHED]</p> <p>Specifies a hint to sharded queue whether to cache messages or not. User can specify following:</p> <ul style="list-style-type: none"> [1:AUTO]: Message cache does best effort based on available memory. [2:CACHED]: Message cache will cache messages and give preference to those queues with CACHED hint. 	1:AUTO
<code>-retention_type, -rtype</code>	<p>[0: DEQUEUE_TIME]</p> <p>The retention time starts after a subshard is dequeued by all the subscribers. If a new subscriber seeks back before or to this subshard, then the retention clock is reset.</p>	0:DEQUEUE_TIME
<code>-replication_mode, -repl</code>	<p>[0:NONE 1:REPLICATION_MODE]</p>	0:NONE

2.11.5.13 Drop a Transactional Event Queue



Note:

This command is only available for Oracle Database release 21c and later versions.

Syntax

```
AQ DROP TRANSACTIONAL EVENT QUEUE/DROPTEQ -n[ame] queue_name
  [-for[ce] {NO | YES}]
```

Parameters

Parameter	Description	Default
-name, -n	<name> Name of a queue to drop.	-
-force, -f	[TRUE FALSE] TRUE: The sharded queue is dropped even if the queue is not stopped. FALSE: The sharded queue is not dropped even if the queue is not stopped.	FALSE

2.11.5.14 Create an EQ Exception Queue

Syntax

```
AQ CREATE EQ EXCEPTION QUEUE/CREATEEQEQ -n[ame] queue_name
  -teq[_queue_name] [schema.]queue_name
```

Parameters

Parameter	Description	Default
-name, -n	<name> Name of a queue to create.	NULL
-teq_queue_name, -teq	[schema].<name> The name of the transactional event queue.	FALSE

2.11.5.15 Start a Queue

Syntax

```
AQ START QUEUE/STARTQ -n[ame] queue_name
  [-enq[ueue] {ENABLE | KEEP}]
  [-deq[ueue] {ENABLE | KEEP}]
```

Parameters

Parameter	Description	Default
-name, -n	<name> Name of a queue to enable.	NULL
-enqueue, -enq	[TRUE FALSE] TRUE: Enable ENQUEUE. FALSE: Do not alter the current setting.	TRUE
-dequeue, -deq	[TRUE FALSE] TRUE: Enable DEQUEUE. FALSE: Do not alter the current setting.	TRUE

2.11.5.16 Stop a Queue

Syntax

```
AQ STOP QUEUE/STOPQ -n[ame] queue_name
  [-enq[ueue] {DISABLE | KEEP}]
  [-deq[ueue] {DISABLE | KEEP}]
  [-wait {YES | NO}]
```

Parameters

Parameter	Description	Default
-name, -n	<name> Name of a queue to disable.	NULL
-enqueue, -enq	[TRUE FALSE] TRUE: Enable ENQUEUE. FALSE: Do not alter the current setting.	TRUE
-dequeue, -deq	[TRUE FALSE] TRUE: Enable DEQUEUE. FALSE: Do not alter the current setting.	TRUE
-wait, -w	[TRUE FALSE] TRUE: Wait if there are any outstanding transactions. FALSE: Return immediately either with a success or an error.	TRUE

2.11.5.17 Add a Subscriber

Syntax

```
AQ ADD SUBSCRIBER/ADDSUB -n[ame] subscriber_name
  -queue[_name] queue_name
  [-subscriber_address string]
  [-subscriber_protocol number]
  [-rule string]
  [-trans[formation] [schema.]name]
  [-queue_to_queue {NO | YES}] t
  [-mode {PERSISTENT | BUFFERED | PERSISTENT_OR_BUFFERED}]
```

Parameters

Parameter	Description	Default
-name, -n	Name of a producer or consumer of a message.	-
-queue_name, -queue	<name> Name of a queue.	-
-subscriber_address, -sa	<subscriber_address> Protocol-specific address of the recipient. If the protocol is 0, then the address is of the form [schema.]queue[@dblink]. Name of the queue table that will contain the queue.	""
-subscriber_protocol, -sp	<subscriber_protocol> Protocol to interpret the address and propagate the message.	0
-rule, -r	<rule> A conditional expression based on the message properties, the message data properties and PL/SQL functions. A rule is specified as a Boolean expression using syntax similar to the WHERE clause of a SQL query. You must prefix each attribute with tab.user_data as a qualifier to indicate the specific column of the queue table that stores the payload.	NULL
-transformation, -trans	<transformation> Specifies a transformation that will be applied when this subscriber dequeues the message.	NULL
-queue_to_queue, -q2q	[TRUE FALSE] TRUE: propagation is from queue-to-queue	FALSE

Parameter	Description	Default
-mode, -m	[1:PERSISTENT 2:BUFFERED 3:PERSISTENT_OR_BUFFERED] Delivery mode of the messages the subscriber is interested in.	PERSISTENT

2.11.5.18 Alter a Subscriber

Syntax

```
AQ ALTER SUBSCRIBER/ALTERSUB -n[ame] subscriber_name
  [-subscriber_address string]
  [-subscriber_protocol number]
  -queue[_name] [schema.]queue_name
  [-rule string]
  [-trans[formation] [schema.]name]
```

Parameters

Parameter	Description	Default
-name, -n	Name of a producer or consumer of a message.	-
-queue_name, -queue	<name> Name of a queue.	-
-subscriber_address, -sa	<subscriber_address> Protocol-specific address of the recipient. If the protocol is 0, then the address is of the form [schema.]queue[@dblink]. Name of the queue table that will contain the queue.	""
-subscriber_protocol, -sp	<subscriber_protocol> Protocol to interpret the address and propagate the message.	0
-rule, -r	<rule> A conditional expression based on the message properties, the message data properties and PL/SQL functions. A rule is specified as a Boolean expression using syntax similar to the WHERE clause of a SQL query. You must prefix each attribute with tab.user_data as a qualifier to indicate the specific column of the queue table that stores the payload.	NULL
-transformation, -trans	<transformation> Specifies a transformation that will be applied when this subscriber dequeues the message.	NULL

2.11.5.19 Remove a Subscriber

Syntax

```
AQ REMOVE SUBSCRIBER/REMOVESUB -n[ame] subscriber_name
  [-subscriber_address string]
  [-subscriber_protocol number]
  -queue[_name] [schema.]queue_name
```

Parameters

Parameter	Description	Default
-name, -n	Name of a producer or consumer of a message.	-
-queue_name, -queue	<name> Name of a queue.	-
-subscriber_address, -sa	<subscriber_address> Protocol-specific address of the recipient. If the protocol is 0, then the address is of the form [schema.]queue[@dblink]. Name of the queue table that will contain the queue.	""
-subscriber_protocol, -sp	<subscriber_protocol> Protocol to interpret the address and propagate the message.	0

2.11.5.20 Enqueue

Syntax

```
AQ ENQ[UEUE] -n[ame] queue_name
  {
    -pay[load] payload
    |
    -file[name] name
  }
  [-type {JSON | HEX | BINARY}]

  [--vis[ibility] {ON_COMMIT | IMMEDIATE}]
  [--trans[formation] [schema.]name]
  [--mode {PERSISTENT | BUFFERED}]
  [--pri[ority] priority]
  [--del[ay] delay]
  [--exp[iration] expiration]
  [--corr[elation] string]
  [--rec[ipient_list] agents]
  [--exc[emption_queue] name]
```

```
[-sender[_agent] name]
[-out_msgid string]
```

Parameters

Parameter	Description	Default
-name, -n	<name> Name of the queue to which this message should be enqueued.	-
-payload, -p	Message payload.	-
-filename, -file	File to read the message payload.	-
-payload_type, -pt	Payload format type.	JSON
-visibility, -vis	Specifies the transactional behavior of the enqueue request. Possible settings are: <ul style="list-style-type: none"> [2:ON_COMMIT]: The enqueue is part of the current transaction. The operation is complete when the transaction commits. This setting is the default. [1:IMMEDIATE]: The enqueue operation is not part of the current transaction, but an autonomous transaction which commits at the end of the operation. This is the only value allowed when enqueueing to a non-persistent queue. 	2:ON_COMMIT
-mode, -m	[1:PERSISTENT 2:BUFFERED 3:PERSISTENT_OR_BUFFERED] Delivery mode of the messages the subscriber is interested in.	PERSISTENT
-priority, -pri	Specifies the priority of the message. A smaller number indicates higher priority. The priority can be any number, including negative numbers.	1
-comment, -c	<comment> User-specified description of the queue table.	NULL
-delay, -del	The delay represents the number of seconds after which a message is available for dequeuing.	0
-expiration, -exp	It determines, in seconds, the duration the message is available for dequeuing.	-1 - NEVER
-correlation, -corr	Specifies the name of the queue into which the message is moved if it cannot be processed successfully.	-
-sender_id, -sid	The application-sender identification specified at enqueue time by the message producer. Sender name is required for secure queues at enqueue time.	-

Parameter	Description	Default
-out_message_id, -out_msgid	System generated identification of the message. This is a globally unique identifier that can be used to identify the message at dequeue time. A bind variable can also be used as an input to store the message id. (Example: -out_msgid :xyz)	-

2.11.5.21 Dequeue

Syntax

```
AQ DEQ[UEUE] -n[ame] queue_name
  [-cons[umer] name]
  {
    -pay[load] payload
    |
    -file[name] name
  }
  [-type {JSON | HEX | BINARY}]
  [-deq[ueue]_mode {REMOVE | BROWSE | LOCKED | REMOVE_NODATA}]
  [-nav[igation] {NEXT_MESSAGE | NEXT_TRANSACTION | FIRST_MESSAGE}]
  [-vis[ibility] {ON_COMMIT | IMMEDIATE}]
  [-wait number]
  [-msgid string]
  [-corr[elation] string]
  [-cond[ition] string]
  [-trans[formation] [schema.]name]
  [-mode {PERSISTENT | BUFFERED | PERSISTENT_OR_BUFFERED}]
  [-for[mat_enqueue_time] string]
  [-out_msgid string]
  [-out_pri[ority] number]
  [-out_del[ay] number]
  [-out_exp[iration] number]
  [-out_corr[elation] string]
  [-out_attempts number]
  [-out_exc[ception_queue] name]
  [-out_enqueue_time string]
  [-out_state string]
  [-out_sender_agent name]
  [-out_original_msgid string]
  [-out_mode string]
```

Parameters

Parameter	Description	Default
-name, -n	<name> Name of the queue to which this message should be dequeued.	-

Parameter	Description	Default
-payload, -p	Message payload to be written on the console.	-
-filename, -file	File to write the message payload.	-
-payload_type, -pt	Payload format type.	JSON
-consumer_name, -cons	Only those messages matching the consumer name are accessed. If a queue is not set up for multiple consumers, then this field should be set to NULL.	-
-dequeue_mode, -dm	Specifies the locking behavior associated with the dequeue. Possible settings are: <ul style="list-style-type: none">• [1: BROWSE] : Read the message without acquiring any lock on the message. This specification is equivalent to a select statement.• [2: LOCKED] : Read and obtain a write lock on the message. The lock lasts for the duration of the transaction. This setting is equivalent to a select for update statement.• [3: REMOVE - DEFAULT] : Read the message and delete it.• [4: REMOVE_NODATA] : Mark the message as updated or deleted. The message can be retained in the queue table based on the retention properties.	-
-navigation, -nav	Specifies the position of the message that will be retrieved. Possible settings are: <ul style="list-style-type: none">• [1: FIRST_MESSAGE:] : Retrieves the first message which is available and matches the search criteria.• [2: NEXT_TRANSACTION] : Skip the remainder of the current transaction group (if any) and retrieve the first message of the next transaction group.• [3: NEXT_MESSAGE - DEFAULT] : Retrieve the next message that is available and matches the search criteria.	-

Parameter	Description	Default
-visibility, -vis	Specifies the transactional behavior of the enqueue request. Possible settings are: <ul style="list-style-type: none"> [2:ON_COMMIT]: The enqueue is part of the current transaction. The operation is complete when the transaction commits. This setting is the default. [1:IMMEDIATE]: The enqueue operation is not part of the current transaction, but an autonomous transaction which commits at the end of the operation. This is the only value allowed when enqueueing to a non-persistent queue. 	2:ON_COMMIT
-deq_wait, -deq_w	Specifies the wait time if there is currently no message available which matches the search criteria. Possible settings are: <ul style="list-style-type: none"> [-1:FOREVER]: Wait forever. This setting is the default. [0:NO_WAIT]: Do not wait. [x]: Wait time in seconds. (x seconds) 	
-correlation, -corr	Specifies the name of the queue into which the message is moved if it cannot be processed successfully.	-
-condition, -con	A conditional expression based on the message properties, the message data properties, and PL/SQL functions.	-
-message_id, msg_id	Specifies the message identifier of the message to be dequeued. A bind variable can also be used as an input (Example: -msgid :xyz).	-
-transformation, -trans	<transformation> Specifies a transformation that will be applied after dequeuing the message.	NULL
-mode, -m	[1:PERSISTENT 2:BUFFERED 3:PERSISTENT_OR_BUFFERED] Delivery mode of the messages the subscriber is interested in.	PERSISTENT
-out_message_id, -out_msgid	System generated identification of the message. This is a globally unique identifier that can be used to identify the message at dequeue time. A bind variable can also be used as an input to store the message id. (Example: -out_msgid :xyz)	-
-out_priority, -out_pri	Priority of the message. A smaller number indicates higher priority. A bind variable can also be used as an input to store the priority. (Example: -out_priority :xyz)	-

Parameter	Description	Default
<code>-out_delay, -out_del</code>	The delay represents the number of seconds after which a message is available for dequeuing. A bind variable can also be used as an input to store the delay. (Example: <code>-out_delay :xyz</code>)	-
<code>-out_expiration, -out_exp</code>	The duration the message is available for dequeuing. A bind variable can also be used as an input to store the expiration. (Example: <code>-out_expiration :xyz</code>)	-
<code>-out_correlation, -out_corr</code>	Correlation identifier of the message to be dequeued. A bind variable can also be used as an input to store the correlation. (Example: <code>-out_correlation :xyz</code>)	-
<code>-out_attempts, -out_att</code>	Number of attempts made to dequeue the message. A bind variable can also be used as an input to store the attempts. (Example: <code>-out_attempts :xyz</code>)	-
<code>-out_exception_queue, -out_exc</code>	Name of the queue into which the message is moved if it cannot be processed successfully. A bind variable can also be used as an input to store the exception queue (Example: <code>-out_exception_queue :xyz</code>)	-
<code>-out_enqueue_time, -out_eqt</code>	The time the message was enqueued. A bind variable can also be used as an input to store the enqueue time. (Example: <code>-out_enqueue_time :xyz</code>)	-
<code>-out_state, -out_st</code>	State of the message at the time of the dequeue. A bind variable can also be used as an input to store the state (Example: <code>-out_state :xyz</code>)	-
<code>-out_sender_id, -out_sid</code>	The application-sender identification specified at enqueue time by the message producer. A bind variable can also be used as an input to store the sender id (Example: <code>-out_sender_id :xyz</code>)	-
<code>-out_mode, -out_m</code>	The delivery mode of the messages. A bind variable can also be used as an input to store the mode (Example: <code>-out_mode :xyz</code>)	-

2.11.6 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:

```

SET APPI[NFO] {ON | OFF | text}
SET ARRAY[SIZE] {15 | n}
SET AUTO[COMMIT] {ON | OFF | IMM[EDIATE] | n}
SET AUTOP[RINT] {ON | OFF}
SET AUTORECOVERY {ON | OFF}
SET AUTOT[RACE] {ON | OFF | TRACE[ONLY]}
SET BLO[CKTERMINATOR] {. | c | ON | OFF}
SET CLASSIC [ ON | OFF ]
SET CLEAR [ TOP | BOTTOM | SAME ]
SET CLOUDCONFIG [ -proxy=<proxyhost>:<port> ] <wallet.zip location>
SET CMDS[EP] {; | c | ON | OFF}
SET CODESCAN [ON | SQLINJECTION | SQLPERFORMANCE | OFF] (For more details,
see the description at the bottom.)
SET COLSEP {_ | text}
SET CON[CAT] {. | c | ON | OFF}
SET COPYC[OMMIT] {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 DEF[INE] {& | c | ON | OFF}
SET ECHO {ON | OFF}
SET EDITF[ILE] file_name[.ext]
SET EMB[EDDED] {ON | OFF}
SET ENCODING
SET ERRORL[OGGING] {ON | OFF} [TABLE [schema.]tablename] [TRUNCATE]
[IDENTIFIER identifier]
SET ESC[APE] {\ | c | ON | OFF}
SET ESCCHAR {@ | ? | % | $ | OFF}
SET EXITC[OMMIT] {ON | OFF}
SET FEED[BACK] {6 | n | ON | OFF} [SQL_ID]
SET FLU[SH] {ON | OFF}
SET HEA[DING] {ON | OFF}
SET HEADS[EP] {_ | c | ON | OFF}

```

```
SET HISTORY [FAILS [LIMIT [ n | DEFAULT ] ] | NOFAILS | FILTER [DEFAULT  
<command list>?|<command list>?] |LIMIT [n|DEFAULT]]  
SET LDAPCON  
SET LIN[ESIZE] {80 | n}  
SET LOAD default [options...]  
SET LOADFORMAT [ DEFAULT | CSV | DELIMITED | HTML | INSERT | JSON | JSON-  
FORMATTED | LOADER | T2 | XML ] [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 NEWP[AGE] {1 | n | NONE}  
SET NOVERWRITE {ON | OFF | WARN}  
SET NULL text  
SET NUMF[ORMAT] format  
SET NUM[WIDTH] {10 | n}  
SET PAGES[IZE] {14 | n}  
SET PARAMETERPOLICY {default | isolate}  
SET PAU[SE] {ON | OFF | text}  
SET RECSEPCHAR {_ | c}  
SET SERVEROUT[PUT] {ON | OFF} [SIZE {n | UNL[IMITED]}] [FOR[MAT] {WRA[PPED] |  
WOR[D_WRAPPED] | TRU[NCATED]}]  
SET SHOW[MODE] {ON | OFF}  
SET SQLBL[ANKLINES] {ON | OFF}  
SET SQLC[ASE] {MIX[ED] | LO[WER] | UP[PER]}  
SET SQLCO[NTINUE] {≥ | text}  
SET SQLFORMAT {csv | html | xml | json | ansiconsole | insert | loader |  
fixed | default}  
SET SQLPLUSCOMPAT[IBILITY] {x.y[.z]}  
SET SQLPRE[FIX] {# | c}  
SET SQLP[ROMPT] {SQL> | text}  
SET SUF[FIX] {SQL | text}  
SET T2 METRICDATA NAMESPACE {text}  
SET T2 METRICDATA COMPARTMENTID {text}  
SET T2 METRICDATA NAME {text}  
SET T2 DIMENSIONS RESOURCEID {text}  
SET T2 DIMENSIONS REGION {text}  
SET T2 METADATA UNIT {text}  
SET TAB {ON | OFF}  
SET TERM[OUT] {ON | OFF}  
SET TI[ME] {ON | OFF}  
SET TIMI[NG] {ON | OFF}  
SET TRIM[OUT] {ON | OFF}  
SET TRIMS[POOL] {ON | OFF}  
SET VER[IFY] {ON | OFF}  
SET WRA[P] {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 ]
```

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.

```
SET CODESCAN [ON | SQLINJECTION | SQLPERFORMANCE | OFF]
```

Controls warning messages issued for code quality issues. `ON` turns on warnings for possible SQL injection vulnerabilities and SQL performance issues. See [SQL Performance Troubleshooting](#)

2.11.7 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
ERR[ORS] [ {FUNCTION | PROCEDURE | PACKAGE | PACKAGE BODY | TRIGGER |
VIEW | TYPE | TYPE BODY | DIMENSION | JAVA CLASS} [schema.]name]
INSTANCE
JAVA
JDBC
LNO
NLS
PARAMETER[S] [parameter_name]
PDBS
PNO
RECYC[LEBIN] [original_name]
REL[EASE]
REPF[OOTER]
REPH[EADER]
SGA
SPOOL[L]
SPPARAMETER[S] [parameter_name]
SQLCODE
```

```
SQLPATH
TNS
TTI [TLE]
USER
VERSION
```

```
SHOW ENCODING
```

Shows the encoding which is set for the client.

```
SHOW ENCODINGS
```

Shows the available encodings for the client.

2.12 Loading a File

Use the `LOAD` command in SQLcl to load a comma-separated value file from a local directory or cloud storage location into a table.

2.12.1 LOAD Command

Loads a comma-separated value (csv) file from a local directory or cloud storage location into a table.

Syntax

```
LOAD [TABLE] [schema.]table_name { <file-specification> | <cloud-storage-
specification> }
[NEW | SHOW | SHOW_DDL | CREATE |CREATE_DDL]
```

where

`[schema.]table_name` identifies the table to load. If the schema is omitted, the table for the connected user schema is loaded.

`file-specification` has the following syntax:

```
{ <fully-qualified-file-name> | <file-name> }
```

- *fully-qualified-file-name*: Identifies the full path to the file to load.
- *file-name*: Identifies the file to load. The file must be located in the default path.

`cloud-storage-specification` has the following syntax:

```
{ CLOUDSTORAGE | CS | CLOUD_STORAGE } [ <url> | <qualified-name> ]
```

- *url*: Complete URL for the cloud storage file if a default cloud storage URL is not set using the Cloud Storage command.
- *qualified-name*: Name of the object, optionally qualified by the namespace and bucket. The qualified name combined with the URL specified by the Cloud Storage command must fully identify the object URL. If *url* and *qualified-name* are omitted, the default Cloud Storage URL must be set to the object.

NEW creates a table and loads data.

[SHOW | SHOW_DDL] executes the DDL generation phase and shows the DDL.

[CREATE | CREATE_DDL] executes the DDL generation phase and creates the table.

Use SET LOAD and SET LOADFORMAT to specify properties for DDL analysis and generation.

Create table DDL generation pre-scans the data file to determine column properties. Use SET LOAD SCAN <n> to specify the number of rows to scan for DDL. 100 is the default. To turn off scanning, set to 0.

Use SET LOAD COL_SIZE to change column sizes that are generated. Use SET LOAD MAP_NAMES to map file column names to table column names.

For more information about the Cloud Storage command, see [Using Cloud Storage](#).

The defaults for the file format are:

- 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).

Example

The following example shows how to load a file from local storage into a table.

```
--Create Table "countries"
create table countries(countries_id NUMBER(5),countries_name
VARCHAR2(40));
Table COUNTRIES created

--Load file COUNTRIES_DATA_TABLE.csv in local storage to "countries"
table
load countries C:\Users\JDOE\SQLcL\COUNTRIES_DATA_TABLE.csv

format csv

column_names on
delimiter ,
enclosure_left "
enclosure_right "
encoding UTF8
row_limit off
```

```
row_terminator default
skip_rows 0
skip_after_names

--Number of rows processed: 30
--Number of rows in error:
0 - SUCCESS: Load processed without errors

--Check the number of rows in countries table
select count(*) from countries;

COUNT(*)
-----
30
```

The following example shows how to load data into a new table EMP.

```
load emp empfile.csv new

--Create new table and load data into table HR.EMP

csv
column_names on
delimiter ,
enclosures ""
encoding UTF8
row_limit off
row_terminator default
skip_rows 0
skip_after_names

#INFO DATE format detected: RRRR-MM-DD

CREATE TABLE HR.EMP
(
  EMPLOYEE_ID NUMBER(5),
  FIRST_NAME VARCHAR2(26),
  LAST_NAME VARCHAR2(26),
  EMAIL VARCHAR2(26),
  PHONE_NUMBER VARCHAR2(26),
  HIRE_DATE DATE,
  JOB_ID VARCHAR2(26),
  SALARY NUMBER(9, 2),
  COMMISSION_PCT VARCHAR2(26),
  MANAGER_ID NUMBER(5),
  DEPARTMENT_ID NUMBER(5)
)
;

#INFO Table created
#INFO Number of rows processed: 21
#INFO Number of rows in error: 0
```

```
#INFO Last row processed in final committed batch: 21  
SUCCESS: Processed without errors
```

The following example shows how to create a new table from a local file.

```
load emp1 empfile.csv create_ddl  
  
--Create new table HR.EMP1  
  
csv  
column_names on  
delimiter ,  
enclosures ""  
encoding UTF8  
row_limit off  
row_terminator default  
skip_rows 0  
skip_after_names  
batch_rows 50  
batches_per_commit 10  
clean_names transform  
column_size rounded  
commit on  
date_format  
errors 50  
map_column_names off  
method insert  
timestamp_format  
timestamp_tz_format  
locale English United States  
scan_rows 100  
truncate off  
unknown_columns_fail on  
  
--Pre-scans the date format  
#INFO DATE format detected: RRRR-MM-DD  
  
CREATE TABLE SYSTEM.EMP1  
(  
  EMPLOYEE_ID NUMBER(5),  
  FIRST_NAME VARCHAR2(26),  
  LAST_NAME VARCHAR2(26),  
  EMAIL VARCHAR2(26),  
  PHONE_NUMBER VARCHAR2(26),  
  HIRE_DATE DATE,  
  JOB_ID VARCHAR2(26),  
  SALARY NUMBER(9, 2),  
  COMMISSION_PCT VARCHAR2(26),  
  MANAGER_ID NUMBER(5),  
  DEPARTMENT_ID NUMBER(5)  
)  
;
```



```
#INFO Table created  
SUCCESS: Processed without errors
```

2.12.1.1 SET LOAD Command

`SET LOAD` enables you to set options for loading data when using the `LOAD` command.

Syntax

```
SET LOAD default | [options...]
```

where

`default` means load method properties return to default values.

options represents the following:

- `BATCH_ROWS|BATCHROWS <number_of_rows>`

Data loading is done in batches. Specifies the number of rows to include in each batch.

- `BATCHES_PER_COMMIT|BATCHESPERCOMMIT <batches_per_commit>`

Commit after processing *number_of_batches*. If the number is equal to 0, commit happens at the end of the load. If the number is greater than or equal to 0, `COMMIT ON` is set.

- `CLEAN_NAMES [TRANSFORM | TRANSFORM128 | QUOTE | QUOTE128 | UNIQUE]`

Identifies the rule for making table and column names compliant with database identifiers. Names are cleaned before they are mapped to provide consistency with previous releases. If both `CLEAN_NAMES` and `MAP_COLUMN_NAMES` are used, then clean names should be specified.

The standard identifiers are:

- No longer than 30 or 128 characters.
- Not a reserved word.
- Starts with a letter and contains only letters, digits, or one of `_$#`.
- Uppercase
- Names that do not comply must be quoted. Length rules always apply.

Note:

Data that is enclosed in quotes will have quotes in the header row removed before names are cleaned.

```
TRANSFORM (default)
```

Indicates that names are transformed as follows:

- Names are in uppercase.
- If the name starts and ends with the quote character, the quotes are removed.
- Names that are reserved words are appended with a dollar sign (\$).
- Names that start with a number or special character is prefixed with an X.
- Spaces and hyphens are replaced with underscores (_). \$ and # characters are retained.
- Special characters other than \$ and # is replaced with the number sign (#).
- Names are truncated to 30 or 128 characters depending on database `MAX_STRING_SIZE`.
- After names are cleaned, non-unique names within the column set are appended with a unique sequence number. If truncation is required, the sequence number is maintained.

`TRANSFORM (default)`

Applies all transform rules. Names may be 128 characters.

`QUOTE`

Quote non-compliant names and shorten to 30 or 128 characters depending on database `MAX_STRING_SIZE`.

`QUOTE128`

Quote non-compliant names. Names may be 128 characters.

`UNIQUE`

Compatibility option with previous releases of load service. Names that are not unique within the column set are appended with a unique sequential number. Truncation is not provided.

- `COLUMN_SIZE | COLUMNSIZE | COLSIZE {ACTUAL | ROUND | ROUNDED | MAX | MAXIMUM}`

Create table column size strategy.

`ACTUAL` uses the largest size found during the scan.

`ROUND | ROUNDED` uses a size a little larger than the largest size found during the scan.

`MAX | MAXIMUM` uses the database maximum size for the data type that was detected.

- `COMMIT {ON | OFF}`

Enable or disable data commits.

- `DATE | DATE_FORMAT | DATEFORMAT format_mask`

The format of all `DATE` data type columns loaded. Specify `no format_mask` or `DEFAULT` to use database default.

For DATE columns, if format is not set and `SCAN_ROWS = 0`, the data is not scanned for a valid mask.

`ERRORS {number_of_rows | UNLIMITED}|-1`: Indicates the number of error rows allowed.

If this number is exceeded, the load will be terminated.

-1 and UNLIMITED indicate no error limit.

All rows in a batch may be in error if any row fails.

- `LOCALE { <language country> | DEFAULT | "" }`

Specify locale language and optionally country.

`DEFAULT | ""` : Set to default locale.

- `MAP_COLUMN_NAMES|MAPCOLUMNNAMES|MAPNAMES { OFF| (<file-col-name>=<table-col-name>, ...) }`

Provide a mapping from the column names specified in the file to column names in the table.

- `METHOD INSERT`

Method to use for data loads.

- `SCAN_ROWS|SCANROWS|SCAN <1-5000>`

Identify the number of rows to scan for create table generation. Default is 100 rows.

- `TIMESTAMP|TIMESTAMP_FORMAT|TIMESTAMPFORMAT`

The format of all `TIMESTAMP` data type columns being loaded. Specify no `format_mask` or `DEFAULT` to use database default. For `TIMESTAMP` columns, if format is not set and `SCAN_ROWS` not equal to 0, the data is scanned for a valid mask.

- `TIMESTAMPTZ|TIMESTAMPTZ_FORMAT|TIMESTAMPTZFORMAT`

The format of all `TIMESTAMPTZ` data type columns being loaded. Specify no `format_mask` or `DEFAULT` to use database default. For `TIMESTAMPTZ` columns, if format is not set and `SCAN_ROWS` not equal to 0, the data is scanned for a valid mask.

- `TRUNCATE {OFF|ON}`

Truncate ON truncates the table before loading

- `UNKNOWN_COLUMNS_FAIL|UNKNOWNCOLUMNSFAIL|UNKNOWNFAIL {ON|OFF}`

ON: Terminates the load if any columns in the file do not map to a column in the table.

OFF: Allows the load to proceed when columns in the file do not map to a column in the table.

2.12.1.2 SET LOADFORMAT Command

SET LOADFORMAT enables you to set format properties for loading data when using the LOAD command.

Syntax

```
SET LOADFORMAT [ default|csv|delimited|html|insert|json|json-formatted|  
loader|t2|xml] [options...]
```

where

- **default**: Load format properties return to default values.
- **csv**: Comma-separated values.
- **delimited**: (csv synonym) Delimited format, comma separated values by default.
- **html**: Hypertext Markup Language. For the UNLOAD command only.
- **insert**: SQL insert statements. For the UNLOAD command only.
- **json**: JavaScript Object Notation. For the UNLOAD command only.
- **json-formatted**: Pretty-formatted JSON. For the UNLOAD command only.
- **loader**: Oracle SQL Loader format. For the UNLOAD command only.
- **t2**: T2 Metrics. For the UNLOAD command only.
- **xml**: Extensible Markup Language. For the UNLOAD command only.

options represent the following clauses:

- **COLUMN_NAMES|COLUMNNAMES|NAMES {ON|OFF}**: Header row with column names.
- **DELIMITER {separator}**: Delimiter separating fields in the record.
- **DOUBLE [OFF]**: (Import only) Embedded right enclosures are doubled. OFF indicates embedded right enclosures are not doubled and embedded right enclosures can lead to unexpected results.
- **ENCLOSURES {enclosures|OFF}**: Optional left and right enclosures.
 - OFF indicates no enclosures
 - If 1 character is specified, sets left and right enclosures to this value.
 - If 2 or more characters are specified, sets left to the first character, right to the second character and ignores the remaining characters.
 - To set multiple character enclosures, use Set ENCLOSURE_LEFT and ENCLOSURE_RIGHT.
- **ENCODING {encoding|OFF|""}**: Encoding of load file. OFF and "" reset to default encoding for environment.
- **LEFT|ENCLOSURE_LEFT|ENCLOSURELEFT {enclosure|OFF}**: Set a 1 or more character left enclosure. If no ENCLOSURE_RIGHT is specified, it is used for both left and right. OFF indicates no enclosures.

- `RIGHT|ENCLOSURE_RIGHT|ENCLOSURERIGHT {enclosure|OFF}`: Set a 1 or more character right enclosure. OFF indicates no right enclosure.
- `ROW_LIMIT|ROWLIMIT|LIMIT {number_of_rows|OFF|""}`: Maximum number of rows to read, including the header. OFF and "" set to not limit.
- `SKIP|SKIP_ROWS|SKIPROWS {number_of_rows|OFF|""}`: Number of rows to skip.
- `[[SKIP_AFTER_NAMES|SKIPAFTERNAMES|AFTER] | [SKIP_BEFORE_NAMES|SKIPBEFORENAMES|BEFORE]]`: Skip the rows before or after the (header) Column Names row.
- `TERM|ROW_TERMINATOR {terminator|""|DEFAULT|CR|CRLF|LF}`: Character(s) indicating end of row. If the file contains standard line end characters, the `line_end` does not need to be specified.
 - "" or DEFAULT specifies the default (any standard terminator) for the LOAD command.
 - "" or DEFAULT specifies the environment default for the UNLOAD command.
 - CRLF specifies WINDOWS terminator, generally for the UNLOAD command.
 - LF specifies UNIX terminator, generally for the UNLOAD command.
 - CR specifies MAC terminator, generally for the UNLOAD command.

Examples

```
SQL> set loadformat delimited
7369,"SMITH","CLERK",7902,17-DEC-80,800,,20,5555555555554444

SQL> set loadformat delimited enclosures <> line_end {eol}
7369,<SMITH>,<CLERK>,7902,17-DEC-80,800,,20,5555555555554444{eol}

SQL> set loadformat default (restore default settings)
7369,"SMITH","CLERK",7902,17-DEC-80,800,,20,5555555555554444
```

2.13 Calling Oracle Cloud Infrastructure REST APIs Using the OCI Command

Starting from SQLcl release 20.2, you can call Oracle Cloud Infrastructure (OCI) REST APIs using the `OCI` command.



See Also:

[Oracle Cloud Infrastructure API Documentation](#)

Prerequisites

To use the OCI command, you need to first set the OCI profile for authentication and access.

For more information about how to set up the required SSH keys and configure your Oracle Cloud Infrastructure Software Development Kits, see [Setup and Prerequisites](#) in the *Oracle Cloud Infrastructure Documentation*.

To list profiles contained in the OCI configuration file at `~/.oci/config`, enter:

```
oci profile
```

To set the profile name as "demo", enter:

```
oci profile demo
```

From SQLCl release 23.3, if you have a DEFAULT OCI profile installed, it is loaded when starting SQLCl.

Two Syntax Formats

There are two syntax formats available for using the OCI command.

Specify Target

In the first syntax format, the target is specified completely in the OCI command:

```
oci <host> <method> [file-to-send-as-body] <request-target>
```

where

method is GET, PUT or DELETE.

request-target is the path to the namespace, bucket or object on *host*.

Examples

To delete the emp.csv file from testing-bucket:

```
oci objectstorage.us-ashburn-1.oraclecloud.com delete /n/abc123/b/testing-bucket/o/emp.csv
```

To list the contents of testing-bucket:

```
oci objectstorage.us-ashburn-1.oraclecloud.com get /n/abc123/b/testing-bucket/o/
```

To put the emp.csv file into testing-bucket:

```
oci objectstorage.us-ashburn-1.oraclecloud.com put ./emp.csv /n/abc123/b/testing-bucket/o/emp.csv
```

To get the emp.csv file from testing-bucket:

```
oci objectstorage.us-ashburn-1.oraclecloud.com get /n/abc123/b/testing-bucket/o/emp.csv
```

Specify Target using Cloud Storage Command

In the second syntax format, the target is a complete or partial URL to the location, which is set using the Cloud Storage command (cs):

```
oci <method> [file-to-send-as-body] <qualifier>
```

where

method is GET, PUT or DELETE.

qualifier is the cloud storage namespace or bucket. *qualifier* is appended to the location specified on the set Cloud Storage command and must form the complete URL to the namespace, bucket, or object used by the *method*.

For more information about the Cloud Storage command, see [Using Cloud Storage](#).

Examples

To delete emp.csv from testing-bucket:

```
cs objectstorage.us-ashburn-1.oraclecloud.com
oci delete /n/abc123/b/testing-bucket/o/emp.csv
```

To list contents of testing-bucket:

--Using the OCI Command (oci get)

```
cs objectstorage.us-ashburn-1.oraclecloud.com/n/abc123/b/testing-bucket/o/
oci get
```

--Using the Cloud Storage Command (cs listo)

```
cs objectstorage.us-ashburn-1.oraclecloud.com/n/abc123/b/testing-bucket/o/
cs listo
```

To put emp.csv into testing-bucket:

```
cs objectstorage.us-ashburn-1.oraclecloud.com/n/abc123/b/testing-bucket
oci put ./emp.csv /o/emp.csv
```

To get emp.csv from testing-bucket:

```
cs objectstorage.us-ashburn-1.oraclecloud.com/n/abc123/b/testing-bucket
oci get /o/emp.csv
```

2.14 Running Tasks in the Background

The `BACKGROUND` command runs the SQLcl command as a background task.

Syntax

```
background|bg {OPTIONS} <commandspec>
```

where *<commandspec>* is the SQLcl command.

Options

Option	Description
-wait4 -w4 <i><wait4></i>	List of task names to wait for. See Wait4 Command
-taskname -tn <i><taskname></i>	Name of the task. To know the task details, use the Jobs Command .

Examples

```
SQL> background apex list
SQL> background -taskname task3 -wait4 task1,task2 apex list
```

2.14.1 Jobs Command

The `JOBS` command lists the details of jobs that are running in the background.

Syntax

```
jobs|jb {SUBCOMMAND} {OPTIONS}
```

where `SUBCOMMAND` can be any of the following:

- **Cancel:** Cancel a running job.
- **Logs:** Show job logs.
- **Delete:** Remove jobs from the list.

Options

Option	Description
-id -i <i><id></i>	The id of the task.
-taskname -tn <i><taskname></i>	Name of the task.

Examples

```
SQL> jobs -id 2
SQL> jobs logs -id 2
SQL> jobs cancel -id 2
```

2.14.1.1 Cancel Jobs

This command cancels a running job.

Syntax

```
jobs|jb cancel|c {OPTIONS}
```


Options

Option	Description
-id -i <id>	The id of the task.
-taskname -tn <taskname>	Name of the task.

Examples

```
SQL> jobs cancel -id 2
```

2.14.1.2 Log Jobs

This command shows the log files for jobs.

Syntax

```
jobs|jb logs|l {SUBCOMMAND} {OPTIONS}
```

where SUBCOMMAND is:

delete|d: Delete logfiles for completed jobs.

Options

Option	Description
-id -i <id>	The id of the task.
-taskname -tn <taskname>	Name of the task.

Examples

```
SQL> jobs logs -id 2
SQL> jobs logs delete
```

2.14.1.3 Delete Jobs

This command removes jobs from the list. This could be either a a specific job, or all jobs, or only if the job is finished.

Syntax

```
jobs|jb delete|d {OPTIONS}
```

Options

Option	Description
-id -i <id>	The id of the task.
-taskname -tn <taskname>	Name of the task.
-all -a	Remove all tasks from the list.
-finished -f	Only remove finished tasks from the list.

Examples

```
SQL> jobs delete -id 2
```

2.14.2 Wait4 Command

Wait for one or more tasks to finish before continuing the job.

Syntax

```
wait4|w4 {OPTIONS} {PARAMETERS}
```

Options

Option	Description
-delay -d <delay> (0)	Number of milliseconds to wait before continuing with processing.

Parameters

Option	Description
<tasknames>	List of task names to wait for.

Examples

```
SQL> wait4 task1,task3
```

3

Using Liquibase

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](#)
- [Using SQLcl Liquibase Functionality with Open-Source Liquibase](#)
- [Dynamic Object Transformation with SQLcl Liquibase and `DBMS_METADATA` Oracle Database Package](#)
- [Liquibase Open-Source Changesets with SQLcl Liquibase](#)
- [DATABASECHANGELOG_DETAILS VIEW](#)
- [ChangeSets in Liquibase](#)
- [Tips for Liquibase Settings](#)
- [Important 23.4 Update with Liquibase Changelog Files](#)
- [Known Issues](#)
- [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 with the Liquibase plug-in available.

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 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:

- the extension installed in your Liquibase environment. Add the following jar files from `sqlcl/lib` and `sqlcl/lib/ext` folders to the `liquibase/lib` folder:

- * `dbtools-liquibase.jar`
- * `dbtools-apex.jar`
- * `guava-with-lf.jar`
- * `xmlparserv2_sans_jaxp_services.jar`
- * `dbtools-common.jar`

- the privileges to create a table and a package.
- to update your properties file by adding the following line:

```
change-exec-listener-class:  
liquibase.changelog.visitor.OracleActionChangeListener
```

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
- 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
- ROLLBACK_SEGMENT
- SEQUENCE
- TABLE
- TABLESPACE
- TRIGGER XS_ACL
- TRUSTED_DB_LINK
- USER
- VIEW
- XMLSCHEMA
- XS_ACL_PARAM INDEX
- XS_DATA_SECURITY
- XS_ROLE
- XS_ROLESET
- XS_ROLE_GRANT
- XS_SECURITY_CLASS
- XS_USER

3.4 Supported Liquibase Commands in SQLcl

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

The SQLcl Liquibase commands that were initially launched in SQLcl release 19.2 has deprecated. In this release, the SQLcl plug-in has been updated to synchronize with the new command format introduced by Liquibase.

Syntax

```
Liquibase|lb COMMAND {OPTIONS}
```

To see the help for Liquibase in SQLcl, type :

```
help Liquibase
```

To only view the examples in help, type:

```
help liquibase examples
```

<OPTIONS>: The list of options for each Liquibase command is provided in the following sections.

Database Diff Commands

New Command	Description
diff	Writes description of differences between two databases to standard out.
diff-changeLog	Adds any differences between the databases specified to a changelog. Can append in any of the supported changelog formats.

Database Rollback Commands

New Command	Description
rollback	Rolls back the database to the state it was in when the tag was applied.
rollback-sql	A helper command that produces the raw SQL Liquibase would run when using the rollbackByTag command.
rollback-to-date	Rolls back the database to the state it was in at the given date/time.
rollback-to-date-sql	A helper command that allows you to inspect the SQL Liquibase will run while using the rollback-to-date command.
rollback-count	Rolls back the last <value> changesets.
rollback-count-sql	Writes SQL to roll back the last <value> changesets to STDOUT.
future-rollback-sql	Writes SQL to roll back the database to the current state after the changes in the changelog have been applied.
future-rollback-count-sql	Generates the SQL that Liquibase would use to sequentially revert the number of changes associated with undeployed changesets, which are added to a changelog file.
future-rollback-from-tag-sql	Produces the raw SQL Liquibase would need to roll back all undeployed changes made up to the specified tag.

Database Snapshot Commands

New Command	Description
data	Generate changelogs for the data.
generate-apex-object	Generate apex objects from a database
generate-controlfile	Generate an empty control file that you can use to start a new changelog.
generate-db-object	Generate database objects from a database
generate-ords-module , generate-ords-schema	Generate ords objects from a database
generate-schema	Generate all supported objects in a schema and controller file.
generate-changelog	Generate a changelog from a database when adding Liquibase to a new project. This is synonymous with snapshot with the exception of saving the output as XML in the changelog.
snapshot	Gathers the current database schema and displays that information to STDOUT. With options, can save the schema in JSON format, and that JSON snapshot can serve as a comparison database.
update-to-tag-sql	A helper command that inspects the SQL code Liquibase will run when using the update-to-tag <tag> command.

Database Update Commands

New Command	Description
update	Updates the database to the current version.
update-sql	A helper command that enables you to inspect the SQL code that Liquibase will run when using the update command.
update-count	Applies the next <value> changesets.
update-count-sql	Writes SQL to apply the next <value> changesets to STDOUT.
update-testing-rollback	Updates the database, then rolls back changes before updating again.
update-to-tag	Applies sequential changes to your database from the newest changeset to the changeset with the tag you specified and applied earlier.
update-to-tag-sql	A helper command that inspects the SQL code Liquibase will run when using the update-to-tag <tag> command.

Documentation Commands

New Command	Description
db-doc	Generates Javadoc-like documentation based on current database and changelog.

Maintenance Commands

New Command	Description
calculate-checksum	Calculates and prints a checksum for the changeset with the specified id in the following format: filepath::id::author.
changelog-sync	Marks all changes as executed in the database.
changelog-sync-sql	Writes SQL to mark all changes as executed in the database to STDOUT.
changelog-sync-to-tag	Marks all undeployed changesets from your changelog up to and including the specified tag as executed in your database.
changelog-sync-to-tag-sql	Produces the raw SQL that Liquibase would run when using the changelog-sync-to-tag command to mark all undeployed changesets associated with the specified tag as executed in your database.
clear-checksums	Removes current checksums from database. On next update changesets that have already been deployed will have their checksums recomputed, and changesets that have not been deployed will be deployed.
drop-all	Drops all database objects owned by the user.
list-locks	Lists who currently has locks on the database changelog.
mark-next-changeset-ran	Mark the next changeset as executed in the database.
mark-next-changeset-ran-sql	Inspects the SQL Liquibase will run while using the mark-next-changeset-ran command.
release-locks	Releases all locks on the database changelog.
tag	"Tags" the current database state for future rollback.
tag-exists	Checks whether the given tag already exists.
unexpected-changesets	Produces a list of changesets that were run in the database but do not exist in the current changelog.
validate	Checks the changelog for errors.

Status Commands

New Command	Description
history	Lists all deployed changesets and their deploymentIds.
status	Outputs the count (or list, if --verbose) of changesets that have not been deployed.

3.4.1 calculate-checksum

Calculates and prints a checksum for the changeset with the given ID in the format filepath::id::author..

Syntax

```
Liquibase|lb calculate-checksum|cac {OPTIONS}
```

The calculate-checksum command is typically used to compute an MD5 checksum, which serves as a unique identifier for the changeset. As a result, you can see whether the changeset has been changed and whether it has to be deployed differently. The MD5SUM

column in the `DATABASECHANGELOG` table contains a checksum of the changeset and any change made in the changeset will result in a different checksum.

Options

Option	Description	Default
Required		
<code>-changelog-file -chf</code>	The root changelog file.	-
<code>-changeset-identifier -chi</code>	Changeset ID identifier of form <code>filepath::id::author</code> .	-
Optional		
<code>-database-changelog-table-name -dactn</code>	Name of table to use for tracking change history.	-
<code>-debug -de</code>	Enable debug output.	-
<code>-default-schema-name -desn</code>	The default schema name to use for the database connection.	-
<code>-defaults-file -def</code>	Fully qualified path to the properties file you want to use. Example: <code>defaults-file/tmp/liquibase.properties</code>	-
<code>-liquibase-schema-name -lbsn</code>	Schema to use for Liquibase objects.	-
<code>-liquibase-tablespace-name -lbtn</code>	Tablespace to use for Liquibase objects.	-
<code>-log -lo</code>	Enable logging. Standard logging is <code>INFO</code> level (no debug flag). Debug logging is <code>FINEST</code> level (both log and debug flag).	-
<code>-search-path -sep</code>	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
<code>-secure-parsing -scp</code>	If true, remove functionality from file parsers, which can be used insecurely. An example is disabling remote XML entity support.	True
<code>-output-default-schema -ouds</code>	Controls whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False

Example

Calculate a checksum for changeset:

```
SQL> lb calculate-checksum --changelog-file countries_table.xml --
changeset-identifier
countries_table.xml::382e51cedfbfc7ba59568dd09dcd4e110b9fbeca:: (USER) -
Generated
SQL> liquibase calculate-checksum changelog.oracle.sql::myID_123::Steve
```

3.4.2 changelog-sync

Marks all changes as executed in the database.

Syntax

```
Liquibase|lb changelog-sync|chs {OPTIONS}
```

Uses include:

- Creating a new baseline database.
- Excluding objects from a database.
- Marking a change as executed. The change was created manually.

Options

Option	Description	Default
Required		
-changelog-file -chf	The root changelog file.	-
Optional		
-contexts -co	Context string to use for filtering which changes to operate on.	-
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-
-default-schema-name -desn	The default schema name to use for the database connection.	-
-defaults-file -def <defaults-file> {FILE}	Fully qualified path to the properties file you want to use. Example: -defaults-file/tmp/liquibase.properties	-
-labels -la	Label expression to use for filtering the changes to operate on.	-
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-tablespace-name -lbtn	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-search-path -sep	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-

Option	Description	Default
<code>-secure-parsing -scp</code>	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	True
<code>-output-default-schema -ouids</code>	Controls whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False

Example

Mark changes as executed in the database:

```
-- Set default output path
SQL> cd <output-files-path>
-- Connect to target and execute command
SQL> connect <db-connect-string>
SQL> lb changelog-sync -changelog-file countries_table.xml
```

3.4.3 changelog-sync-sql

Output the raw SQL used by Liquibase when running `changelogsync`.

Syntax

```
Liquibase|lb changelog-sync-sql|chss {OPTIONS}
```

Options

Option	Description	Default
Required		
<code>-changelog-file -chf</code>	The root changelog file.	-
Optional		
<code>-contexts -co</code>	Context string to use for filtering which changes to operate on.	-
<code>-database-changelog-table-name -dactn</code>	Name of table to use for tracking change history.	-
<code>-debug -de</code>	Enable debug output.	-
<code>-default-schema-name -desn</code>	The default schema name to use for the database connection.	-
<code>-defaults-file -def</code>	Fully qualified path to the properties file you want to use. Example: <code>-defaults-file/tmp/liquibase.properties</code>	-

Option	Description	Default
-labels -la	Label expression to use for filtering the changes to operate on.	-
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-tablespace-name -lbtn	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-output-default-schema -ouds	Control whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False
-output-file -ouf	The name of the file to write the output to.	-
-search-path -sep	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
-secure-parsing -scp	If true, remove functionality from file parsers, which can be used insecurely. An example is disabling remote XML entity support.	True

Example

Generate SQL to mark changes as executed in the database:

```
-- Set default output path
SQL> cd <output-files-path>
-- Connect to target and execute command
SQL> connect <db-connect-string>
SQL> lb changelog-sync-sql -changelog-file countries_table.xml -outputfile
countries_synch.sql
```

3.4.4 changelog-sync-to-tag

Marks all undeployed changesets as executed starting from the top of the changelog file and moving down up to and including the tag.

Syntax

```
Liquibase|lb changelog-sync-to-tag|chstt {OPTIONS}
```

Options

Option	Description	Default
Required		
-changelog-file -chf	The root changelog file.	-
-tag -ta <tag>	The tag to be used during the execution of command.	-
Optional		
-contexts -co	Context string to use for filtering which changes to operate on.	-
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-
-default-schema-name -desn	The default schema name to use for the database connection.	-
-defaults-file -def <defaults-file> {FILE}	Fully qualified path to the properties file you want to use. Example: -defaults-file/tmp/liquibase.properties	-
-labels -la	Label expression to use for filtering the changes to operate on.	-
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-tablespace-name -lbtn	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-search-path -sep	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
-secure-parsing -scp	If true, remove functionality from file parsers, which can be used insecurely. An example is disabling remote XML entity support.	True

Option	Description	Default
<code>-output-default-schema -ouods</code>	Controls whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False

Example

Mark changes as executed in the database up to and including tag.

```
cd <lb-changes-directory>
-- Edit changelog file and add tagDatabase entries for versions.
-- Execute command using a tag specified in tagDatabase in the changelog
file.
SQL> lb changelog-sync-to-tag -tag version1 -changelog-file controller.xml
```

3.4.5 changelog-sync-to-tag-sql

Output the raw SQL used by Liquibase when running `changelogSyncToTag`.

Syntax

```
Liquibase|lb changelog-sync-to-tag-sql|chstts {OPTIONS}
```

Options

Option	Description	Default
Required		
<code>-changelog-file -chf</code>	The root changelog file.	-
<code>-tag -ta <tag></code>	The tag to be used during the execution of the command.	-
Optional		
<code>-contexts -co</code>	Context string to use for filtering which changes to operate on.	-
<code>-database-changelog-table-name -dactn</code>	Name of table to use for tracking change history.	-
<code>-debug -de</code>	Enable debug output.	-
<code>-default-schema-name -desn</code>	The default schema name to use for the database connection.	-
<code>-defaults-file -def <defaults-file> {FILE}</code>	Fully qualified path to the properties file you want to use. Example: <code>-defaults-file/tmp/liquibase.properties</code>	-
<code>-labels -la</code>	Label expression to use for filtering the changes to operate on.	-

Option	Description	Default
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-tablespace-name -lbtn	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is <code>INFO</code> level (no debug flag). Debug logging is <code>FINEST</code> level (both log and debug flag).	-
-output-default-schema -ouds	Control whether names of objects in the default schema are fully qualified or not. If true they are qualified. If false, only objects outside the default schema are fully qualified.	False
-output-file -ouf	The name of the file to write the output to.	-
-search-path -sep	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
-secure-parsing -scp	If true, remove functionality from file parsers, which can be used insecurely. An example is disabling remote XML entity support.	True

Example

Mark changes as executed in database up to and including tag.

```
cd <lb-changes-directory>
-- Edit changelog file and add tagDatabase entries for versions.
-- Execute command using a tag specified in tagDatabase in the
changelog file.
SQL> lb changelog-sync-to-tag-sql -tag version1 -changelog-file
controller.xml -outputfile synch.sql
```

3.4.6 clear-checksums

Clears all checksums and nullifies the `MD5SUM` column of the `DATABASECHANGELOG` table so that they will be recomputed on the next database update.

Syntax

```
Liquibase|lb clear-checksums|clc {OPTIONS}
```


Options

Option	Description	Default
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-
-default-schema-name -desn <default-schema-name>	The default schema name to use for the database connection.	-
-defaults-file -def <defaults-file> {FILE}	Fully qualified path to the properties file you want to use. Example: -defaults-file/tmp/liquibase.properties	-
-liquibase-schema-name -lbsn <liquibase-schema-name>	Schema to use for Liquibase objects.	-
-liquibase-tablespace-name -lbtn <liquibase-tablespace-name>	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-secure-parsing -scp	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	True
-output-default-schema -ouds	Control whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False

Example

Clear checksums:

```
-- Connect to target and execute command.
SQL> connect <db-connect-string>
SQL> clear-checksums
```

3.4.7 data

Generate changelogs for the data. Creates a changelog for data from all objects or as filters are specified.

Syntax

```
Liquibase|lb data|da {OPTIONS}
```

Options

Option	Description	Default
-data-output-directory -daod <data-output-directory>	Directory to write data to, only applicable when <DIFF_TYPE> includes data.	-
-database-changelog-table-name -dactn <database-changelog-table-name>	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-
-default-schema-name -desn <default-schema-name>	The default schema name to use for the database connection.	-
-defaults-file -def <defaults-file> {FILE}	Fully qualified path to the properties file you want to use. Example: -defaults-file/tmp/liquibase.properties	-
-exclude-objects -exo <exclude-objects>	Objects to exclude from diff.	-
-include-objects -ino <include-objects>	Objects to include in diff.	-
-include-schema -ins <include-schema>	If true, the schema is included in generated changesets.	False
-include-tablespace -int <include-tablespace>	Include the tablespace attribute in the changelog.	False
-liquibase-schema-name -lbsn <liquibase-schema-name>	Schema to use for Liquibase objects.	-
-liquibase-tablespace-name -lbtn <liquibase-tablespace-name>	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-output-default-schema -ouds	Controls whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False
-output-file -ouf <output-file>	The name of the file to write the output to.	-
-overwrite-files -ovf	Overwrite any existing files in directory. This will not affect other files.	-
-schemas -sc <schemas>	Schemas to include operation.	-

Option	Description	Default
<code>-search-path -sep <search-path></code>	Complete list of locations to search for files such as changelog files. Multiple paths can be specified by separating them with commas.	-
<code>-secure-parsing -scp <secure-parsing></code>	Keep functionality from file parsers which could be used insecurely. Examples include (but not limited to) disabling remote XML entity support.	True

3.4.8 db-doc

Generates JavaDoc documentation for the existing database and changelogs.

Syntax

```
Liquibase|lb db-doc|dbd {OPTIONS}
```

Options

Option	Description	Default
Required		
<code>-changelog-file -chf <changelog-file></code>	The root changelog file.	-
<code>-output-directory -oud <output-directory></code>	The directory where the documentation is generated.	-
Optional		
<code>-database-changelog-table-name -dactn <database-changelog-table-name></code>	Name of table to use for tracking change history.	-
<code>-debug -de</code>	Enable debug output.	-
<code>-default-schema-name -desn <default-schema-name></code>	The default schema name to use for the database connection.	-
<code>-defaults-file -def <defaults-file> {FILE}</code>	Fully qualified path to the properties file you want to use. Example: <code>-defaults-file/tmp/liquibase.properties</code>	-
<code>-liquibase-schema-name -lbsn <liquibase-schema-name></code>	Schema to use for Liquibase objects.	-
<code>-liquibase-namespace -lbtn <liquibase-namespace-name></code>	Namespace to use for Liquibase objects.	-

Option	Description	Default
-log -lo	Enable logging. Standard logging is <code>INFO</code> level (no debug flag). Debug logging is <code>FINEST</code> level (both log and debug flag).	-
-search-path -sep <search-path>	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
-secure-parsing -scp <secure-parsing>	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	True
-output-default-schema - ouids <output-default- schema>	Controls whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False

Example

Generate db documentation:

```
-- Set default output path
SQL> cd <output-files-path>
-- Generate doc
SQL> lb db-doc -output-directory ./dbdoc -changelog-file controller.xml
```

3.4.9 diff

Compare two databases.

Syntax

```
Liquibase|lb diff|di {OPTIONS}
```

Options

Option	Description	Default
Required		
-reference-password - rep	The reference database password.	-
-reference-url -reur	The JDBC reference database connection URL.	-
-reference-username - reu	The reference database username.	-
Optional		

Option	Description	Default
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-
-default-schema- -desn	The default schema name to use for the database connection.	-
-defaults-file -def	Fully qualified path to the properties file you want to use. Example: -defaults-file/tmp/liquibase.properties	-
-diff-types -dit	Types of objects to compare.	catalogs, tables, views, columns, indexes, foreignkeys, primarykeys, uniqueconstraints, data, storedprocedures, sequences{catalogs tables views columns indexes foreignkeys primarykeys uniqueconstraints data storedprocedures sequences}
-exclude-objects -exo <exclude-objects>	Objects to exclude from diff.	-
-include-objects -ino <include-objects>	Objects to include in diff.	-
-include-schema -ins <include-schema>	If true, the schema will be included in generated changesets.	False
-include-tablespace -int <include-tablespace>	Include the tablespace attribute in the changelog.	False
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-tablespace-name -lbtn	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-overwrite-files -ovf	Overwrite any existing files in directory. This will not affect other files.	-
-search-path -sep <search-path>	Complete list of locations to search for files such as changelog files. Specify multiple paths by separating them with commas.	-

Option	Description	Default
<code>-secure-parsing -scp</code>	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	True
<code>-output-default-schema -ouds</code>	Controls whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False
<code>-output-file -ouf</code>	The name of the file to write the output to.	-
<code>-reference-default-schema-name -redsn</code>	The reference default schema name to use for the database connection.	-
<code>-schemas -sc</code>	Schemas to include operation.	-

Examples

Compare two databases and spool output.

```
-- Set default output path
SQL> cd <output-files-path>
SQL> spool diff.sql
-- Connect to target database
SQL> connect <db-connect-string>
-- Compare to a reference database
SQL> lb diff -reference-url <reference-db-url> -reference-username
<reference-db-user> -reference-password <reference-db-password>
SQL> spool off
```

Compare tables, indexes and views between two databases.

```
-- Set default output path
SQL> cd <output-files-path>
SQL> spool diff.sql
-- Connect to comparison database
SQL> connect <db-connect-string>
-- Compare to a reference database
SQL> lb diff -diff-types tables,indexes,views -reference-url <db-url>
-reference-username <db-user> -reference-password <db-password>
```

3.4.10 diff-changeLog

Compare two databases to produce changesets and write them to a changelog file.

Syntax

```
Liquibase|lb diff-changelog|dic {OPTIONS}
```

Options

Option	Description	Default
Required		
-reference-password -rep	The reference database password.	-
-reference-url -reur	The JDBC reference database connection URL.	-
-reference-username -reu	The reference database username.	-
Optional		
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-
-default-schema-name -desn	The default schema name to use for the database connection.	-
-defaults-file -def	Fully qualified path to the properties file you want to use. Example: -defaults-file/tmp/liquibase.properties	-
-diff-types -dit	Types of objects to compare	catalogs, tables, views, columns, indexes, foreignkeys, primarykeys, uniqueconstraints, data, storedprocedures, sequences{catalogs tables views columns indexes foreignkeys primarykeys uniqueconstraints data storedprocedures sequences}
-exclude-objects -exo	Objects to exclude from diff	-
-include-objects -ino	Objects to include in diff	-
-include-schema -ins	If true, the schema is included in generated changesets.	False
-include-tablespace -int	Include the tablespace attribute in the changelog	False
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-tablespace-name -lbtn	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-

Option	Description	Default
<code>-overwrite-files -ovf</code>	Overwrite any existing files in the directory. This will not affect other files.	-
<code>-schemas -sc</code>	Schemas to include in diff	-
<code>-search-path -sep</code>	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
<code>-secure-parsing -scp</code>	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	True
<code>-output-default-schema - ouids</code>	Controls whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False
<code>-output-file -ouf</code>	The name of the file to write the output to.	-

Examples

Create changelog to synchronize two databases.

```
-- Set default output path
SQL> cd <output-files-path>
-- Connect to target database
SQL> connect <db-connect-string>
-- Compare to a reference database and create a changelog to
synchronize them
SQL> lb diff-changelog -changelog-file diff.xml -reference-url <db-
url> -reference-username <db-user> -reference-password <db-password>
```

Create changelog to synchronize table excluding employees between two databases.

```
-- Set default output path
SQL> cd <output-files-path>
-- Connect to comparison database
SQL> connect <db-connect-string>
-- Compare tables to a reference database
SQL> lb diff-changelog -changelog-file diff.xml -diffTypes=tables -
exclude-objects employees -reference-url <db-url>
-reference-username <db-user> -reference-password <db-password>
```

3.4.11 drop-all

Drops all database objects owned by the user.

Syntax

```
Liquibase|lb drop-all|dra {OPTIONS}
```

Options

Option	Description	Default
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-
-default-schema-name -desn	The default schema name to use for the database connection.	-
-defaults-file -def	Fully qualified path to the properties file you want to use. Example: -defaults-file/tmp/liquibase.properties	-
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-tablespace-name -lbtn	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-output-default-schema -ouds	Control whether names of objects in the default schema are fully qualified or not. If true they are qualified. If false, only objects outside the default schema are fully qualified.	False
-search-path -sep	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
-secure-parsing -scp	If true, remove functionality from file parsers, which can be used insecurely. An example is disabling remote XML entity support.	True
-schemas -sc	Schemas to include operation.	-

Example

To drop all database objects owned by the user, enter:

```
SQL> lb drop-all
```

3.4.12 future-rollback-count-sql

Generates SQL that is used to sequentially revert the specified number of undeployed changes.

Syntax

```
Liquibase|lb future-rollback-count-sql|furcs {OPTIONS}
```

Options

Option	Description	Default
Required		
-changelog-file -chf	The root changelog file.	-
-count -cu	The number of changes to roll back.	-
Optional		
-contexts -co	Context string to use for filtering which changes to operate on.	-
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	False
-default-schema-name -desn	The default schema name to use for the database connection.	-
-defaults-file -def	Fully qualified path to the properties file you want to use. Example: - defaults-file/tmp/liquibase.properties	-
-labels -la	Label expression to use for filtering the changes to operate on.	-
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-namespace-name -lbtn	Namespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-output-default-schema -ouds	Control whether names of objects in the default schema are fully qualified or not. If true, they are qualified. If false, only objects outside the default schema are fully qualified.	False
-output-file -ouf	The name of the file to write the output to.	-
-search-path -sep	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-

Option	Description	Default
<code>-overwrite-files -ovf</code>	Overwrite any existing files in the directory. This will not affect other files.	-
<code>-secure-parsing -scp</code>	If true, remove functionality from file parsers, which can be used insecurely. An example is disabling remote XML entity support.	True

Example

Generate SQL to roll back the specified number of undeployed changes.

```
-- Set default output path
SQL> cd <output-files-path>
-- Connect to target
SQL> connect <db-connect-string>
-- Generate SQL to roll back 1 undeployed change
SQL> lb future-rollback-count-sql -count 1 -changelog-file controller.xml
```

3.4.13 future-rollback-from-tag-sql

Generates SQL to revert future undeployed changes up to the specified tag.

Syntax

```
Liquibase|lb future-rollback-from-tag-sql|furfts {OPTIONS}
```

Options

Option	Description	Default
Required		
<code>-changelog-file -chf</code>	The root changelog file.	-
<code>-tag -ta</code>	Generic 'tag to apply action to'.	-
Optional		
<code>-contexts -co</code>	Context string to use for filtering which changes to operate on.	-
<code>-database-changelog-table-name -dactn</code>	Name of table to use for tracking change history.	-
<code>-debug -de</code>	Enable debug output.	-
<code>-default-schema-name -desn</code>	The default schema name to use for the database connection.	-
<code>-defaults-file -def</code>	Fully qualified path to the properties file you want to use. Example: <code>-defaults-file/tmp/liquibase.properties</code>	-
<code>-labels -la</code>	Label expression to use for filtering the changes to operate on.	-
<code>-liquibase-schema-name -lbsn</code>	Schema to use for Liquibase objects.	-

Option	Description	Default
-liquibase-tablespace-name -lbtn	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is <code>INFO</code> level (no debug flag). Debug logging is <code>FINEST</code> level (both log and debug flag).	-
-output-default-schema -ouids	Control whether names of objects in the default schema are fully qualified or not. If true, they are qualified. If false, only objects outside the default schema are fully qualified.	False
-output-file -ouf	The name of the file to write the output to.	-
-overwrite-files -ovf	Overwrite any existing files in the directory. This will not affect other files.	-
-search-path -sep	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
-secure-parsing -scp	If true, remove functionality from file parsers, which can be used insecurely. An example is disabling remote XML entity support.	True

Example

Generate SQL to roll back undeployed changes to tag.

```
-- Set default output path
SQL> cd <output-files-path>
-- Connect to target
SQL> connect <db-connect-string>
-- Generate SQL to roll back 1 undeployed change
SQL> lb future-rollback-count-sql -count 1 -changelog-file
controller.xml
-- Edit changelog file and add tagDatabase entries for versions
-- Generate SQL to roll undeployed changes back to version1
SQL> lb future-rollback-from-tag-sql -tag version1 -changelog-file
controller.xml
```

3.4.14 future-rollback-sql

Generate the raw SQL needed to roll back future undeployed changes.

Syntax

```
Liquibase|lb future-rollback-sql|furs {OPTIONS}
```

Options

Option	Description	Default
Required		
<code>-changelog-file -chf</code>	The root changelog file.	-
Optional		
<code>-contexts -co</code>	Context string to use for filtering which changes to operate on.	-
<code>-database-changelog-table-name -dactn</code>	Name of table to use for tracking change history.	-
<code>-debug -de</code>	Enable debug output.	-
<code>-default-schema-name -desn</code>	The default schema name to use for the database connection.	-
<code>-defaults-file -def</code>	Fully qualified path to the properties file you want to use. Example: <code>-defaults-file/tmp/liquibase.properties</code>	-
<code>-labels -la</code>	Label expression to use for filtering the changes to operate on.	-
<code>-liquibase-schema-name -lbsn</code>	Schema to use for Liquibase objects.	-
<code>-liquibase-tablespace-name -lbtn</code>	Tablespace to use for Liquibase objects.	-
<code>-log -lo</code>	Enable logging. Standard logging is <code>INFO</code> level (no debug flag). Debug logging is <code>FINEST</code> level (both log and debug flag).	-
<code>-output-default-schema -ouds</code>	Control whether names of objects in the default schema are fully qualified or not. If true, they are qualified. If false, only objects outside the default schema are fully qualified.	False
<code>-output-file -ouf</code>	The name of the file to write the output to.	-
<code>-overwrite-files -ovf</code>	Overwrite any existing files in the directory. This will not affect other files.	-
<code>-search-path -sep</code>	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
<code>-secure-parsing -scp</code>	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	True

Example

Generate SQL to roll back undeployed changes.

```
-- Set default output path
SQL> cd <output-files-path>
```

```

-- Connect to target
SQL> connect <db-connect-string>
-- Generate SQL to roll back 1 undeployed change
SQL> lb future-rollback-count-sql -count 1 -changelog-file
controller.xml
-- Generate SQL to rollback all undeployed changes
SQL> lb future-rollback-sql -changelog-file controller.xml

```

3.4.15 generate-apex-object

Generates the changeset for an APEX object.

Syntax

```
Liquibase|lb generate-apex-object|geao {OPTIONS}
```

Options

Option	Description	Default
-applicationid -api	ID for application to be exported.	-
-changesby -chb	Expects string parameter. Limit -list values to changes by the given user.	-
-changessince -chs	Expects date parameter (YYYY-MM-DD). Limit -list values to changes since the given date.	-
-contexts -co	Context string to use for filtering which changes to operate on.	-
-debug -de	{true false} Enable debug output.	-
-deploymentsystem -desy	Deployment system for exported feedback.	-
-dir -di	Save all files in the given directory. Example: -dir some/sub/directory	-
-exporiginalids -dxoi	Export will not emit ids as they were when the application was imported.	-
-runalways -ra	{true false} Set runAlways attribute to true in changelog.	False
-expaclassignments -exacl	Export ACL user role assignments.	-
-expcomments -exco	Export developer comments.	-
-expcomponents -exc	-	-
-expfeedback -exfe	Export team development feedback for all workspaces or identified by -workspaceid.	-

Option	Description	Default
-expfeedbacksince -exfs	Export team development feedback since date in the format YYYYMMDD.	-
-expfiles -exfi	Export all workspace files identified by -workspaceid.	-
-expirnotif -exir	Export all interactive report notifications.	-
-expminimal -exmi	Only export workspace definition, users, and groups.	-
-expnosubscriptions -exns	Do not export references to subscribed components.	-
-exppublicreports -exre	Export all user saved public interactive reports.	-
-expsavedreports -exsr	Export all user saved interactive reports.	-
-expsupportingobjects -exso	Pass (Y)es, (N)o or (I)nstall to override the default.	-
-expteamdevdata -exte	Export team development data for all workspaces or identified by -workspaceid.	-
-exptranslations -extr	Export the translation mappings and all text from the translation repository	-

Option	Description	Default
-exptype -exty	Comma delimited list of export types to perform: <ul style="list-style-type: none"> • APPLICATION_SOURCE: export an APEX application using other parameters passed. • EMBEDDED_CODE: Export code such as SQL, PL/SQL and Javascript. APEX ignores all other options when EMBEDDED_CODE is selected. • CHECKSUM-SH1: Export a SHA1 checksum that is independent of IDs and can be compared across instances and workspaces. • CHECKSUM-SH256: Export an SHA-256 checksum that is independent of IDs and can be compared across instances and workspaces. • READABLE_JSON: Export a readable version of the application metadata in JSON format. • READABLE_YAML: Export a readable version of the application metadata in YAML format. 	
-expworkspace -exwo	Export workspace identified by -workspaceid or all workspaces if -workspaceid not specified.	
-fail-on-error -foe	{true false}	False
-instance -in	Export all applications.	-
-skipexportdate -ked	Include export date in application export files.	-
-labels -la	Label expression to use for filtering which changes to operate on.	-
-list -li	Lists applications installed in the database.	-

Option	Description	Default
-log -lo	{true false} Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-nochecksum -noch	Overwrite existing files even if the contents have not changed.	-
-overwrite-files -ovf	Overwrite any existing files in the directory. This will not affect other files.	=
-split -sp	{true false} This makes the export split the files into directories based on the object types.	False
-workspaceid -woi	Workspace ID to export all applications to or the workspace to be exported.	-

Example

Generate APEX object:

```
-- Set default output path
SQL> cd <output-files-path>
-- Generate XML files
SQL> lb generate-apex-object
```

3.4.16 generate-changelog

Writes changelog XML to copy the current state of the database to standard output or a file (uses core Liquibase functionality).

Syntax

```
Liquibase|lb generate-changelog|gec {OPTIONS}
```

Options

Option	Description	Default
-data-output-directory -daod	Directory to write data to.	-
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-
-default-schema-name -desn	The default schema name to use for the database connection.	-

Option	Description	Default
<code>-diff-types -dit</code>	Types of objects to compare	catalogs, tables, views, columns, indexes, foreignkeys, primarykeys, uniqueconstraints, data, storedprocedures, sequences{catalogs tables views columns indexes foreignkeys primarykeys uniqueconstraints data storedprocedures sequences}
<code>-exclude-objects -exo</code>	Objects to exclude from diff	-
<code>-include-objects -ino</code>	Objects to include in diff	-
<code>-include-schema -ins</code>	If true, the schema is included in generated changeSets.	False
<code>-include-tablespace -int</code>	Include the tablespace attribute in the changelog	False
<code>-liquibase-schema-name -lbn</code>	Schema to use for Liquibase objects.	-
<code>-liquibase-tablespace-name -lbtn</code>	Tablespace to use for Liquibase objects.	-
<code>-log -lo</code>	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
<code>-output-default-schema -ouds</code>	Control whether names of objects in the default schema are fully qualified or not. If true they are qualified. If false, only objects outside the default schema are fully qualified.	False
<code>-output-file -ouf</code> <code><output-file></code>	The name of the file to write the output to.	-
<code>-overwrite-files -ovf</code>	Overwrite any existing files in the directory. This will not affect other files.	-
<code>-defaults-file -def</code>	Fully qualified path to the properties file you want to use. Example: <code>-defaults-file/tmp/liquibase.properties</code>	-
<code>-schemas -sc</code>	Schemas to include in diff	-
<code>-search-path -sep</code>	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
<code>-secure-parsing cp</code>	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	True

Examples

Generate XML files for a database.

```
-- Set default output path
SQL> cd <output-files-path>
-- Generate xml files
SQL> lb generate-changelog
```

Generate XML files for specific schemas in a database.

```
SQL> lb generate-changelog -schemas hr,sales
```

3.4.17 generate-controlfile

Generates an empty control file that you can use to start a new changelog.

Syntax

```
Liquibase|lb generate-controlfile {OPTIONS}
```

Options

Option	Description	Default
Required		
-changelog-file -chf	The root changelog file.	-
Optional		
-debug -de	Enable debug output.	-
-log -lo	Enable logging.	-
	Standard logging is INFO level (no debug flag).	
	Debug logging is FINEST level (both log and debug flag).	

Example

Generate control file:

```
--Set default output path
SQL> cd <output-files-path>
SQL> lb generate-controlfile
```

3.4.18 generate-db-object

Writes change log XML to copy the current state of the database object to a file.

Syntax

```
lb generate-db-object|geo {OPTIONS}
```

Options

Option	Description	Default
-database-changelog-table-name -dactn <database-changelog-table-name>	Name of table to use for tracking change history.	-
-debug -de	Enable debug output	-
-default-schema-name -desn <default-schema-name>	The default schema name to use for the database connection.	-
-defaults-file -def	Fully qualified path to the properties file you want to use. Example: -defaults-file/tmp/liquibase.properties	-
-fail-on-error -foe	Set failOnError attribute to true in changelog.	False
-liquibase-schema-name -lbsn <liquibase-schema-name>	Schema to use for Liquibase objects.	-
-liquibase-tablespace-name -lbtn <liquibase-tablespace-name>	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging	-
-object-name -obn	Name of the object.	-
-object-type -obt	Type of object.	-
-output-default-schema -ouds <output-default-schema>	Control whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False
-search-path -sep	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
-secure-parsing -scp	If true, remove functionality from file parsers, which can be used insecurely. An example is disabling remote XML entity support.	True
-sql -sq	Generate a sql file along with the changelog showing the DDL for the object. This sql is not intended to be used for anything other than review.	-
-replace -re	Set replaceIfExists attribute to true in changelog.	-
-runalways -ra	Set runAlways attribute to false in changelog	-

Option	Description	Default
<code>-runonchange -rc</code>	Set <code>runOnChange</code> attribute to <code>true</code> in changelog.	-

Example

Generate the XML file for a specific object.

```
-- Set default output path
SQL> cd <output-files-path>
-- Generate xml files
SQL> lb generate-object -object-type table -object-name employees
```

3.4.19 generate-ords-module

Generates the code necessary to reproduce a module and all children using the ORDS APIs.

Syntax

```
Liquibase|lb generate-ords-module|geom {OPTIONS}
```

Options

Option	Description	Default
Required		
<code>-module-name -mon</code>	The module name for which to generate code.	-
Optional		
<code>-debug -de</code>	Enable debug output.	-
<code>-exclude-enable-schema -exes</code>	Dictates whether the <code>enable_schema</code> call will be included in the export.	-
<code>-exclude-privs -exp</code>	Dictates whether privileges will be included in the export.	-
<code>-log -lo</code>	Enable logging. Standard logging is <code>INFO</code> level (no debug flag). Debug logging is <code>FINEST</code> level (both log and debug flag).	-
<code>-overwrite-files -ovf</code>	Overwrite any existing files in the directory. This will not affect other files.	-

Example

Generate ORDS module object:

```
-- Set default output path
SQL> cd <output-files-path>
```

```
-- Generate XML files
SQL> lb generate-ords-module
```

3.4.20 generate-ords-schema

Generates the code necessary to reproduce all modules and children using the ORDS APIs.

Syntax

```
Liquibase|lb generate-ords-schema|geos {OPTIONS}
```

Options

Option	Description	Default
-debug -de	Enable debug output.	-
-exclude-enable-schema -exes	Dictates whether the <code>enable_schema</code> call is included in the export.	-
-exclude-privs -exp	Dictates whether privileges will be included in the export.	-
-log -lo	Enable logging. Standard logging is <code>INFO</code> level (no debug flag). Debug logging is <code>FINEST</code> level (both log and debug flag).	-
-overwrite-files -ovf	Overwrite any existing files in the directory. This will not affect other files.	-

3.4.21 generate-schema

Writes changelog XML to copy the current state of the database to files.

Syntax

```
Liquibase|lb generate-schema|ges {OPTIONS}
```

This command uses custom extension functionality. XML files are generated defining the DDL for each object in the database. A controller XML file is created or updated identifying the individual XML files generated. The files are used to deploy using `UPDATE` commands.

Options

Option	Description	Default
-contexts -co	Context string to use for filtering which changes to operate on.	-

Option	Description	Default
-database-changelog-table-name -dactn	Name of table to use for tracking change history	DATABASECHANGELOG
-debug -de	Enable debug output.	-
-fail-on-error -foe	{true false} Set failOnError attribute to true in changelog.	False
-filter -fi	The filter value is the right-hand side of a SQL comparison, that is, a SQL comparison operator (=,!=, and so on) and the value compared against. The value must contain parentheses and quotation marks where appropriate. For example: "IN ('DEPT','EMP')". The filter value is combined with the object attribute corresponding to the object name to produce a WHERE condition in the query that fetches the objects. In the preceding example, objects named DEPT and EMP are retrieved. By default, all named objects of object_type are selected.	-
-grants -gr	Export Object, System and Role grants.	-
-labels -la	Label expression to use for filtering which changes to operate on.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-overwrite-files -ovf	Overwrite any existing files in the directory. This will not affect other files.	-
-perform-detail-parse -pdp	Setting this flag will cause all functions, procedures and packages to undergo a complete parse to determine dependencies. This additional processing will cause the generation to take more time. This flag should only be used when there is a sorting issue in functions, procedures or packages.	-
-replace -re	Set replaceIfExists attribute to true in changelog.	-

Option	Description	Default
-runalways -ra	Set runAlways attribute to false in changelog.	-
-runonchange -rc	Set runOnChange attribute to true in changelog.	-
-split -sp	This makes the export split the files into directories based on the object types.	-
-sql -sq	Generate a SQL file along with the changelog showing the DDL for the object. This SQL is not intended for anything other than review.	-
-synonyms -sy	Export public synonymns.	-

Examples

Generate XML files into separate directories.

```
-- Set default output path
SQL> cd <output-files-path>
-- Generate xml files
SQL> lb generate-schema -split
```

Generate XML files using a filter to include specific object types.

```
SQL> lb generate-schema -filter "IN ('DEPARTMENTS','EMPLOYEES')"
```

3.4.22 history

List all deployed changesets and their deployment ID.

Syntax

```
Liquibase|lb history|hi {OPTIONS}
```

Options

Option	Description	Default
Required		
-changelog-file -chf	The root changelog file.	-
Optional		
-contexts -co <contexts>	Context string to use for filtering the changes to operate on.	-
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-

Option	Description	Default
-default-schema-name -desn	The default schema name to use for the database connection.	-
-defaults-file -def	Fully qualified path to the properties file you want to use. Example: - defaults-file/tmp/liquibase.properties	-
-labels -la <labels>	Label expression to use for filtering the changes to operate on.	-
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-tablespace-name -lbtn	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-search-path sep	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
-secure-parsing -scp	If true, remove functionality from file parsers, which can be used insecurely. An example is disabling remote XML entity support.	True
-output-default-schema -ouds	Controls whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False

Example

Show the deployment history.

```
-- Connect to target
SQL> connect <db-connect-string>
SQL> lb history
```

3.4.23 list-locks

List the hostname, IP address, and timestamp of the Liquibase lock record.

Syntax

```
Liquibase|lb list-locks|lil {OPTIONS}
```

The DATABASECHANGELOGLOCK table is read to show lock details based on the connection.

Options

Option	Description	Default
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-
-default-schema-name -desn	The default schema name to use for the database connection.	-
-defaults-file -def	Fully qualified path to the properties file you want to use. Example: – defaults-file/tmp/liquibase.properties	-
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-namespace -lbns	Namespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-search-path -sep <search-path>	Complete list of locations to search for files such as changelog files. Specify multiple paths by separating them with commas.	-
-secure-parsing -scp	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	True
-output-default-schema -ouds	Controls whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False

3.4.24 mark-next-changeset-ran

Marks the next change you apply as executed in your database.

Syntax

```
Liquibase|lb mark-next-changeset-ran|man cr {OPTIONS}
```

The `mark-next-changeset-ran` command is used when deploy errors occur due to Liquibase not being synchronized with changes made outside of Liquibase.

Options

Option	Description	Default
Required		

Option	Description	Default
-changelog-file -chf	The root changelog file.	-
Optional		
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-
-default-schema-name -desn	The default schema name to use for the database connection.	-
-defaults-file -def	Fully qualified path to the properties file you want to use. Example: - defaults-file/tmp/liquibase.properties	-
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-tablespace-name -lbtn	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-search-path -sep	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
-secure-parsing -scp	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	True
-output-default-schema -ouds	Controls whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False

3.4.25 mark-next-changeset-ran-sql

Writes the SQL used to mark the next change you apply as executed in your database.

Syntax

```
Liquibase|lb mark-next-changeset-ran-sql|mancrs {OPTIONS}
```

Options

Option	Description	Default
Required		
-changelog-file -chf	The root changelog file.	-
Optional		

Option	Description	Default
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-
-default-schema-name -desn	The default schema name to use for the database connection.	-
-defaults-file -def	Fully qualified path to the properties file you want to use. Example: -defaults-file/tmp/liquibase.properties	-
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-tablespace-name -lbtn	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is <code>INFO</code> level (no debug flag). Debug logging is <code>FINEST</code> level (both log and debug flag).	-
-output-default-schema -ouds	Control whether names of objects in the default schema are fully qualified or not. If true, they are qualified. If false, only objects outside the default schema are fully qualified.	False
-overwrite-files -ovf	Overwrite any existing files in the directory. This will not affect other files.	-
-search-path -sep	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
-secure-parsing -scp	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	-
-output-file -ouf	The name of the file to write the output to.	-

3.4.26 release-locks

Remove the Liquibase lock record from the `DATABASECHANGELOG` table.

Syntax

```
Liquibase|lb release-locks|rel {OPTIONS}
```

Options

Option	Description	Default
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-

Option	Description	Default
-debug -de	Enable debug output.	-
-default-schema-name -desn	The default schema name to use for the database connection.	-
-defaults-file -def	Fully qualified path to the properties file you want to use. Example: - defaults-file/tmp/liquibase.properties	-
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-namespace -lbns	Namespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-search-path -sep <search-path>	Complete list of locations to search for files such as changelog files. Specify multiple paths by separating them with commas.	-
-secure-parsing -scp	If true, remove functionality from file parsers, which can be used insecurely. An example is disabling remote XML entity support.	True
-output-default-schema -ouds	Controls whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False

3.4.27 rollback

Roll back changes made to the database based on the specified tag.

Syntax

```
Liquibase|lb rollback|rb {OPTIONS}
```

The rollback command is used to revert all changes that were made to the database after a defined tag. All deployed changes are rolled back until the tag row in the DATABASECHANGELOG table.

Options

Option	Description	Default
Required		
-changelog-file -chf	The root changelog file.	-
-tag -ta	The tag to use during the execution of the command.	-

Option	Description	Default
Optional		
-contexts -co	Context string to use for filtering which changes to operate on.	-
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-
-default-schema-name -desn	The default schema name to use for the database connection.	-
-defaults-file -def	Fully qualified path to the properties file you want to use. Example: -defaults-file/tmp/liquibase.properties	-
-labels -la	Label expression to use for filtering the changes to operate on.	-
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-tablespace-name -lbtn	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-rollback-script -ros	Rollback script to execute.	-
-search-path -sep	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
-secure-parsing -scp	If true, remove functionality from file parsers, which can be used insecurely. An example is disabling remote XML entity support.	True
-output-default-schema -ouds	Controls whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False

Example

Roll back changes to tag.

```
-- Set default output path
SQL> cd <output-files-path>
-- Connect to target
SQL> connect <db-connect-string>
-- Apply update for versions adding new tag for each version
SQL> lb update -changelog-file controller.xml
SQL> lb tag -tag version1
SQL> lb update -changelog-file controller.xml
SQL> lb tag -tag version2
```

```
-- Roll back to version1
SQL> lb rollback-sql -tag version1 -changelog-file controller.xml
```

3.4.28 rollback-count

Roll back the specified number of changes made to the database.

Syntax

```
Liquibase|lb rollback-count|rbc {OPTIONS}
```

The `rollback-count` command is used to revert the specified number of changes to the database starting from the most recent changes.

Options

Option	Description	Default
Required		
<code>-changelog-file -chf</code>	The root changelog file.	-
<code>-count -cu</code>	The number of changes to apply.	-
Optional		
<code>-contexts -co</code>	Context string to use for filtering which changes to operate on.	-
<code>-database-changelog-table-name -dactn</code>	Name of table to use for tracking change history.	-
<code>-debug -de</code>	Enable debug output.	-
<code>-default-schema-name -desn</code>	The default schema name to use for the database connection.	-
<code>-defaults-file -def</code>	Fully qualified path to the properties file you want to use. Example: <code>-defaults-file/tmp/liquibase.properties</code>	-
<code>-labels -la</code>	Label expression to use for filtering the changes to operate on.	-
<code>-liquibase-schema-name -lbsn</code>	Schema to use for Liquibase objects.	-
<code>-liquibase-tablespace-name -lbtn</code>	Tablespace to use for Liquibase objects.	-
<code>-log -lo</code>	Enable logging. Standard logging is <code>INFO</code> level (no debug flag). Debug logging is <code>FINEST</code> level (both log and debug flag).	-
<code>-rollback-script -ros</code>	Rollback script to execute.	-
<code>-search-path -sep</code>	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-

Option	Description	Default
<code>-secure-parsing -scp</code>	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	True
<code>-output-default-schema - ouids</code>	Controls whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False

Example

Roll back the specified number of changes.

```
-- Set default output path
SQL> cd <output-files-path>
-- Connect to target
SQL> connect <db-connect-string>
-- Apply update for versions adding new tag for each version
SQL> lb update -changelog-file controller.xml
SQL> lb update -changelog-file controller.xml
-- Roll back to version1
SQL> lb rollback-count -count 1 -changelog-file controller.xml
```

3.4.29 rollback-count-sql

Generate the SQL to roll back the specified number of changes.

Syntax

```
Liquibase|lb rollback-count-sql|rbc {OPTIONS}
```

The `rollback-count` command is used to revert the specified number of changes to the database starting from the most recent changes.

Options

Option	Description	Default
Required		
<code>-changelog-file -chf</code>	The root changelog file.	-
<code>-count -cu</code>	The number of changes to apply.	-
Optional		
<code>-contexts -co</code>	Context string to use for filtering which changes to operate on.	-
<code>-database-changelog- table-name -dactn</code>	Name of table to use for tracking change history.	-
<code>-debug -de</code>	Enable debug output.	-
<code>-default-schema-name - desn</code>	The default schema name to use for the database connection.	-

Option	Description	Default
-defaults-file -def	Fully qualified path to the properties file you want to use. Example: – defaults-file/tmp/liquibase.properties	-
-labels -la	Label expression to use for filtering the changes to operate on.	-
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-tablespace-name -lbtn	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-output-default-schema -ouds	Control whether names of objects in the default schema are fully qualified or not. If true they are qualified. If false, only objects outside the default schema are fully qualified.	False
-output-file -ouf	The name of the file to write the output to.	-
-overwrite-files -ovf	Overwrite any existing files in the directory. This will not affect other files.	-
-rollback-script -ros	Rollback script to execute.	-
-search-path -sep <search-path>	Complete list of locations to search for files such as changelog files in. Specify multiple paths by separating them with commas.	-
-secure-parsing -scp	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	-

Example

Generate SQL to roll back the specified number of changes.

```
-- Set default output path
SQL> cd <output-files-path>
-- Connect to target
SQL> connect <db-connect-string>
-- Apply update for versions
SQL> lb update -changelog-file controller.xml
SQL> lb update -changelog-file controller.xml
-- Roll back to version1
SQL> lb rollback-count-sql -count1 -changelog-file controller.xml
```

3.4.30 rollback-sql

Generate the SQL to roll back changes made to the database after a defined tag.

Syntax

```
Liquibase|lb rollback-sql|rbs {OPTIONS}
```

The SQL will contain all deployed changes being rolled back until the tag row in the DATABASECHANGELOG table.

Options

Option	Description	Default
Required		
-changelog-file -chf	The root changelog file.	-
-tag -ta	The tag to use during the execution of the command.	-
Optional		
-contexts -co	Context string to use for filtering which changes to operate on.	-
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-
-default-schema-name -desn	The default schema name to use for the database connection.	-
-defaults-file -def	Fully qualified path to the properties file you want to use. Example: - defaults-file/tmp/liquibase.properties	-
-labels -la	Label expression to use for filtering the changes to operate on.	-
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-tablespace-name -lbtn	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-output-default-schema -ouds	Control whether names of objects in the default schema are fully qualified or not. If true they are qualified. If false, only objects outside the default schema are fully qualified.	False
-output-file -ouf	The name of the file to write the output to.	-
-overwrite-files -ovf	Overwrite any existing files in the directory. This will not affect other files.	-

Option	Description	Default
-rollback-script -ros	Rollback script to execute.	-
-search-path -sep	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
-secure-parsing -scp	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	True

Example

Generate SQL to roll back the specified number of changes.

```
-- Set default output path
SQL> cd <output-files-path>
-- Connect to target
SQL> connect <db-connect-string>
-- Apply update for versions adding new tag for each version
SQL> lb update -changelog-file controller.xml
SQL> lb tag -tag version1
SQL> lb update -changelog-file controller.xml
SQL> lb tag -tag version2
-- Roll back to version1
SQL> lb rollback-sql -tag version1 -changelog-file controller.xml
```

3.4.31 rollback-to-date

Roll back changes made to the database back to the specified date and time.

Syntax

```
Liquibase|lb rollback-to-date|rbtd {OPTIONS}
```

The rollback-to-date command is used to revert changes from today's date to the specified date and time..

Options

Option	Description	Default
Required		
-changelog-file -chf	The root changelog file.	-
-date -da [Date to use when determining what changes to apply. The date format is YYYY-MM-DD HH:MM:SS. If including time, enclose the entire date/time in double quotes.	-
Optional		

Option	Description	Default
-contexts -co	Context string to use for filtering which changes to operate on.	-
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-
-default-schema-name -desn	The default schema name to use for the database connection.	-
-defaults-file -def	Fully qualified path to the properties file you want to use. Example: -defaults-file/tmp/liquibase.properties	-
-labels -la	Label expression to use for filtering the changes to operate on.	-
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-tablespace-name -lbtn	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-rollback-script -ros	Rollback script to execute.	-
-search-path -sep	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
-secure-parsing -scp	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	True
-output-default-schema -ouds	Controls whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False

Example

Roll back to the specified date and time.

```
-- Set default output path
SQL> cd <output-files-path>
-- Connect to target
SQL> connect <db-connect-string>
-- Apply update update on 2022-09-01
SQL> lb update -changelog-file controller.xml
-- Apply update on 2022-09-02
SQL> lb update -changelog-file controller.xml
-- Apply update on 2022-09-03
SQL> lb update -changelog-file controller.xml
```

```
-- Roll back to version1
SQL> lb rollback-to-date -date 2022-09-02 -changelog-file controller.xml
```

3.4.32 rollback-to-date-sql

Generate SQL to roll back changes made to the database back to the specified date and time.

Syntax

```
Liquibase|lb rollback-to-date-sql|rbt ds {OPTIONS}
```

The `rollback-to-date-sql` command is used to generate SQL to revert changes from today's date to the specified date and time.

Options

Option	Description	Default
Required		
<code>-changelog-file -chf</code>	The root changelog file.	-
<code>-date -da [</code>	Date to use when determining what changes to apply. The date format is YYYY-MM-DD HH:MM:SS. If including time, enclose the entire date/time in double quotes.	-
Optional		
<code>-contexts -co</code>	Context string to use for filtering which changes to operate on.	-
<code>-database-changelog-table-name -dactn</code>	Name of table to use for tracking change history.	-
<code>-debug -de</code>	Enable debug output.	-
<code>-default-schema-name -desn</code>	The default schema name to use for the database connection.	-
<code>-defaults-file -def</code>	Fully qualified path to the properties file you want to use. Example: <code>-defaults-file/tmp/liquibase.properties</code>	-
<code>-labels -la</code>	Label expression to use for filtering the changes to operate on.	-
<code>-liquibase-schema-name -lbsn</code>	Schema to use for Liquibase objects.	-
<code>-liquibase-namespace-name -lbtn</code>	Namespace to use for Liquibase objects.	-
<code>-log -lo</code>	Enable logging. Standard logging is <code>INFO</code> level (no debug flag). Debug logging is <code>FINEST</code> level (both log and debug flag).	-

Option	Description	Default
<code>-output-default-schema -ouuds</code>	Control whether names of objects in the default schema are fully qualified or not. If true they are qualified. If false, only objects outside the default schema are fully qualified.	False
<code>-output-file -ouf</code>	The name of the file to write the output to.	-
<code>-overwrite-files -ovf</code>	Overwrite any existing files in the directory. This will not affect other files.	-
<code>-rollback-script -ros</code>	Rollback script to execute.	-
<code>-search-path -sep</code>	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
<code>-secure-parsing -scp</code>	If true, remove functionality from file parsers, which can be used insecurely. An example is disabling remote XML entity support.	True

Example

Generate SQL to roll back the specified date.

```
-- Set default output path
SQL> cd <output-files-path>
-- Connect to target
SQL> connect <db-connect-string>
-- Apply update on 2022-09-01
SQL> lb update -changelog-file controller.xml
-- Apply update on 2022-09-02
SQL> lb update -changelog-file controller.xml
-- Apply update on 2022-09-03
SQL> lb update -changelog-file controller.xml
-- Roll back to version1
SQL> lb rollback-to-date-sql -date 2022-09-02 -changelog-file
controller.xml
```

3.4.33 snapshot

Capture the current state of a target database.

Syntax

```
Liquibase|lb snapshot|sn {OPTIONS}
```

The snapshot command is used to:

- Review and track changes in your target database
- Compare a previous database state to an online database
- Compare a previous database state to another snapshot

Options

Option	Description	Default
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-
-default-schema-name -desn	The default schema name to use for the database connection.	-
-defaults-file -def	Fully qualified path to the properties file you want to use. Example: -defaults-file/tmp/liquibase.properties	-
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-namespace-name -lbtn	Namespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-output-file -ouf	The name of the file to write the output to.	-
-overwrite-files -ovf	Overwrite any existing files in the directory. This will not affect other files.	-
-schemas -sc	Schemas to include in diff.	-
-search-path -sep	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
-secure-parsing -scp	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	True
-snapshot-format -snf	Output format to use (JSON, YAML, or TXT)	-
-output-default-schema -ouds	Controls whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False

Example

Generate a snapshot capturing the current state of a database.

```
-- Set default output path
SQL> cd <output-files-path>
-- Connect to target
SQL> connect <db-connect-string>
-- Take a snapshot
SQL> lb snapshot -snapshot-format json -outputfile snaptgt20220901.json
```

3.4.34 status

Generate a list of pending changesets.

Syntax

```
Liquibase|lb status|st {OPTIONS}
```

Options

Option	Description	Default
Required		
-changelog-file -chf	The root changelog file.	-
Optional		
-contexts -co	Context string to use for filtering which changes to operate on.	-
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-
-default-schema-name -desn	The default schema name to use for the database connection.	-
-defaults-file -def	Fully qualified path to the properties file you want to use. Example: – defaults-file/tmp/liquibase.properties	-
-labels -la	Label expression to use for filtering the changes to operate on.	-
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-tablespace-name -lbtn	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-search-path -sep	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
-secure-parsing -scp	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	True
-verbose -ve	Verbose flag	True
-output-default-schema -ouds	Controls whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False

Example

Report the number of undeployed changesets and identify them.

```
-- Set default output path
SQL> cd <output-files-path>
-- Check the status
SQL> lb status -verbose -changelog-file controller.xml
```

3.4.35 tag

Mark the current database state with the specified tag to use for roll back.

Syntax

```
Liquibase|lb tag|ta {OPTIONS}
```

For example, you can use the tag to mark the current database state for version, release, and so on. The tag is added to the last row in the `DATABASECHANGELOG` table.

Options

Option	Description	Default
Required		
-tag -ta	The tag to use during the execution of the command.	-
Optional		
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-
-default-schema-name -desn	The default schema name to use for the database connection.	-
-defaults-file -def	Fully qualified path to the properties file you want to use. Example: <code>-defaults-file/tmp/liquibase.properties</code>	-
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-tablespace-name -lbtn	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is <code>INFO</code> level (no debug flag). Debug logging is <code>FINEST</code> level (both log and debug flag).	-
-search-path -sep	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-

Option	Description	Default
-secure-parsing -scp	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	True
-output-default-schema - ouids	Controls whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False

Example

Create initial tag and version tags.

```
-- Set default output path
SQL> cd <output-files-path>
-- Connect to target and add base tag
SQL> connect <db-connect-string>
SQL> lb tag -tag baseversion1
-- Apply update for version adding and add new tag for each version
SQL> lb update -changelog-file controller.xml
SQL> lb tag -tag version1
```

3.4.36 tag-exists

Verify the existence of the specified tag.

Syntax

```
Liquibase|lb tag-exists|tae {OPTIONS}
```

Options

Option	Description	Default
Required		
-tag -ta	The tag to use during the execution of the command.	-
Optional		
-database-changelog- table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-
-default-schema-name - desn	The default schema name to use for the database connection.	-
-defaults-file -def	Fully qualified path to the properties file you want to use. Example: - defaults-file/tmp/ liquibase.properties	-
-liquibase-schema- name -lbsn	Schema to use for Liquibase objects.	-

Option	Description	Default
<code>-liquibase-tablespace-name -lbtn</code>	Tablespace to use for Liquibase objects.	-
<code>-log -lo</code>	Enable logging. Standard logging is <code>INFO</code> level (no debug flag). Debug logging is <code>FINEST</code> level (both log and debug flag).	-
<code>-search-path -sep</code>	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
<code>-secure-parsing -scp</code>	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	True
<code>-output-default-schema -ouds</code>	Controls whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False

3.4.37 unexpected-changesets

Generate a list of changesets that have been executed but are not in the current changelog.

Syntax

```
Liquibase|lb unexpected-changesets|unc {OPTIONS}
```

This command detects and compares the changes between the `DATABASECHANGELOG` table and the current changelog and reports:

- Changesets in the `DATABASECHANGELOG` table that do not exist in the current changelog.
- Previously deployed changesets that were deleted from your current changelog.

Options

Option	Description	Default
Required		
<code>-changelog-file -chf</code>	The root changelog file.	-
Optional		
<code>-contexts -co</code>	Context string to use for filtering which changes to operate on.	-
<code>-database-changelog-table-name -dactn</code>	Name of table to use for tracking change history.	-
<code>-debug -de</code>	Enable debug output.	-
<code>-default-schema-name -desn</code>	The default schema name to use for the database connection.	-

Option	Description	Default
<code>-defaults-file -def</code> <code><defaults-file> {FILE}</code>	Fully qualified path to the properties file you want to use. For example, <code>defaults-file /tmp/liquibase.properties</code>	-
<code>-labels -la</code>	Label expression to use for filtering the changes to operate on.	-
<code>-liquibase-schema-name -lbn</code>	Schema to use for Liquibase objects.	-
<code>-liquibase-tablespace-name -lbtn</code>	Tablespace to use for Liquibase objects.	-
<code>-log -lo</code>	Enable logging. Standard logging is <code>INFO</code> level (no debug flag). Debug logging is <code>FINEST</code> level (both log and debug flag).	-
<code>-output-default-schema -ouds</code>	Control whether names of objects in the default schema are fully qualified or not. If true they are qualified. If false, only objects outside the default schema are fully qualified.	False
<code>-output-file -ouf</code>	The name of the file to write the output to.	-
<code>-overwrite-files -ovf</code>	Overwrite any existing files in the directory. This will not affect other files.	-
<code>-search-path -sep</code>	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
<code>-secure-parsing -scp</code>	If true, remove functionality from file parsers, which can be used insecurely. An example is disabling remote XML entity support.	True
<code>-verbose -ve</code>	Verbose flag	True

Example

Report unexpected changesets.

```
-- Set default output path
SQL> cd <output-files-path>
-- Connect to target and run command
SQL> connect <db-connect-string>
SQL> lb unexpected-changesets -changelog-file controller.xml
```

3.4.38 update

Deploy any changes in the changelog file that have not been deployed.

Syntax

```
Liquibase|lb update|up {OPTIONS}
```

When you run the update command, the changesets in the changelog file are read sequentially. The unique identifiers (file::id::author) in the file are compared to those stored in the DATABASECHANGELOG table.

- If the unique identifiers do not exist, Liquibase will apply the changeset to the database.
- If the unique identifiers exist, the MD5Sum of the changeset is compared to the one in the database.

If they are different, Liquibase will produce an error message that someone has changed it unexpectedly.

If the status of the runOnChange or runAlways changeset attribute is set to TRUE, Liquibase will re-apply the changeset. Example: <changeSet id="2" author="bob" runAlways="true">

Options

Option	Description	Default
Required		
-changelog-file -chf	The root changelog file.	-
Optional		
-contexts -co	Context string to use for filtering which changes to operate on.	-
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-
-default-schema-name -desn	The default schema name to use for the database connection.	-
-defaults-file -def	Fully qualified path to the properties file you want to use. Example: -defaults-file/tmp/liquibase.properties	-
-labels -la	Label expression to use for filtering the changes to operate on.	-
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-tablespace-name -lbtn	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-search-path -sep	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-

Option	Description	Default
<code>-secure-parsing -scp</code>	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	True
<code>-show-summary -shs <show-summary> {OFF SUMMARY VERBOSE}</code>	Produces a summary list of any changesets skipped and why they were skipped. Valid values are OFF, SUMMARY, and VERBOSE.	SUMMARY
<code>-output-default-schema -ouds</code>	Controls whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False
<code>-override-app-alias -ovaa</code>	Override value to be used for the APEX application alias.	-
<code>-override-app-id -ovai</code>	Override value to be used for the APEX application id.	-
<code>-override-app-schema -ovas</code>	Override value to be used for the APEX workspace schema.	-
<code>-override-app-workspace -ovaw</code>	Override value to be used for the APEX application workspace.	-

3.4.39 update-count

Deploy the specified number of changes from the changelog file.

Syntax

```
Liquibase|lb update-count|upc {OPTIONS}
```

The `update-count` command applies changes and updates changesets sequentially, starting from the top of the changelog file until the number specified is reached.

- If the unique identifiers do not exist, Liquibase will apply the changeset to the database.
- If the unique identifiers exist, the MD5Sum of the changeset is compared to the one in the database.

If they are different, Liquibase will produce an error message that someone has changed it unexpectedly.

If the status of the `runOnChange` or `runAlways` changeset attribute is set to `TRUE`, Liquibase will re-apply the changeset. Example: `<changeSet id="2" author="bob" runAlways="true">`

Options

Option	Description	Default
Required		
<code>-changelog-file -chf</code>	The root changelog file.	-
<code>-count -cu</code>	The number of changes to apply.	-

Option	Description	Default
Optional		
-contexts -co	Context string to use for filtering which changes to operate on.	-
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-
-default-schema-name -desn	The default schema name to use for the database connection.	-
-defaults-file -def	Fully qualified path to the properties file you want to use. Example: - defaults-file/tmp/ liquibase.properties	-
-labels l-	Label expression to use for filtering the changes to operate on.	-
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-tablespace-name -lbtn	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-search-path -sep	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
-secure-parsing -scp	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	True
-show-summary -shs <show-summary> {OFF SUMMARY VERBOSE}	Produces a summary list of any changesets skipped and why they were skipped. Valid values are OFF, SUMMARY, and VERBOSE.	SUMMARY
-output-default-schema -ouds	Controls whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False

Example

Update database with the specified number of changesets in the changelog file.

```
SQL> cd <lb-changes-directory>
SQL> lb update -changelog-file controller.xml -count 2
```

3.4.40 update-count-sql

Generate the SQL to deploy the specified number of changes for review before running the update command.

Syntax

```
Liquibase|lb update-count-sql|upcs {OPTIONS}
```

Liquibase uses the raw SQL to apply database changes you have added to the changelog file.

Options

Option	Description	Default
Required		
-changelog-file -chf	The root changelog file.	-
-count -cu	The number of changes to apply.	-
Optional		
-contexts -co	Context string to use for filtering which changes to operate on.	-
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-
-default-schema-name -desn	The default schema name to use for the database connection.	-
-defaults-file -def	Fully qualified path to the properties file you want to use. Example: - defaults-file/tmp/liquibase.properties	-
-labels -la	Label expression to use for filtering the changes to operate on.	-
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-tablespace-name -lbtn	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-output-default-schema -ouds	Control whether names of objects in the default schema are fully qualified or not. If true they are qualified. If false, only objects outside the default schema are fully qualified.	False
-output-file -ouf	The name of the file to write the output to.	-
-overwrite-files -ovf	Overwrite any existing files in the directory. This will not affect other files.	-

Option	Description	Default
<code>-search-path -sep</code>	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
<code>-secure-parsing scp</code>	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	True

3.4.41 update-sql

Generate the SQL identified in the changelog for review before running the `update` command.

Syntax

```
Liquibase|lb update-sql|ups {OPTIONS}
```

Liquibase uses the raw SQL to apply database changes you have added to the changelog file.

Options

Option	Description	Default
Required		
<code>-changelog-file -chf</code>	The root changelog file.	-
Optional		
<code>-contexts -co</code>	Context string to use for filtering which changes to operate on.	-
<code>-database-changelog-table-name -dactn</code>	Name of table to use for tracking change history.	-
<code>-debug -de</code>	Enable debug output.	-
<code>-default-schema-name -desn</code>	The default schema name to use for the database connection.	-
<code>-defaults-file -def</code>	Fully qualified path to the properties file you want to use. Example: <code>-defaults-file/tmp/liquibase.properties</code>	-
<code>-labels -la</code>	Label expression to use for filtering the changes to operate on.	-
<code>-liquibase-schema-name -lbsn</code>	Schema to use for Liquibase objects.	-
<code>-liquibase-tablespace-name -lbtn</code>	Tablespace to use for Liquibase objects.	-

Option	Description	Default
-log -lo	Enable logging. Standard logging is <code>INFO</code> level (no debug flag). Debug logging is <code>FINEST</code> level (both log and debug flag).	-
-output-default-schema - ouods	Control whether names of objects in the default schema are fully qualified or not. If true they are qualified. If false, only objects outside the default schema are fully qualified.	False
-output-file -ouf	The name of the file to write the output to.	-
-overwrite-files -ovf	Overwrite any existing files in the directory. This will not affect other files.	-
-search-path -sep	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
-secure-parsing -scp	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	True
-override-app-alias -ovaa	Override value to be used for the APEX application alias.	-
-override-app-id -ovai	Override value to be used for the APEX application id.	-
-override-app-schema - ovas	Override value to be used for the APEX workspace schema.	-
-override-app-workspace - ovaw	Override value to be used for the APEX application workspace.	-

3.4.42 update-testing-rollback

Updates database, then rolls back changes before updating again. It provides testing of rollback functionality.

Syntax

```
Liquibase|lb update-testing-rollback|uptr {OPTIONS}
```

Use only when all pending changelogs have been verified as ready to be deployed.

A multi-step operation is used and runs in sequential order:

```
update changeset1; update changeset2; update changeset3\  
rollback changeset3; rollback changeset2; rollback changeset1  
update changeset1; update changeset2; update changeset3
```

Options

Option	Description	Default
Required		
<code>-changelog-file -chf</code>	The root changelog file.	-
Optional		
<code>-contexts -co</code>	Context string to use for filtering which changes to operate on.	-
<code>-database-changelog-table-name -dactn</code>	Name of table to use for tracking change history.	-
<code>-debug -de</code>	Enable debug output.	-
<code>-default-schema-name -desn</code>	The default schema name to use for the database connection.	-
<code>-defaults-file -def</code>	Fully qualified path to the properties file you want to use. Example: <code>-defaults-file/tmp/liquibase.properties</code>	-
<code>-labels -la</code>	Label expression to use for filtering the changes to operate on.	-
<code>-liquibase-schema-name -lbsn</code>	Schema to use for Liquibase objects.	-
<code>-liquibase-tablespace-name -lbtn</code>	Tablespace to use for Liquibase objects.	-
<code>-log -lo</code>	Enable logging. Standard logging is <code>INFO</code> level (no debug flag). Debug logging is <code>FINEST</code> level (both log and debug flag).	-
<code>-output-default-schema -ouds</code>	Control whether names of objects in the default schema are fully qualified or not. If true they are qualified. If false, only objects outside the default schema are fully qualified.	False
<code>-output-file -ouf</code>	The name of the file to write the output to.	-
<code>-overwrite-files -ovf</code>	Overwrite any existing files in the directory. This will not affect other files.	-
<code>-search-path -sep</code>	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
<code>-secure-parsing -scp</code>	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	-

3.4.43 update-to-tag

Deploy changes sequentially from the newest changeset up to and including the changeset with the specified tag.

Syntax

```
Liquibase|lb update-to-tag|uptt OPTIONS
```

The update-to-tag command will deploy changes only when you have previously added a tag Database Change Type in your changelog file. You cannot use the update-to-tag command with the reference to a tag created in the DATABASECHANGELOG table using the tag command. An update-to-tag-sql should always be run to review the SQL before running update-to-tag.

Options

Option	Description	Default
Required		
-changelog-file -chf	The root changelog file.	-
-tag -ta	The tag to use during the execution of the command.	-
Optional		
-contexts -co	Context string to use for filtering which changes to operate on.	-
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-
-default-schema-name -desn	The default schema name to use for the database connection.	-
-defaults-file -def	Fully qualified path to the properties file you want to use. Example: - defaults-file/tmp/liquibase.properties	-
-labels -la	Label expression to use for filtering the changes to operate on.	-
-liquibase-schema-name -lbsn	Schema to use for Liquibase objects.	-
-liquibase-tablespace-name -lbtn	Tablespace to use for Liquibase objects.	-
-log -lo	Enable logging. Standard logging is INFO level (no debug flag). Debug logging is FINEST level (both log and debug flag).	-
-search-path -sep	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
-secure-parsing -scp	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	-

Option	Description	Default
-show-summary -shs <show-summary> {OFF SUMMARY VERBOSE}	Produces a summary list of any changesets skipped and why they were skipped. Valid values are OFF, SUMMARY, and VERBOSE.	SUMMARY
-output-default-schema -ouds	Controls whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False

Example

Update database with the changesets up to and including the changeset with the specified database tag.

```
SQL> cd <lb-changes-directory>
-- Edit changelog file and add tagDatabase entries for versions
-- Execute an update-to-tag using a tag specified in tagDatabase in the
changelog file
SQL> lb update-to-tag -tag version1 -changelog-file controller.xml
```

3.4.44 update-to-tag-sql

Generate the SQL from the newest changeset up to and including the changeset with the specified tag.

Syntax

```
Liquibase|lb update-to-tag-sql|uptts {OPTIONS}
```

An update-to-tag-sql should always be run to review the SQL before running update-to-tag. The update-to-tag-sql command will generate SQL when you have previously added a tag Database Change Type in your changelog file. You cannot use the update-to-tag command with the reference to a tag created in the DATABASECHANGELOG table using the tag cde command.

Options

Option	Description	Default
Required		
-changelog-file -chf	The root changelog file.	-
-tag -ta	The tag to use during the execution of the command.	-
Optional		
-contexts -co	Context string to use for filtering which changes to operate on.	-
-database-changelog-table-name -dactn	Name of table to use for tracking change history.	-
-debug -de	Enable debug output.	-

Option	Description	Default
<code>-default-schema-name -desn</code>	The default schema name to use for the database connection.	-
<code>-defaults-file -def</code>	Fully qualified path to the properties file you want to use. Example: <code>-defaults-file/tmp/liquibase.properties</code>	-
<code>-labels -la</code>	Label expression to use for filtering the changes to operate on.	-
<code>-liquibase-schema-name -lbsn</code>	Schema to use for Liquibase objects.	-
<code>-liquibase-tablespace-name -lbtn</code>	Tablespace to use for Liquibase objects.	-
<code>-log -lo</code>	Enable logging. Standard logging is <code>INFO</code> level (no debug flag). Debug logging is <code>FINEST</code> level (both log and debug flag).	-
<code>-output-default-schema -ouds</code>	Control whether names of objects in the default schema are fully qualified or not. If true they are qualified. If false, only objects outside the default schema are fully qualified.	False
<code>-output-file -ouf</code>	The name of the file to write the output to.	-
<code>-overwrite-files -ovf</code>	Overwrite any existing files in the directory. This will not affect other files.	-
<code>-search-path -sep</code>	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
<code>-secure-parsing -scp</code>	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	True

Example

Update database with the changesets up to and including the changeset with the specified database tag.

```
SQL> cd <lb-changes-directory>
-- Edit changelog file and add tagDatabase entries for version1
SQL> lb update-to-tag-sql -tag version1 -changelog-file controller.xml
```

3.4.45 validate

Validate the changelog for errors that may cause an `UPDATE` to fail.

Syntax

```
Liquibase|lb validate|va {OPTIONS}
```

The following checks are done:

- XML, YAML, JSON, and SQL structure
- Referenced files exist
- Required or prohibited attributes are correct for your database
- Duplicated id, author, and file combinations
- Checksum errors

Options

Option	Description	Default
Required		
<code>-changelog-file -chf</code>	The root changelog file.	-
Optional		
<code>-database-changelog-table-name -dactn</code>	Name of table to use for tracking change history.	-
<code>-debug -de</code>	Enable debug output.	-
<code>-default-schema-name -desn</code>	The default schema name to use for the database connection.	-
<code>-defaults-file -def</code>	Fully qualified path to the properties file you want to use. Example: <code>-defaults-file/tmp/liquibase.properties</code>	-
<code>-liquibase-schema-name -lbsn</code>	Schema to use for Liquibase objects.	-
<code>-liquibase-tablespace-name -lbtn</code>	Tablespace to use for Liquibase objects.	-
<code>-log -lo</code>	Enable logging. Standard logging is <code>INFO</code> level (no debug flag). Debug logging is <code>FINEST</code> level (both log and debug flag).	-
<code>-search-path -sep</code>	Complete list of locations to search for files such as changelog files. You can specify multiple paths by separating them with commas.	-
<code>-secure-parsing -scp</code>	If true, remove functionality from file parsers that could be used insecurely. An example is disabling remote XML entity support.	True
<code>-output-default-schema -ouds</code>	Controls whether names of objects in the default schema are fully qualified or not. If false, only objects outside the default schema are fully qualified.	False

Example

Validate before running UPDATE.

```
-- Set default output path
SQL> cd <output-files-path>
-- Connect to target and validate
SQL> connect <db-connect-string>
SQL> lb validate -changelog-file controller.xml
```

3.4.46 version

Display version information.

Syntax

```
Liquibase|lb version|ve
```

Options

Option	Description	Default
-debug -de	Enable debug output.	-

3.5 Using SQLcl Liquibase Functionality with Open-Source Liquibase

SQLcl Liquibase with Oracle Database provides extended functionality to the Liquibase experience compared to the vanilla Liquibase client. This includes dynamically altering tables using Liquibase and SQLcl-exclusive Liquibase commands, such as generating specialized snapshots for:

- A comprehensive schema (`generate-schema`)
- Oracle REST Data Service (ORDS) objects (`generate-ords-module` and `generate-ords-schema`)
- Oracle APEX objects (`generate-apex`)

By default, the Liquibase client does not include this enhanced functionality or enable you to read the specialized changelogs generated by SQLcl Liquibase.

You can add the functionality to read these specialized changelogs to the Liquibase client by copying certain jar files from SQLcl and updating your Liquibase properties file. The steps to do this are demonstrated using the following example:

1. Connect to your Oracle Database and start the SQLcl command-line interface. The example database has a few sample tables that you can view.

```
SQL> select table_name from user_tables;
```

```
TABLE_NAME
```

```
_____
```



```
REGIONS  
LOCATIONS  
DEPARTMENTS  
JOBS  
EMPLOYEES  
JOB_HISTORY  
COUNTRIES
```

7 rows selected.

2. Create a table Fruits. This will serve as an example table to track.

```
SQL> create table fruits (id number(1,0), type varchar2(50), price  
number, constraint fruits_pk primary key (id));
```

Table FRUITS created.

The table is added to the list of sample tables.

```
SQL> select table_name from user_tables;
```

```
TABLE_NAME  
-----  
REGIONS  
LOCATIONS  
DEPARTMENTS  
JOBS  
EMPLOYEES  
JOB_HISTORY  
FRUITS  
COUNTRIES
```

8 rows selected.

3. Generate a changelog for the Fruits table.

```
SQL> lb generate-object -object-type table -object-name fruits;
```

```
--Starting Liquibase at 13:43:52 (version 4.15.0 #0 built at 2022-08-19  
14:45+000)
```

```
Changelog created and written to file fruits_table.xml
```

```
Operation completed successfully.
```

4. Delete the Fruits table so that you can run some tests generating it with the changelog created.

```
SQL> drop table fruits;
```

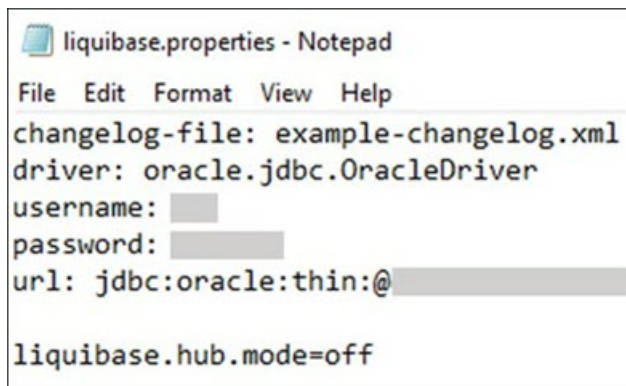
```
SQL> select table_name from user_tables;
```

```
TABLE_NAME  
-----
```

```
REGIONS
LOCATIONS
DEPARTMENTS
JOBS
EMPLOYEES
JOB_HISTORY
COUNTRIES
```

7 rows selected.

5. Switch to the vanilla Liquibase open-source command line client, which you can [download](#) from Liquibase's website.
6. You must provide the credentials of the Oracle Database that you are connected to in SQLcl for the vanilla Liquibase client. Create a `liquibase.properties` file from a blank text file. In this example, the `liquibase.properties` file is created in `C:\Users\[username]` folder on a Windows system. The following figure shows the properties file used in this example. For more information about providing database credentials for Liquibase, see [Specifying Properties in a Connection Profile](#).



7. Copy and paste the `fruits_table.xml` changelog file created earlier from your SQLcl bin folder to the folder location of your `liquibase.properties` file (in this case, `C:\Users\[username]`). To keep your changelog files in a different location, specify the path to the file location in the `changelog-file` field of your `liquibase.properties` file.
8. Run the update command.

```
>liquibase --changelog-file=fruits_table.xml update
```


Connect to an Oracle database with SQLcl release 22.3. The one featured in this example includes a few sample tables. The tables that are going to be used for this example are employees and departments.

```
SQL> select table_name from user_tables;
```

```
TABLE_NAME
-----
REGIONS
LOCATIONS
DEPARTMENTS
JOBS
EMPLOYEES
JOB_HISTORY
HIRE_DATE
PERSON_COLLECTION
COUNTRIES
```

```
9 rows selected.
```

1. Generate a schema of the database state using SQLcl Liquibase.

```
SQL> lb generate-schema
```

```
SQL> lb generate-schema
--Starting Liquibase at 15:59:29 (version 4.15.0 #0 built at 2022-08-19 14:45+0000)

Export Flags Used:

Export Grants          false
Export Synonyms        false

[Method loadCaptureTable]:
  [Type - TYPE_SPEC]:          451 ms
  [Type - TYPE_BODY]:          247 ms
  [Type - SEQUENCE]:           205 ms
  [Type - DIRECTORY]:          112 ms
  [Type - CLUSTER]:            1473 ms
  [Type - TABLE]:             25672 ms
```

2. Switching over to another command-line window, use the open-source Liquibase client to generate a changelog of the database state. Because generate-schema is a SQLcl-exclusive command that uses extended functionality, the open-source Liquibase client must use the generate-changelog command.

 **Note:**

You can [download](#) the open-source Liquibase client from the Liquibase website.

```
>liquibase --changelog-file=sql_test.xml generate-changelog
```



```
SQL> lb update-sql -changelog-file controller.xml
--Starting Liquibase at 09:59:36 (version 4.15.0 #0 built at 2022-08-19 14:45+0000)

-- Loaded 37 change(s)
-- *****
-- Update Database Script
-- *****
-- Change Log: controller.xml
-- Ran at: 9/16/22, 9:59 AM
-- Against: ████████████████████████████████████████████████████████████████
-- Liquibase version: 4.15.0
-- *****
```

Examining the output, you see that departments and employees tables are recognized and that you need to drop the extra columns that you created to return to the state in the changelog.

```
-- Changeset departments_table.xml::18f3f88289eddcfc2b16fd4e44a17169f8fe0d3f::(HR)-Generated
ALTER TABLE "HR"."DEPARTMENTS" DROP ("HAPPINESS")
/

-- Changeset employees_table.xml::3679094045b7965245949695613df9351c236f3e::(HR)-Generated
ALTER TABLE "HR"."EMPLOYEES" DROP ("HEIGHT")
/
ALTER TABLE "HR"."EMPLOYEES" DROP ("MOOD")
/
```

In actual use cases that are more complicated, there can often be risks involved with the SQL drop command. Examining the SQL code using the update-sql command is beneficial for review. Any manual changes can then be made to the changesets and checked as needed.

When you run the update command, the schema is successfully updated and the columns are dropped.

```
SQL> lb update -changelog-file controller.xml
--Starting Liquibase at 68:23:55 (version xml 4.15.0 #0 built at
2022-08-19 14:45+0000)

-- Loaded 38 change(s)
```

Example 2

This example also explains the same concept, this time adding columns and a table. For this example, in the database, a table *Activities* has been previously created along with columns *Head_Count* and *Retention* in the *departments* table and *Awards* in the *employees* table.

```
SQL> select * from departments;
```

DEPARTMENT_ID	DEPARTMENT_NAME	MANAGER_ID	LOCATION_ID	HEAD_COUNT	RETENTION
10	Administration	200	1700		
20	Marketing	201	1800		
30	Purchasing	114	1700		
40	Human Resources	203	2400		
50	Shipping	121	1500		
60	IT	103	1400		
70	Public Relations	204	2700		
80	Sales	145	2500		
90	Executive	100	1700		
100	Finance	108	1700		
110	Accounting	205	1700		
120	Treasury		1700		
130	Corporate Tax		1700		
140	Control And Credit		1700		

```
SQL> select * from employees;
```

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY	COMMISSION_PCT	MANAGER_ID	DEPARTMENT_ID	AWARDS
100	Donald	OConnell	DOCONNEL	650.507.9833	21-JUN-99	SH_CLERK	2600		124	50	
199	Douglas	Grant	DGRANT	650.507.9844	13-JAN-00	SH_CLERK	2600		124	50	
200	Jennifer	Whalen	JWHALEN	515.123.4444	17-SEP-87	AD_ASST	4400		101	10	
201	Michael	Hartstein	MHARTSTE	515.123.5555	17-FEB-96	PK_MAN	13000		100	20	
202	Pat	Fay	PFAY	603.123.6666	17-AUG-97	PK_REP	6000		201	20	
203	Susan	Mavris	SMAVRIS	515.123.7777	07-JUN-94	HR_REP	6500		101	40	
204	Hermann	Baer	HBAER	515.123.8888	07-JUN-94	PR_REP	10000		101	70	
205	Shelley	Higgins	SHIGGINS	515.123.8000	07-JUN-94	AC_MGR	12000		101	110	
206	William	Gietz	WGIEZT	515.123.8101	07-JUN-94	AC_ACCOUNT	8300		205	110	
100	Steven	King	SKING	515.123.4567	17-JUN-87	AD PRES	24000			90	
101	Neeha	Kochhar	NKOCHHAR	515.123.4568	21-SEP-89	AD_VP	17000		100	90	
102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-93	AD_VP	17000		100	90	
103	Alexander	Humold	AHUMOLD	590.423.4567	03-JAN-90	IT_PROG	9000		103	60	
104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-91	IT_PROG	6000		103	60	

Changelogs are generated and the `Activities` table and `Head_count`, `Retention`, and `columns` are deleted so as to showcase using Liquibase to create them.

1. Generate the schema in SQLcl.

Note:

Move the changelogs from the previous example to a separate folder to avoid issues.

```
SQL> lb generate-schema
--Starting Liquibase at 09:33:52 (version 4.15.0 #0 built at
2022-08-19 14:45+0000)
```

2. Switching over to another command-line window to execute commands in the open-source Liquibase client, here also generate a changelog:

```
>liquibase --changelog-file=sql_test2.xml generate-changelog
```

```
C:\Users\>liquibase --changelog-file=sql_test2.xml generate-changelog
#####
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
#####
Get documentation at docs.liquibase.com
Get certified courses at learn.liquibase.com
Free schema change activity reports at
https://hub.liquibase.com
#####
Starting Liquibase at 09:39:06 (version 4.15.0 #4001 built at 2022-08-05 16:17+0000)
Liquibase Version: 4.15.0
Liquibase Community 4.15.0 by Liquibase
BEST PRACTICE: The changelog generated by diffChangelog/generateChangelog should be inspected for correctness and completeness before being deployed. Some database objects and their dependencies cannot be represented automatically, and they may need to be manually updated before being deployed.
Generated changelog written to C:\Users\>sql_test2.xml
Liquibase command 'generate-changelog' was executed successfully.
C:\Users\>
```

3. In the SQLcl command-line window, delete the `Activities` table and `Head_count`, `Retention`, and `Awards` columns, so that their creation can be demonstrated with the update command.

```
SQL> drop table activities;
Table ACTIVITIES dropped.
```

```
SQL> alter table employees drop column awards;
Table EMPLOYEES altered.
```

```
SQL> alter table departments drop column head_count;
Table DEPARTMENTS altered.
```

```
SQL> alter table departments drop column retention;
Table DEPARTMENTS altered.
```

4. In the open-source Liquibase command-line window, run the update command.

```
> liquibase --changelog-file=sql_test2.xml update
```

```
C:\Users\>liquibase --changelog-file=sql_test2.xml update
#####
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
#####
Get documentation at docs.liquibase.com
Get certified courses at learn.liquibase.com
Free schema change activity reports at
https://hub.liquibase.com
#####
Starting Liquibase at 09:52:16 (version 4.15.0 #4001 built at 2022-08-05 16:17+0000)
Liquibase Version: 4.15.0
Liquibase Community 4.15.0 by Liquibase
Running Changeset: sql_test2.xml::1663339182389-1: (generated)
Unexpected error running Liquibase: Migration failed for changeset sql_test2.xml::1663339182389-1: (generated):
Reason: liquibase.exception.DatabaseException: ORA-00955: name is already used by an existing object
[Failed SQL: (955) CREATE TABLE HR.REGIONS (REGION_ID NUMBER CONSTRAINT REGION_ID_PK PRIMARY
KEY (REGION_ID))]
For more information, please use the --log-level flag
C:\Users\>
```

The update fails when Liquibase encounters pre-existing objects.

5. In the SQLcl command-line window, generate the SQL to examine, then run the update with SQLcl Liquibase .

```
SQL>lb update-sql -changelog-file controller.xml
```

```
SQL> lb update-sql -changelog-file controller.xml
--Starting Liquibase at 09:59:36 (version 4.15.0 #0 built at 2022-08-19 14:45+0000)
-- Loaded 37 change(s)
-- *****
-- Update Database Script
-- *****
-- Change Log: controller.xml
-- Ran at: 9/16/22, 9:59 AM
-- Against: ████████████████████████████████████████████████████████████
-- Liquibase version: 4.15.0
-- *****
```

Looking at the SQL output, you can see sections involving the creation of the `Activities` table and SQLcl Liquibase generating the SQL statements to alter the `Departments` and `Employees` table to add the columns.

```
-- Changeset departments_table.xml::62926485197be515dcecdf2174bca09c4331d020::(HR)-Generated
ALTER TABLE "HR"."DEPARTMENTS" ADD ("HEAD_COUNT" NUMBER)
/
ALTER TABLE "HR"."DEPARTMENTS" ADD ("RETENTION" VARCHAR2(50))
/

-- Changeset employees_table.xml::14662f7d19c2e2d74bd735e31b78b79cf20ee0f6::(HR)-Generated
ALTER TABLE "HR"."EMPLOYEES" ADD ("AWARDS" NUMBER)
/

-- Changeset activities_table.xml::a7941c2352f1cad12cd6e4eadfbd4fc9d1d438d6::(HR)-Generated
CREATE TABLE "HR"."ACTIVITIES"
(
  "ID" NUMBER,
  "NAME" VARCHAR2(50),
  "COST" NUMBER,
  "LOCATION" VARCHAR2(50),
  "DIFFICULTY" VARCHAR2(50)
) SEGMENT CREATION DEFERRED
PCTFREE 10 PCTUSED 40 INITRANS 1 NOCOMPRESS LOGGING
TABLESPACE "USERS";
```

6. Run the update to see that the table and columns are added.

```
SQL> lb update -changelog-file controller.xml
```

```

SQL> lb update -changelog-file controller.xml
--Starting Liquibase at 10:05:17 (version 4.15.0 #0 built at 2022-08-19 14:45+0000)

-- Loaded 37 change(s)
Running Changeset: departments_seq_sequence.xml::93020a4f5c3fc570029b0695d52763142b6e44e1::(HR)-Generated
Statement executed successfully
Running Changeset: employees_seq_sequence.xml::42e3db1348e500dade36829bab3b7f5343ad6f09::(HR)-Generated
Statement executed successfully
Running Changeset: locations_seq_sequence.xml::7ec49fad51eb8c0b53fa0128bf6ef2d3fee25d35::(HR)-Generated
Statement executed successfully
Running Changeset: departments_table.xml::62926485197be515dcecdf2174bca09c4331d020::(HR)-Generated
Table "HR"."DEPARTMENTS" altered.
Table "HR"."DEPARTMENTS" altered.
Table "HR"."DEPARTMENTS" altered.
Table "HR"."DEPARTMENTS" altered.
Running Changeset: employees_table.xml::14662f7d19c2e2d74bd735e31b78b79cf20ee0f6::(HR)-Generated
Table "HR"."EMPLOYEES" altered.
Table "HR"."EMPLOYEES" altered.
Table "HR"."EMPLOYEES" altered.
Table "HR"."EMPLOYEES" altered.
Running Changeset: regions_table.xml::52334f421d935229140b0468d06157dd45c20f96::(HR)-Generated
Statement executed successfully
Running Changeset: jobs_table.xml::84d6c14a5af0d22812c689a42e58e6c0cf300c1e::(HR)-Generated
Statement executed successfully
Running Changeset: activities_table.xml::a7941c2352f1cad12cd6e4eadfbd4fc9d1d438d6::(HR)-Generated
Table "HR"."ACTIVITIES" created.
Running Changeset: countries_table.xml::43c08b308b52ef60fc8e8f42f33ebda679f18323::(HR)-Generated
Statement executed successfully

```

```
SQL>select table_name from user_tables;
```

```
SQL>select * from employees;
```

```
SQL>select * from departments;
```

```
SQL> select table_name from user_tables;
```

```
TABLE_NAME
```

```

-----
REGIONS
LOCATIONS
DEPARTMENTS
JOBS
EMPLOYEES
JOB_HISTORY
DATABASECHANGELOG_ACTIONS
DATABASECHANGELOG
ACTIVITIES
COUNTRIES

```

```
11 rows selected.
```

```
SQL> select * from employees;
```

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY	COMMISSION_PCT	MANAGER_ID	DEPARTMENT_ID	AMARDS
100	Donald	OConnell	DOCONNEL	650.507.9833	21-JUN-99	SH_CLERK	2600		124	50	
190	Douglas	Grant	DGRANT	650.507.9844	13-JAN-00	SH_CLERK	2600		124	50	
200	Jennifer	Whalen	JWHALEN	515.123.4444	17-SEP-87	AD_ASST	4400		101	10	
201	Michael	Hartstein	MHARTSTE	515.123.5555	17-FEB-96	MK_MAN	13000		100	20	
202	Pat	Fay	PFAY	603.123.6666	17-AUG-97	PK_REP	6000		201	20	
203	Susan	Mayvis	SMAYVIS	515.123.7777	07-JUN-94	HR_REP	6500		101	40	
204	Hermann	Baer	HBAER	515.123.8888	07-JUN-94	PR_REP	10000		101	70	
205	Shelley	Higgins	SHIGGINS	515.123.8000	07-JUN-94	AC_MGR	12000		101	110	
206	William	Gietz	WGIEZT	515.123.9121	07-JUN-94	AC_ACCOUNT	8200		205	110	
100	Steven	King	SKING	515.123.4567	17-JUN-87	AD PRES	24000			90	
101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-89	AD_VP	17000		100	90	
102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-93	AD_VP	17000		100	90	
103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-98	IT_PROG	9000		102	60	
104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-91	IT_PROG	6000		103	60	

```
SQL> select * from departments;
```

DEPARTMENT_ID	DEPARTMENT_NAME	MANAGER_ID	LOCATION_ID	HEAD_COUNT	RETENTION
10	Administration	200	1700		
20	Marketing	201	1800		
30	Purchasing	114	1700		
40	Human Resources	203	2400		
50	Shipping	121	1500		
60	IT	103	1400		
70	Public Relations	204	2700		
80	Sales	145	2500		
90	Executive	100	1700		
100	Finance	108	1700		
110	Accounting	205	1700		
120	Treasury		1700		
130	Corporate Tax		1700		
140	Control And Credit		1700		

3.7 Liquibase Open-Source Changesets with SQLcl Liquibase

You can use changesets generated in the open-source Liquibase solution with SQLcl Liquibase. This enables you to carry over previous change management projects to SQLcl to optimize them with your Oracle Database.

The following example demonstrates this using the H2 database available in the open-source download of Liquibase and SQLcl Liquibase:

1. [Download](#) the open-source Liquibase client available on the Liquibase website. In your command-line interface, create a project folder and example H2 database with the following command:

```
>liquibase init project
```

```
C:\Users\>liquibase init project
#####
##                               ##
##  O   O   O   O               ##
##  |   |   |   |               ##
##  L I Q U I B A S E           ##
##  |   |   |   |               ##
##  |   |   |   |               ##
##  |   |   |   |               ##
##  |   |   |   |               ##
##                               ##
##  Get documentation at docs.liquibase.com ##
##  Get certified courses at learn.liquibase.com ##
##  Free schema change activity reports at   ##
##  https://hub.liquibase.com               ##
##                               ##
#####
Starting Liquibase at 13:47:17 (version 4.15.0 #4001 built at 2022-08-05 16:17+0000)
Liquibase Version: 4.15.0
Liquibase Community 4.15.0 by Liquibase
Setup new liquibase.properties and sample changelog? Enter (Y)es with defaults, yes with (C)ustomization, or (N)o. [Y]:
y
Setting up new Liquibase project in 'C:\Users\>\'.
To use the new project files make sure your database is active and accessible by opening a new terminal window to run "liquibase init start-h2",
and then return to this terminal window to run "liquibase update" command.
For more details, visit the Getting Started Guide at https://docs.liquibase.com/start/home.html
Liquibase command 'init project' was executed successfully.

C:\Users\>
```

2. Start your H2 database:

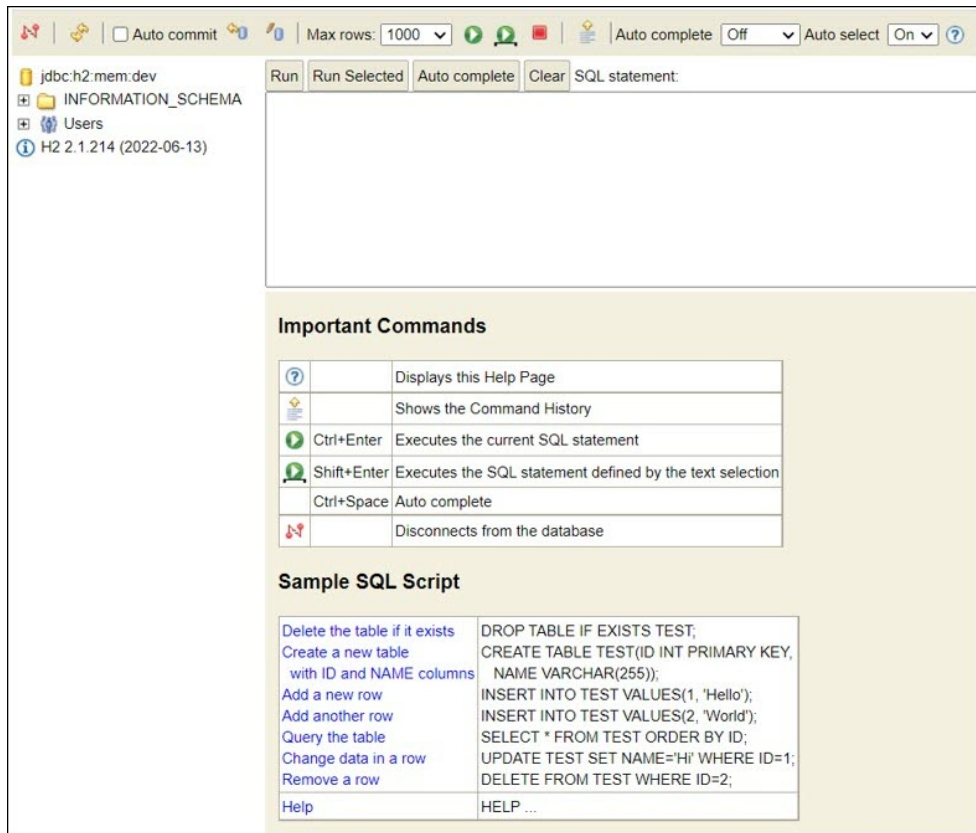
```
>liquibase init start-h2
```

```
C:\Users\ >liquibase init start-h2
#####
##                               ##
##  LIQUIBASE                     ##
##                               ##
##                               ##
##                               ##
##                               ##
##                               ##
## Get documentation at docs.liquibase.com ##
## Get certified courses at learn.liquibase.com ##
## Free schema change activity reports at ##
## https://hub.liquibase.com ##
##                               ##
#####
Starting Liquibase at 13:50:44 (version 4.15.0 #4001 built at 2022-08-05 16:17+0000)
Liquibase Version: 4.15.0
Liquibase Community 4.15.0 by Liquibase
Starting Example H2 Database...
NOTE: The database does not persist data, so stopping and restarting this process will reset it back to a blank database

Connection Information:
Dev database:
  JDBC URL: jdbc:h2:tcp://localhost:9090/mem:dev
  Username: dbuser
  Password: letmein
Integration database:
  JDBC URL: jdbc:h2:tcp://localhost:9090/mem:integration
  Username: dbuser
  Password: letmein

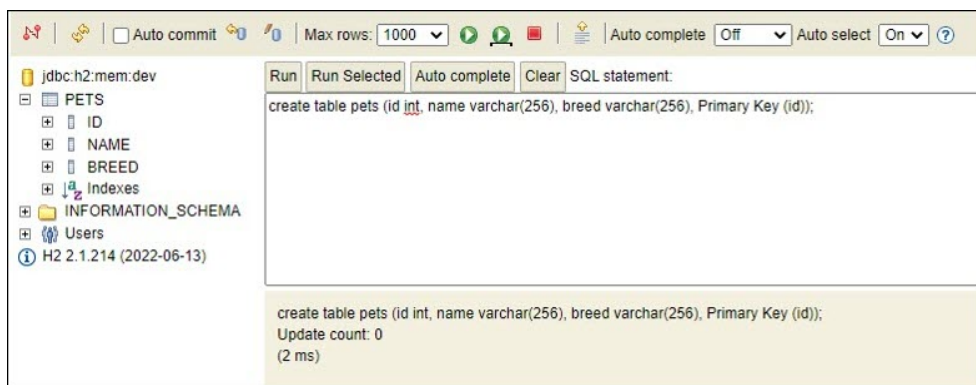
Opening Database Console in Browser...
Dev Web URL: http://localhost:8080/frame.jsp?jsessionId=8321df5bcfa92fc43c05b576e86ad283
Integration Web URL: http://localhost:8080/frame.jsp?jsessionId=eccffa1c93a406ac30b50493f105c0db
```

This also launches the database console of the empty H2 database in your browser.



3. In the browser console, create a sample table using the following command and click **Run**:

```
>create table pets (id int, name varchar(256), breed varchar(256), Primary Key (id));
```



4. Capture this schema consisting of the `Pets` table with a Liquibase changelog. Open a new command-line window and generate the changelog:

```
>liquibase --changelog-file=examplepets.xml generate-changelog
```

Name the changelog file as `examplepets.xml`.


```
C:\Users\>liquibase --changelog-file-examplepets.xml generate-changelog
#####
##
## Liquibase
##
##
## Get documentation at docs.liquibase.com
## Get certified courses at learn.liquibase.com
## Free schema change activity reports at
## https://hub.liquibase.com
##
#####
Starting Liquibase at 14:15:05 (version 4.15.0 #4001 built at 2022-08-05 16:17+0000)
Liquibase Version: 4.15.0
Liquibase Community 4.15.0 by Liquibase
BEST PRACTICE: The changelog generated by diffChangelog/generateChangelog should be inspected for correctness and completeness before being deployed.
Some database objects and their dependencies cannot be represented automatically, and they may need to be manually updated before being deployed.
Generated changelog written to C:\Users\>examplepets.xml
Liquibase command 'generate-changelog' was executed successfully.

C:\Users\>
```

The output shows where the file is saved.

5. Connect to your Oracle Database from the SQLcl 22.3 bin location.

You can view the tables in your database with the following command. The example database shows a few sample tables.

```
SQL> select table_name from user_tables;
```

TABLE_NAME
REGIONS
LOCATIONS
DEPARTMENTS
JOBS
EMPLOYEES
JOB_HISTORY
COUNTRIES

7 rows selected.

6. Copy the examplepets.xml changelog file to the SQLcl 22.3 bin folder.
7. In the SQL command-line interface, run the changelog to add the Pets table to your database, and check to see that the table is now included in your list.

```
SQL> lb update --changelog-file examplepets.xml
SQL> select table_name from user_tables;
```

```

SQL> lb update --changelog-file examplepets.xml
--Starting Liquibase at 14:40:11 (version 4.15.0 #0 built at 2022-08-19 14:45+0000)
-- Loaded 1 change(s)
Running Changeset: examplepets.xml::1662750905905-1: (generated)

Operation completed successfully.

SQL> select table_name from user_tables;

TABLE_NAME
-----
REGIONS
LOCATIONS
DEPARTMENTS
JOBS
EMPLOYEES
JOB_HISTORY
DATABASECHANGELOGLOCK
DATABASECHANGELOG_ACTIONS
DATABASECHANGELOG
PETS
COUNTRIES

11 rows selected.

SQL>

```

3.8 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
```

Name	Null?	Type
DEPLOYMENT_ID		VARCHAR2 (10)
ID		VARCHAR2 (255)
AUTHOR		VARCHAR2 (255)
FILENAME		VARCHAR2 (255)
SQL		CLOB
SXML		CLOB
DATEEXECUTED	NOT NULL	TIMESTAMP (6)
EXECTYPE	NOT NULL	VARCHAR2 (10)
MD5SUM		VARCHAR2 (35)
DESCRIPTION		VARCHAR2 (255)
COMMENTS		VARCHAR2 (255)
LIQUIBASE		VARCHAR2 (20)

CONTEXTS VARCHAR2 (255)
LABELS VARCHAR2 (255)

3.9 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.

ChangeSet	Description
CreateOracleConstraint	Creates a constraint from SQL.
CreateOracleDirectory	Creates a directory from SQL.
CreateOracleFunction	Creates a function from SQL.
CreateOracleGrant	Creates a grant from SQL.
CreateOraclePackageBody	Creates a package body from SQL.
CreateOracleJob	Creates a DBMS_Scheduler job from SQL.
CreateOraclePackageSpec	Creates a package specification from SQL.
CreateOracleProcedure	Creates a procedure from SQL.
CreateOraclePublicSynonym	Creates a public synonym from SQL.
CreateOracleRefConstraint	Creates a referential constraint from SQL.
CreateOracleSynonym	Creates a synonym from SQL.
CreateOracleTrigger	Creates a trigger from SQL.
CreateOracleTypeBody	Creates a type body from SQL.
CreateOracleTypeSpec	Creates a type spec from SQL.
CreateSxmlObject	Creates a function from SQL.
DropOracleConstraint	Drops a constraint.
DropOracleFunction	Drops a function.
DropOracleGrant	Drops a grant.
DropOraclePackageBody	Drops a package body.
DropOraclePackageSpec	Drops a package specification.
DropOracleProcedure	Drops a procedure.
DropOracleRefConstraint	Drops a referential constraint.
DropOracleTrigger	Drops a trigger.
DropOracleTypeBody	Drops a type body.
DropOracleTypeSpec	Drops a type specification.
DropOracleSynonym	Drops a synonym.
DropSxmlObject	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.
RunOracleScript	Executes a SQL script using the SQLcl engine and therefore supports all SQLcl commands. Supports script, file, and URL sources.

3.10 Tips for Liquibase Settings

This section covers the following:

- [How to Exclude Table Properties When Deploying Changelogs to a New Environment](#)
- [Create Database Objects in a Schema Different From the Connected Schema](#)

3.10.1 How to Exclude Table Properties When Deploying Changelogs to a New Environment

When capturing tables from one environment and deploying to another, there are certain table properties you may want to exclude from the deployment while creating the table. This may be due to these properties being unavailable or undesired in your target environment, such as:

- [Partitioning](#)
- [Compression](#)
- [Tablespace](#)

SQLcl uses the Data Definition Language (DDL) session settings in the target environment, where the database objects are created or altered in (and not the environment the changelog was generated from), to generate the DDL for the objects. By turning off the DDL settings, you can prevent the corresponding table properties from being included in the table creation.

1. Generate your Liquibase changelog file for the table you want to capture and deploy.

```
liquibase generate-object -object-name [table name] -object-type  
table
```

As an example, consider the following table:

```
CREATE TABLE "PARTITION_COMPRESSION_TABLESPACE_TEST"  
  ( "A" VARCHAR2(20) NOT NULL ENABLE,  
    "B" VARCHAR2(20),  
    "C" VARCHAR2(20) NOT NULL ENABLE,  
    CONSTRAINT "PARTITION_COMPRESSION_TABLESPACE_TEST_PK"  
  PRIMARY KEY ("A")  
  USING INDEX  
  PCTFREE 10 INITRANS 2 MAXTRANS 255 LOGGING  
  TABLESPACE "USERS" ENABLE  
  ) PCTFREE 0 PCTUSED 40 INITRANS 1 COMPRESS BASIC  
  STORAGE( BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE  
  DEFAULT)  
  TABLESPACE "USERS"  
  PARTITION BY HASH ("C")  
  (PARTITION "SYS_P803" SEGMENT CREATION DEFERRED
```

```

COMPRESS BASIC
TABLESPACE "USERS");

```

The following is an excerpt from the resulting changelog (the partition, compression and tablespace attributes are highlighted):

```

<?xml version="1.0" encoding="UTF-8"?>
<databaseChangeLog
xmlns="http://www.liquibase.org/xml/ns/dbchangelog"
...
  <TABLE_PROPERTIES>
    <HASH_PARTITIONING>
      <COL_LIST>
        <COL_LIST_ITEM>
          <NAME>C</NAME>
        </COL_LIST_ITEM>
      </COL_LIST>
      <DEFAULT_PHYSICAL_PROPERTIES>
        <HEAP_TABLE>
          <SEGMENT_ATTRIBUTES>
            <PCTFREE>0</PCTFREE>
            <PCTUSED>40</PCTUSED>
            <INITTRANS>1</INITTRANS>
            <MAXTRANS>255</MAXTRANS>
            <STORAGE>
              <BUFFER_POOL>DEFAULT</BUFFER_POOL>
              <FLASH_CACHE>DEFAULT</FLASH_CACHE>
              <CELL_FLASH_CACHE>DEFAULT</CELL_FLASH_CACHE>
            </STORAGE>
            <TABLESPACE>USERS</TABLESPACE>
          </SEGMENT_ATTRIBUTES>
          <COMPRESS>BASIC</COMPRESS>
        </HEAP_TABLE>
      </DEFAULT_PHYSICAL_PROPERTIES>
      <PARTITION_LIST>
        <PARTITION_LIST_ITEM>
          <NAME>SYS_P803</NAME>
          <SEGMENT_ATTRIBUTES>
            <SEGMENT_CREATION_DEFERRED></
SEGMENT_CREATION_DEFERRED>
            <TABLESPACE>USERS</TABLESPACE>
          </SEGMENT_ATTRIBUTES>
          <COMPRESS>BASIC</COMPRESS>
        </PARTITION_LIST_ITEM>
      </PARTITION_LIST>
    </HASH_PARTITIONING>
  </TABLE_PROPERTIES>
</RELATIONAL_TABLE>
</TABLE>]]></n0:source>
</n0:createSxmlObject>
</changeSet>
</databaseChangeLog>

```

- In the environment where you apply the update and generate the table, turn off the following DDL settings:

```
set ddl partitioning off
set ddl segment_attributes off
set ddl tablespace off
```

Partitioning turns off the partitioning property, `segment_attributes` turns off the compression property, and `tablespace` turns off the tablespace property.

```
SQL> show ddl
Parameters
-----
BODY                                : ON
COLLATION_CLAUSE                    : NEVER
CONSTRAINTS                          : ON
CONSTRAINTS_AS_ALTER                 : ON
EMIT_SCHEMA                          : ON
FORCE                                 : ON
INHERIT                              : ON
INSERT                               : ON
OID                                  : ON
PARTITIONING                         : OFF
PRETTY                              : ON
REF_CONSTRAINTS                      : ON
SEGMENT_ATTRIBUTES                   : OFF
SIZE_BYTE_KEYWORD                    : ON
SPECIFICATION                        : ON
SQLTERMINATOR                        : ON
STORAGE                              : ON
TABLESPACE                           : OFF
-----
End Parameters
```

- To confirm that these settings are not included in the table generation, use the `liquibase update-sql` command. This command shows you the exact SQL and PL/SQL code that will be run by the `update` command before you execute it.

```
liquibase update-sql -changelog-file
partition_compression_tablespace_test_table.xml
```

When partitioning, compression, and tablespace settings are turned off, the SQL code looks like the following snippet:

```
-- Changeset
partition_compression_tablespace_test_table.xml::fb1d77405bcd3cf7d60
e555337b80ec9555134d7::(HR)-Generated
CREATE TABLE "PARTITION_COMPRESSION_TABLESPACE_TEST"
  (
    "A" VARCHAR2(20) NOT NULL ENABLE,
    "B" VARCHAR2(20),
    "C" VARCHAR2(20) NOT NULL ENABLE,
    CONSTRAINT "PARTITION_COMPRESSION_TABLESPACE_TEST_PK"
    PRIMARY KEY ("A")
```

```

        USING INDEX ENABLE
    );

```

The following is an example of the SQL code if partitioning, compression, and tablespace settings were turned on:

```

-- Changeset
partition_compression_tablespace_test_table.xml::fb1d77405bcd3cf7d60e55533
7b80ec9555134d7::(HR)-Generated
CREATE TABLE "PARTITION_COMPRESSION_TABLESPACE_TEST"
    (
        "A" VARCHAR2(20) NOT NULL ENABLE,
        "B" VARCHAR2(20),
        "C" VARCHAR2(20) NOT NULL ENABLE,
        CONSTRAINT "PARTITION_COMPRESSION_TABLESPACE_TEST_PK" PRIMARY KEY
("A")
    USING INDEX
    PCTFREE 10 INITRANS 2 MAXTRANS 255 LOGGING
    TABLESPACE "USERS" ENABLE
    ) PCTFREE 0 PCTUSED 40 INITRANS 1 COMPRESS BASIC
    STORAGE(
        BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
    TABLESPACE "USERS"
    PARTITION BY HASH ("C")
(PARTITION "SYS_P803" SEGMENT CREATION DEFERRED
    COMPRESS BASIC
    TABLESPACE "USERS");

```

4. You can apply the update and create the table by running the `update` command in your target environment. This creates the table as unpartitioned, uncompressed, and uses the tablespace of the target environment (rather than attempting to use the tablespace of the environment the changelog was generated from).

```

liquibase update -changelog-file
partition_compression_tablespace_test_table.xml

```

3.10.2 Create Database Objects in a Schema Different From the Connected Schema

With SQLcl Liquibase, you can make deployments to a different database user schema than the one you are connected to. However, you must have the required permissions for the target user schema.

There are three important parameters related to this for the `liquibase update` command:

- `-output-default-schema|-ouids`
Controls if the schema is output or not when running the data definition language (DDL) SQL to create or alter your database object.
- If `-output-default-schema true` is set, the schema is included.

```

create table storefront.merchandise ...

```

- If `-output-default-schema false` is set or `-output-default-schema` is not set at all, the schema is not included.

```
create table merchandise ...
```

To deploy database objects to a different schema than the connected schema, you must set `-output-default-schema true` so that you can specify the schema you want to create the objects in using `-default-schema-name`.

- `-default-schema-name|-desn`
If `-output-default-schema true` is set, the `-desn` parameter controls which schema is output.

Use this parameter to specify the schema in which to create your database objects. For example, if you are connected to `test_user` and you want to create your table in `storefront`, your command would be:

```
liquibase update -changelog-file merchandise_table.xml -output-  
default-schema true -default-schema-name storefront
```

If `-output-default-schema true` is set and `-default-schema-name` is not set, the schema output is based on the `ownerName` attribute for your changeset in your changelog file.

```
<n0:createSxmlObject objectName="Merchandise" objectType="TABLE"  
ownerName="LBUSER" replaceIfExists="false" >
```

If `ownerName` is not set, the schema you are connected to is used.

- `-liquibase-schema-name|-lbsn`
One of the big advantages of the Liquibase functionality in SQLcl is the ability to track and manage your changes. This is mainly done with the `databasechangelog` tracking tables automatically created and updated in your schema when you run Liquibase.

`-liquibase-schema-name` allows you to control in which schema you update Liquibase tracking information through the `databasechangelog` tables.

This allows you to have use cases such as having a control schema or user that tracks all your Liquibase change information, while applying the database objects themselves to other schemas.

For example, you are connected to the user or schema `storefront` and want to create your merchandise table using your `merchandise_table.xml` changelog file. However, you do not want Liquibase to create your `databasechangelog` tables in this schema. You want the tracking information to be stored in the pre-existing `databasechangelog` tables in your schema `control_user`.

The following command accomplishes this:

```
liquibase update -changelog-file merchandise_table.xml -liquibase-  
schema-name control_user
```


 **Note:**

Storefront needs to have the permission to write on the `databasechangelog`, `databasechangeloglock`, and `databasechangelog_actions` tables in `control_user`.

```
GRANT SELECT, INSERT, UPDATE, DELETE ON
CONTROL_USER.DATABASECHANGELOG TO STOREFRONT;
GRANT SELECT, INSERT, UPDATE, DELETE ON
CONTROL_USER.DATABASECHANGELOGLOCK TO STOREFRONT;
GRANT SELECT, INSERT, UPDATE, DELETE ON
CONTROL_USER.DATABASECHANGELOG_ACTIONS TO STOREFRONT;
```

3.11 Important 23.4 Update with Liquibase Changelog Files

For cross-schema use, changelog files generated before SQLcl release 23.4 may require regeneration or manual updates. These alterations are necessary only if you are changing schema names between your export and import with pre-23.4 changelogs.

If you do not regenerate your changelogs or make the manual adjustments, then:

- Changelogs containing schema names are applied only to the schema named in them, regardless of provided parameters.
- Changelogs not containing schema names are applied only to the schema you are currently connected to with SQLcl, regardless of provided parameters.

SQLcl release 23.4 introduced a `%USER_NAME%` replacement for the schema name stored in changesets.

There are two types of changes for manually updating your changelogs with the proper `%USER_NAME%` substitution:

- Changelogs with `<SCHEMA></SCHEMA>` XML element
- Changelogs that use SQL within a CDATA field

For changelogs with the `<SCHEMA></SCHEMA>` XML element, replace the content inside with `%USER_NAME%`.

In the following code block, the two `<SCHEMA>` XML elements that appear in this code are highlighted using bold font. These are replaced with `%USER_NAME%`

```
<?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-latest.xsd">
  <changeSet id="5b3935a6b05750a24ac6ebc1c646bc6fe4cb4b40" author="(HR) -
Generated" failOnError="false" runOnChange="true" runAlways="false" >
    <n0:createXmlObject objectName="MERCHANDISE" objectType="TABLE"
```

```

ownerName="HR" replaceIfExists="true" >
  0:source><![CDATA[
<TABLE xmlns="http://xmlns.oracle.com/ku" version="1.0">
<SCHEMA>HR</SCHEMA>
<NAME>MERCHANDISE</NAME>
<RELATIONAL_TABLE>
  <COL_LIST>
    <COL_LIST_ITEM>
      <NAME>ID</NAME>
      <DATATYPE>NUMBER</DATATYPE>
      <IDENTITY_COLUMN>
        <SCHEMA>HR</SCHEMA>
        <GENERATION>ALWAYS</GENERATION>
        <START_WITH>1</START_WITH>
        <INCREMENT>1</INCREMENT>
        <MINVALUE>1</MINVALUE>
        <MAXVALUE>99999999999999999999999999999999</MAXVALUE>
        <CACHE>20</CACHE>
      </IDENTITY_COLUMN>
    </COL_LIST_ITEM>
  </COL_LIST>
</RELATIONAL_TABLE>
</TABLE>
</source></![CDATA[
...

```

After you do the manual adjustment, this section changes to:

```

<?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-latest.xsd">
  <changeSet id="5b3935a6b05750a24ac6ebc1c646bc6fe4cb4b40"
  author="(HR)-Generated" failOnError="false" runOnChange="true"
  runAlways="false" >
    <n0:createSxmlObject objectName="MERCHANDISE" objectType="TABLE"
  ownerName="HR" replaceIfExists="true" >
      <n0:source><![CDATA[
<TABLE xmlns="http://xmlns.oracle.com/ku" version="1.0">
<SCHEMA>%USER_NAME%</SCHEMA>
<NAME>MERCHANDISE</NAME>
<RELATIONAL_TABLE>
  <COL_LIST>
    <COL_LIST_ITEM>
      <NAME>ID</NAME>
      <DATATYPE>NUMBER</DATATYPE>
      <IDENTITY_COLUMN>
        <CHEMA>%USER_NAME%</SCHEMA>
        <GENERATION>ALWAYS</GENERATION>
        <START_WITH>1</START_WITH>
        <INCREMENT>1</INCREMENT>
        <MINVALUE>1</MINVALUE>
        <MAXVALUE>99999999999999999999999999999999</MAXVALUE>
        <CACHE>20</CACHE>
      </IDENTITY_COLUMN>
    </COL_LIST_ITEM>
  </COL_LIST>
</RELATIONAL_TABLE>
</TABLE>
</source></![CDATA[
...

```

For changelogs that use SQL within the CDATA field, attach "%USER_NAME%". to the front of all database object references. If a schema name is in these locations, replace it with "%USER_NAME%". Note that there is a period after "%USER_NAME%".

Two examples are shown below, each showing a changelog file before and after the manual adjustment, with the area of adjustment highlighted in bold font in the code block for emphasis.

Example 1

```
<?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-latest.xsd">
  <changeSet id="f1b1bf677cf990caa0147f863ea18486cdf23815" author="(LBUSER) -
  Generated" failOnError="false" runOnChange="false" runAlways="false" >
  <n0:createOracleRefConstraint objectName="EMP_JOB_FK"
  objectType="REF_CONSTRAINT" ownerName="LBUSER" replaceIfExists="false" >
  <n0:source><![CDATA[ALTER TABLE "LBUSER"."EMPLOYEES" ADD CONSTRAINT
  "EMP_JOB_FK" FOREIGN KEY ("JOB_ID") REFERENCES "LBUSER"."JOBS" ("JOB_ID")
  ENABLE;]]></n0:source>
</n0:createOracleRefConstraint>
</changeSet>
</databaseChangeLog>
```

After you do the manual adjustment, this section changes to:

```
<?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-latest.xsd">
  <changeSet id="f1b1bf677cf990caa0147f863ea18486cdf23815" author="(LBUSER) -
  Generated" failOnError="false" runOnChange="false" runAlways="false" >
  <n0:createOracleRefConstraint objectName="EMP_JOB_FK"
  objectType="REF_CONSTRAINT" ownerName="LBUSER" replaceIfExists="false" >
  <n0:source><![CDATA[ALTER TABLE "%USER_NAME%"."EMPLOYEES" ADD CONSTRAINT
  "EMP_JOB_FK" FOREIGN KEY ("JOB_ID") REFERENCES "%USER_NAME%"."JOBS"
  ("JOB_ID") ENABLE;]]></n0:source>
</n0:createOracleRefConstraint>
</changeSet>
</databaseChangeLog>
```

Example 2

```
<?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-latest.xsd">
    <changeSet id="2b1ce58fc2f1781ce70d5bb99bf23b6ae8741ff3"
    author="(TEST9)-Generated" failOnError="false" runOnChange="false"
    runAlways="false" >
        <n0:createOracleProcedure objectName="P_SQLCLERROR_PROCEDURE"
    objectType="PROCEDURE" ownerName="TEST9" replaceIfExists="false" >
            <n0:source><![CDATA[CREATE OR REPLACE EDITIONABLE PROCEDURE
    "TEST9"."P_SQLCLERROR_PROCEDURE" is
    begin
    null;
    end p_sqlclerror_procedure;
    /]]></n0:source>
        </n0:createOracleProcedure>
    </changeSet>
</databaseChangeLog>

```

After you do the manual adjustment, this section appears as follows:

```

<?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-latest.xsd">
    <changeSet id="2b1ce58fc2f1781ce70d5bb99bf23b6ae8741ff3"
    author="(TEST9)-Generated" failOnError="false" runOnChange="false"
    runAlways="false" >
        <n0:createOracleProcedure objectName="P_SQLCLERROR_PROCEDURE"
    objectType="PROCEDURE" ownerName="TEST9" replaceIfExists="false" >
            <n0:source><![CDATA[CREATE OR REPLACE EDITIONABLE PROCEDURE
    "%USER_NAME%"."P_SQLCLERROR_PROCEDURE" is
    begin
    null;
    end p_sqlclerror_procedure;
    /]]></n0:source>
        </n0:createOracleProcedure>
    </changeSet>
</databaseChangeLog>

```

3.12 Known Issues

The known issues listed are:

- [Liquibase Requires Full Connection Strings with Autonomous Database Connections](#)
- [Use Low or TP Wallet Connections With Liquibase on Autonomous Database](#)

Liquibase Requires Full Connection Strings with Autonomous Database Connections

When using Liquibase commands, any connections to Autonomous Database require full connect strings, even from an existing connection.

For example:

```
--Full Connect String
SQL> connect lbuser/password123@sqlclatp_low
--Not Full Connect String
SQL> connect lbuser/password123
```

Use Low or TP Wallet Connections With Liquibase on Autonomous Database

When using Liquibase with an Autonomous Database wallet connection, it is recommended that you use a Low or TP connection type. These connection types have parallelism disabled and allows the user to avoid any "cannot read/modify an object after modifying it in parallel" ORA errors.

3.13 Examples Using Liquibase

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

- [Review SQL](#)
- [Capture and Deploy an Object](#)
- [Capture and Deploy a Schema](#)
- [Execute Custom SQL with RunOracleScript](#)

3.13.1 Review SQL

To review SQL before running maintenance commands:

1. Optionally, set up to save SQL updates.

```
cd <lb-changes-directory>
spool update.sql
```

2. Connect to HR and capture the object.

```
connect <db-connect1-string>
lb update-sql
spool off
```

3.13.2 Capture and Deploy an Object

To deploy the EMPLOYEES table from HR to HR2:

1. Set default output path.

```
cd <output-files-path>
```

2. Connect to HR and capture the object.

```
connect <db-connect1-string>  
lb generate-object -object-type table -object-name employees
```

3. Connect to HR2 and ensure the object does not exist.

```
connect <db-connect2-string>  
drop table employees
```

4. Create the object in HR2 and verify that it was created.

```
lb update -changelog-file employees_table.xml  
desc employees
```

3.13.3 Capture and Deploy a Schema

To capture HR schema and reproduce it in HR2 schema:

1. Set default output path.

```
cd <output-files-path>
```

2. Connect to HR and capture the schema.

```
connect <db-connect1-string>  
lb generate-schema
```

3. Setup the HR2 user.

```
connect <db-connect-dba-string>  
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;
```

4. Create the schema objects deployed from HR in HR2 and verify.

```
lb update -changelog-file controller.xml  
tables
```

3.13.4 Execute Custom SQL with RunOracleScript

Create a RunOracleScript changeset to create a table and use PL/SQL variables in the script.

```
<?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>
```

4

Using Cloud Storage

Starting from SQLcl release 21.2, you can use the `DBMS_CLOUD` package for authentication to access objects in Cloud Storage.

The following actions can be performed with either `OCI` or `DBMS_CLOUD`:

- Put, get, delete, and peek objects in Cloud Storage.
- Load database objects from objects in Cloud Storage.
- Unload a database table to an object in Cloud Storage.

Table 4-1 Accessing the cloud storage

Using OCI	Using DBMS_CLOUD
Can access on-premises database and cloud database	Can access cloud database only
Set a default Cloud Storage URL, list compartments, buckets and objects, and view some of the contents of an object in Cloud Storage	Set a default Cloud Storage URL, list objects, and view some of the contents of an object in Cloud Storage
Create an OCI profile for authentication and access as a prerequisite step	Authentication is done using existing OCI or Swift credentials

Use the Cloud Storage (`cs`) command to set a default Cloud Storage URI, list compartments, buckets and objects, and view some of the contents of an object in Cloud Storage.

Topics

- [Using DBMS_CLOUD for Authentication](#)
- [Creating the OCI profile for OCI Authentication](#)
- [About the Cloud Storage Command Options](#)
- [Examples](#)



See Also:

- [Loading a File](#)
- [Calling Oracle Cloud Infrastructure REST APIs Using the OCI Command](#)

4.1 Using DBMS_CLOUD for Authentication

You can access the cloud storage using the `DBMS_CLOUD Credential` command. Presently, the `DBMS_CLOUD Credential` supports Oracle Cloud database.

With the `DBMS_CLOUD Credential` command (`dbcc`), you can:

- Create a credential using Swift, OCI credentials, or an existing OCI profile.
- Enable, disable, update, and drop a credential.
- List the credentials.
- Set the default credential.

Create a Credential

To create authentication using the Swift credential, use the following command:

```
dbcc create <new-credential-name> user <username> pass <password>
```

To create authentication using the OCI credential, use the following command:

```
dbcc create <new-credential-name> fingerprint <fingerprint> user_ocid  
<user-id> tenancy_ocid <tenancy-id> private_path <path-to-private-key>
```

To create authentication using OCI profile, use the following command:

```
dbcc create <new-credential-name> profile <oci-profile-name>
```

Enable, Disable, Update, and Drop a Credential

To enable a credential, use the following command:

```
dbcc enable <credential-name>
```

To disable a credential, use the following command:

```
dbcc disable <credential-name>
```

To update a credential, use the following command:

```
dbcc update <credential-name> <attribute> <value>
```

where <attribute> : [user_ocid] [tenancy | tenancy_id] [key_path |
private_key_path] [print | fingerprint]

To drop a credential, use the following command:

```
dbcc drop <credential-name>
```

List the Credentials

To display a list of available credentials, use the following command:

```
dbcc list
```

Set the Default Credential

To set `mycred` as the default credential, use the following command:

```
dbcc mycred
```

To find help on the `dbcc` command, use the following command:

```
help dbccred
```

An Example to Create and Set a DBMS_CLOUD Credential

The following example details the steps to create and set different types of `DBMS_CLOUD` credentials.

```
--Set the path to the Wallet zip file on your system
SQL> set cloudconfig <path-to-Wallet-file>
Operation is successfully completed.

--Supply the database user name, password and the database service name
provided in the tnsnames.ora
SQL> connect admin/<password>@adw20200526_high
Connected.

--Set Cloud Storage URL to the bucket
SQL> cs https://objectstorage.us-ashburn-1.example.com/n/test/b/example
DBMS_CLOUD Credential: Not Set
OCI Profile: Not Set
Transfer Method: Not Set
URI as specified: https://objectstorage.us-ashburn-1.example.com/n/test/b/
example

--create CREDENTIAL using Swift authentication
SQL> dbcc create swiftcred user <username> pass <password>
Credential SWIFTCRED created.
DBMS_CLOUD Credential set to SWIFTCRED.
Transfer method set to DBMS_CLOUD.

--create CREDENTIAL using OCI authentication
SQL> dbcc create ocicred fingerprint ec:98:83:**:**:**:b5
      user_ocid ocidl.user.ocl.....**g4xoca
      tenancy_ocid ocidl.tenancy.ocl.....a**3n3a
      private_path C:\\Users\\test\\oci/freedb_api_key.pem
Credential OCICRED created.
DBMS_CLOUD Credential set to OCICRED.
Transfer method set to DBMS_CLOUD.

--create CREDENTIAL using an existing OCI profile called freedb
--If profile name is not passed as a parameter, it takes the default
OCI profile details which is already set.
SQL> dbcc create profcred profile [freedb]
Credential PROFCRED created.
```

```
DBMS_CLOUD Credential set to PROFURED.  
Transfer method set to DBMS_CLOUD.
```

4.2 Creating the OCI profile for OCI Authentication

For using the OCI authentication scheme, you must first set the OCI profile.

For more information about how to set up the required SSH keys and configure your Oracle Cloud Infrastructure Software Development Kits, see [Setup and Prerequisites](#) in the *Oracle Cloud Infrastructure Documentation*.

Note the following points:

- Generate a RSA key pair in PEM format (minimum 2048 bits required) **without a passphrase**. Use this `key_file` in the profile.
- Do not use relative paths inside the configuration file because relative paths resolve based on the SQLcl launch directory. Therefore, the `key_file` may not be found.
- Use double backslashes (`\\`) instead of a single backslash (`\`) for specifying the path of the `key_file` in Windows.

To display the list of profiles contained in the OCI configuration file at `~/.oci/config`, use the following command:

```
oci profile
```

To set the profile as `demo`, use the following command:

```
oci profile demo
```

4.3 About the Cloud Storage Command Options

You can invoke the Cloud Storage command in SQLcl with `cloudstorage` or `cloud_storage` or `cs`.

The Cloud Storage Command provides Cloud Storage functions to:

- Set and show the default cloud storage URI.
- Set and show the transfer method, profile and credential.
- List compartment, bucket and objects in cloud storage.
- Get, put, delete, and peek a Cloud Storage Object.

For a list of the Cloud Storage command options in SQLcl, enter:

```
help cs
```

The command options are:

- `cs [uri] <uri>`: Sets the default Cloud Storage URI. The URI must contain the host and optionally the namespace, bucket, and object.

Example:

```
--host
cs https://objectstorage.us-ashburn-1.oraclecloud.com
--namespace
cs https://objectstorage.us-ashburn-1.oraclecloud.com/n/test
--bucket
cs https://objectstorage.us-ashburn-1.oraclecloud.com/n/test/b/example
--object
cs https://objectstorage.us-ashburn-1.oraclecloud.com/n/test/b/example/o/
employees.csv
```

- `cs oci [<profile>]`: Sets the default transfer as OCI. Optionally, specify the profile to be used.
- `cs {DBC | DBMS_CLOUD} [<credential>]`: Sets the default transfer as DBMS_CLOUD. Optionally, specify the credential to use.
- `cs clear`: Clears the Cloud Storage URI including URI and transfer options.
- `cs show`: Shows the current default Cloud Storage URI, transfer method, profile and credential.
- `cs listc [<compartment>]`: Lists the compartments in the specified *compartment*. If *compartment* is not specified, lists the compartments in the namespace as identified by the profile. (OCI only)
- `cs listb <compartment>`: Lists the buckets in a compartment. (OCI only)
- `cs listo [<bucket>]`: Lists the objects in a bucket. Bucket must be specified in the URI or on the `listo` command.
- `cs delete [<qualifier>]`: Delete the object from cloud storage.
- `cs get [<qualifier>]`: Get the object from cloud storage.
- `cs PUT [file-to-send-as-body] <qualifier>`: Copy the file to cloud storage.
- `cs peek [<qualifier>] [{ pos | position} <position>] [size <size>]`: Displays the contents of the object where:

qualifier is the name of the object, optionally qualified by the namespace and the bucket. The qualified name combined with the default URI specified must fully identify the object URI.

position is the start location in the object for display.

size is the number of characters to display. If omitted, 2000 characters are displayed.

4.4 Examples

This section provides some examples:

- [Load a Cloud Storage File into a Table](#)
- [Unload Table Data into Cloud Storage](#)
- [List Compartments, Buckets, and Objects](#)
- [Load a Local File into Cloud Storage using the PUT command](#)

- [Get a File from Cloud Storage using the GET Command](#)
- [Delete a File in Cloud Storage using the DELETE Command](#)
- [Grant a DBMS_CLOUD Credential to Another User](#)

Load a Cloud Storage File into a Table

The following example shows how to load a cloud storage file into a database table:

Use Case 1: When using the DBMS_CLOUD authentication scheme, the DBMS_CLOUD credential is set and transfer method is set to dbms_cloud.

```
--Set the DBMS_CLOUD credential
SQL> cs dbc swiftcred

--Set Cloud Storage URI to the bucket
SQL> cs https://objectstorage.us-ashburn-1.example.com/n/test/b/example

DBMS_CLOUD Credential: SWIFTCRED
OCI Profile: Not Set
Transfer Method: dbms_cloud
URI as specified: https://objectstorage.us-ashburn-1.example.com/n/
test/b/example
```

Use Case 2: When using the OCI Profile authentication scheme, the OCI profile is set and transfer method is set to oci.

```
--Set the OCI profile
SQL> cs oci demo
--Set Cloud Storage URI to the bucket

SQL> cs https://objectstorage.us-ashburn-1.example.com/n/test/b/example

DBMS_CLOUD Credential: Not Set
OCI Profile: Demo
Transfer Method: oci
URI as specified: https://objectstorage.us-ashburn-1.example.com/n/
test/b/example

--Create Table "locations"
SQL> create table locations(location_id NUMBER(5),location_name
VARCHAR2(40));
Table LOCATIONS created

--Load data from LOCATIONS_DATA_TABLE.csv in cloud storage into
"locations" table of the schema for the current user
SQL> load locations cs /o/LOCATIONS_DATA_TABLE.csv

format csv

column_names on
delimiter ,
enclosure_left "
```

```
enclosure_right "
encoding UTF8
row_limit off
row_terminator default
skip_rows 0
skip_after_names

--Number of rows processed: 50
--Number of rows in error: 0
--Last row processed in final committed batch: 50
0 - SUCCESS: Load processed without errors

SQL> select count(*) from locations;

COUNT(*)
-----
50

--Load data from LOCATIONS_DATA_TABLE.csv in your current local folder into
"locations" table
  of the schema for the current user
SQL> load locations cs LOCATIONS_DATA_TABLE.csv
```

Unload Table Data into Cloud Storage

The following example shows how to unload data from the `locations` table into cloud storage. The data is unloaded to the cloud storage location and is named `LOCATIONS_DATA_TABLE.csv`.

```
--Set Cloud Storage URI to the bucket
SQL> cs https://objectstorage.us-ashburn-1.oraclecloud.com/n/test/b/example

--Specify delimiter as | and terminator as <eol>
SQL> set loadformat delimiter | term <eol> csv

--Unload locations table into cloud storage
SQL> unload locations cs

DBMS_CLOUD Credential: SWIFTCRED          --Using DBMS_CLOUD authentication
OCI Profile: Not Set
Transfer Method: dbms_cloud
URI as specified: https://objectstorage.us-ashburn-1.oraclecloud.com/n/
test/b/example/o/
Final URI: https://objectstorage.us-ashburn-1.oraclecloud.com/n/test/b/
example/o/

format csv

column_names on
delimiter |
enclosure_left "
enclosure_right "
encoding UTF8
row_terminator <eof>
```

```
** UNLOAD Start ** at 2020.09.10-17.08.34
Export Separate Files to https://objectstorage.us-
ashburn-1.oraclecloud.com/n/test/b/example
DATA TABLE LOCATIONS
File Name: LOCATIONS_DATA_TABLE.csv
Number of Rows Exported: 23
** UNLOAD End ** at 2020.09.10-17.08.39

-- Show file contents
SQL> cs peek /o/LOCATIONS_DATA_TABLE.csv

"LOCATION_ID"|"LOCATION_NAME"<eof>01|"California"<eof>02|"Alaska"<eof>03
|"Florida"<eof>04|"Texas"<eof>05|"Virginia"<eof>
06|"Louisiana"<eof>07|"Massachusetts"<eof>08|"Arkansas"<eof>09|"Oregon"
<eof>10|"Hawaii"<eof>11|"Maryland"<eof>
12|"Pennsylvania"<eof>13|"Colorado"<eof>14|"Michigan"<eof>15|"Minnesota"
<eof>16|"Ohio"<eof>17|"Maine"<eof>18|"Arizona"<eof>
19|"Missouri"<eof>20|"Vermont"<eof>21|"Kansas"<eof>22|"Nevada"<eof>23|"
Illinois"
```

List Compartments, Buckets, and Objects

The following example shows how to list compartments, buckets, and objects in cloud storage:



Note:

When using `DBMS_CLOUD` credential, you can only list the objects in the bucket. `DBMS_CLOUD` transfer method does not support listing compartments and buckets.

```
cs https://objectstorage.us-ashburn-1.oraclecloud.com/n/test

--Lists the compartments in the namespace
SQL> cs listc

COMP_APEX
dbtst
old
ords
pdf-fn-compartment
sandbox
sqldev

--Lists the compartments in the compartment sqldev
SQL> cs listc sqldev

sqldev1

--Lists the buckets in the compartment sqldev
SQL> cs listb sqldev
```

```
example
test

--Lists the objects in the bucket transfer
SQL> cs listo /b/example

COUNTRIES_DATA_TABLE.csv
DEPARTMENTS_DATA_TABLE.csv
REGIONS_DATA_TABLE.csv
LOCATIONS_DATA_TABLE.csv

--Displays the first 2000 characters of LOCATIONS_DATA_TABLE file
SQL> cs peek /o/LOCATIONS_DATA_TABLE.csv
```

Load a Local File into Cloud Storage using the PUT command

The following example shows how to load a local file into cloud storage using the `CS PUT` command and the Cloud Storage command:

```
--Set Cloud Storage URI to the bucket
SQL> cs https://objectstorage.us-ashburn-1.oraclecloud.com/n/test/b/example

--Put an object from local directory into cloud storage
SQL> cs put C:\\Users\\JDOE\\EMPLOYEES_DATA_TABLE.csv /o/myemployees.csv

Put C:\\Users\\JDOE\\EMPLOYEES_DATA_TABLE.csv copied
    to https://objectstorage.us-ashburn-1.oraclecloud.com/n/test/b/
example/o/myemployees.csv

--List the objects in the bucket
SQL> cs listo

COUNTRIES_DATA_TABLE.csv
DEPARTMENTS_DATA_TABLE.csv
REGIONS_DATA_TABLE.csv
LOCATIONS_DATA_TABLE.csv
myemployees.csv
```

Get a File from Cloud Storage using the GET Command

The following example shows how to get a file from cloud storage using the `CS GET` command and the Cloud Storage command:

```
--Set Cloud Storage URI to the bucket
SQL> cs https://objectstorage.us-ashburn-1.oraclecloud.com/n/test/b/
example/o/

--Set the local directory
SQL> cd C:\\Users\\JDOE\\TempCS

--Get the myemployees.csv file from cloud storage
SQL> cs get /o/myemployees.csv
```



```
Get Object https://objectstorage.us-ashburn-1.oraclecloud.com/n/test/b/
example/o/myemployees.csv
copied to C:\Users\JDOE\TempCS\employees.csv
```

Delete a File in Cloud Storage using the DELETE Command

The following example shows how to delete a file in cloud storage using the CS DELETE command and the Cloud Storage command:

```
--Set Cloud Storage URI to the bucket
SQL> cs https://objectstorage.us-ashburn-1.oraclecloud.com/n/test/b/
example/o/

--Set the local directory
SQL> cd C:\\Users\JDOE\\TempCS

--Delete the myemployees.csv file in cloud storage
SQL> cs delete /n/test/b/example/o/myemployees.csv

Deleted Object
https://objectstorage.us-ashburn-1.oraclecloud.com/n/test/b/example/o/
myemployees.csv
```

Grant a DBMS_CLOUD Credential to Another User

The following example shows how to create and grant a DBMS_CLOUD credential to another user:

```
-- Create a DBMS_CLOUD credential using oci-profile
SQL> dbcc create jdoecred profile freedb

DBMS_CLOUD Credential: JDOECRED
OCI Profile: Not Set
Transfer Method: dbms_cloud
URI as specified: https://objectstorage.us-ashburn-1.example.com/n/
test/b/example

-- Grant jdoecred to user jdoe
SQL> grant all on jdoecred to jdoe;

-- Connect to the Cloud instance as jdoe
SQL> connect jdoe/*****@adw20200526_high

-- Create a synonym for jdoecred
SQL> create synonym mycred for admin.jdoecred;

-- Set the transfer method using the synonym mycred
SQL> cs dbc mycred

-- User can now list the objects in the Cloud Storage 'test' bucket
because jdoe.mycred exists (as synonym)
```

```
SQL> cs listo
```

5

Using Data Pump

You can import and export data and metadata using Data Pump. Data Pump is made available in SQLcl using the PL/SQL package, `DBMS_DATAPUMP`.

You can do the following:

- Export one or more schemas.
- Import one or more schemas with the `remap schema` option.
- Use `DATAPUMP` export and import for Oracle Database and Oracle Autonomous Database Cloud Services.
- Use database directory or Oracle Object Store for dump files, which can be optionally encrypted.
- Perform parallel processing of dump files.
- Filter objects by object types or names.
- Use the `SET DATAPUMP` command to set defaults and save them with the `STORE` command.
- Use the Cloud Storage feature to put or get from the database directory.

Topics

- [Getting Started](#)
- [Data Pump Command Syntax and Arguments](#)
- [Use Cases](#)
- [Tips and Troubleshooting](#)

5.1 Getting Started

The following sections provide information needed to get started with the `DATAPUMP` command in SQLcl.

5.1.1 Prerequisites

To use `DATAPUMP` in SQLcl, you need to know the following:

- When you are the logged-in user that is exporting or importing:
 - You must have the appropriate system privileges or adequate user space resource on the tablespace.
 - If you do not have the `DBA` or `PDB_DBA` role, you need access to the Oracle Directory for importing or exporting your own schema.

For example:

```
grant read, write on directory DATA_PUMP_DIR to dpumpnotdba;
```

- When using other schemas:
 - See [Required Roles](#) to learn about the required roles for data pump import and export operations.
 - You must have permissions for the tablespace to import.
- If you are unable to use Data Pump, you can instead load a file using [Loading a File](#).
- To connect to an Autonomous Database:
 - Download the wallet file for the Oracle Cloud connection. See [Download Client Credentials](#).
 - For importing to Autonomous, see [Cloud Premigration Advisor Tool \(CPAT\)](#).
- To use object storage from Oracle Database:
 - See [About the Cloud Storage Command Options](#) and [Setup and Prerequisites](#) in the *Oracle Cloud Infrastructure Documentation*.
 - You must install an OCI profile configuration file.
 - The OCI profile must be set using `OCI PROFILE <name>` or `CS OCI <profile>`.
 - You can copy dump files to object storage as the last step of an export using the `-copycloud` option on the data pump export.
 - You can copy dump files from object storage as the first step of an import using the `-copycloud` option on the data pump import.
 - You can copy dump files between cloud storage and Oracle Directories using the Cloud Storage command (put and get).
- To use object storage from Autonomous Database:
 - See [Using DBMS_CLOUD for Authentication](#).
 - You must set the credential for object storage using Cloud Storage, `SET DATAPUMP` or `DATAPUMP` command.
 - You can export dump files directly to object storage without using a database directory.
 - You can import dump files directly from object storage without using a database directory.
 - You cannot write log files directly to object storage but you can copy them to cloud storage using the Cloud Storage command.
- The Time Zone File version is shown during export. The dump file can only be imported into a database with the same (or later) time zone file version.
- Transparent and Dual encryption modes require Transparent Data Encryption (TDE). If TDE is not available, you can use only password encryption.

5.1.2 Usage

The `DATA PUMP` command creates and submits data pump jobs using the `DBMS_DATAPUMP` package.

- For importing to Autonomous, see [Cloud Premigration Advisor Tool \(CPAT\)](#).
- You can have different hardware, operating systems, character sets, time zones, and versions in the source and target databases.
- All object types and data types existing in Oracle Database release 11g and later versions are supported.
- You can transfer and filter data and metadata.
- You can transform schema names, tablespace names, and metadata at import time.
- You can unload and load data in an Oracle proprietary format.
- You can encrypt dump files to ensure your data is secure. You can use transparent if available on the database or use password as the encryption mode.
- You can filter the import or export process to limit the objects types and objects included.

Export

Data Pump export is used to unload metadata and data into a dump file, which can be stored in an Oracle Directory or object storage.

- If a schema or list of schemas is not provided, the current schema is exported.
- If a directory or object storage and a credential are not provided, the dump file is stored in `DATA_PUMP_DIR`.
- Job name is created as `ESQL_<n>`, if one is not provided.
- If a dump file name is not provided, the dump file is stored as `<jobname>.DMP`.
- If a log file name is not provided, the log file is stored as `<jobname>.LOG`.

Import

Data Pump import is used to load metadata and data from a previously exported dump file, which was stored in an Oracle Directory or object storage.

- If a schema or list of schemas is not provided, all the objects in the dump file are imported (`FULL` import by default). You can use a filter to limit the number of objects imported.
- If a database directory or object storage and a credential are not provided, the dump file is stored in `DATA_PUMP_DIR`.
- Job name is created as `ISQL_<n>`, if one is not provided.
- If a dump file name is not provided, the dump file is stored as `<jobname>.DMP`.
- If a log file name is not provided, the log file is stored as `<jobname>.LOG`.

5.2 Data Pump Command Syntax and Arguments

You can invoke the Data Pump command using `dp` or `datapump`.

Syntax

```
dp help [examples|syntax] | export [<optional-argument>,...] | import
[<optional-argument>,...] |
```

To see the help description for data pump in SQLcl, type:

```
dp help
```

To quickly view the syntax and exclude other details, type:

```
dp help syntax
```

To only view the examples in help, type:

```
dp help examples
```

<optional argument>: The following table describes the possible optional arguments along with default values for each of them.

Table 5-1 Optional Arguments

File Argument	Description	Default
-credential, -c	Credential for dump file access in Oracle Object Store.	As specified in the Cloud Storage command
-directory, -d	Default database directory for reading and writing dump and log files.	DATA_PUMP_DIR
-dumpdirectory, -dd	Database directory for dump file.	-directory if specified or DATA_PUMP_DIR
-dumpfile, -f	<i><file-name></i> [...] Dump file name(s) when using database directory. You can specify multiple files whether parallelism is enabled or not. The number of files specified must be at least as large as the degree of parallelism.	<i><jobname></i> <i><n></i> .DMP

Table 5-1 (Cont.) Optional Arguments

File Argument	Description	Default
-dumpuri,-u	<p>[<uri>[,...]] <qualified-name>[,...]]</p> <p><uri>: Complete URI for the Oracle Object Store file if a default is not set on Cloud Storage command.</p> <p><qualifier>: Name of the object, optionally qualified by the namespace and the bucket. The qualified name concatenated to the URI specified on Cloud Storage command must fully identify the object URI.</p> <p>Credential must be set for direct read/write access to Oracle Object Store from Autonomous database. For -copycloud between database directory and Oracle Object Store, OCI PROFILE must be set.</p> <p>You can specify multiple URIs whether parallelism is enabled or not. The number of files specified should be at least as large as the degree of parallelism.</p>	Default object name is <jobname>.DMP
-logdirectory,-ld	Database directory for log file.	-directory if specified or DATA_PUMP_DIR
-logfile,-lf	Log file name in the database directory.	<jobname><n>.LOG

Table 5-2 Command Arguments

Command Argument	Description	Default
-noexec,-ne	<p>[TRUE FALSE]</p> <p>TRUE: Validate and generate the PL/SQL, but do not execute it.</p>	FALSE
-verbose,-ve	<p>[TRUE FALSE]</p> <p>TRUE: Show additional diagnostic output.</p>	FALSE

Table 5-3 Common Arguments

Common Argument	Description	Default
-copycloud,-cc	<p>[TRUE FALSE]</p> <p>TRUE: Copy the dump file between database directory and Oracle Object Store.</p> <p>For export, copy the dump file from the database directory to Oracle Object Store after the data pump job completes.</p> <p>For import, copy the dump file from Oracle Object Store to the database directory before the data pump job starts.</p> <p>Set the OCI PROFILE using OCI command or CLOUDSTORAGE command. Set the cloud storage URI using the CLOUDSTORAGE command, SET DATA PUMP command or DATA PUMP command.</p>	FALSE
-encryptionpassword,-enp	<p><password></p> <p>If password is not specified, a prompt for the password is given.</p> <p>For export, the dump files are encrypted using the password. For import, the same password used for export is provided.</p>	None
-excludeexpr,-ex	<p><object_type_expression></p> <p>Specify an expression identifying an object type or set of object types to exclude from the job. Example:-</p> <pre>excludeexpr "IN ('GRANT', 'INDEX', 'TRIGGER')"</pre>	None
-excludelist,-el	<p><object-type>[,...]</p> <p>Specify a comma-separated-value list of object types to exclude from the job.</p> <p>Example:-excludelist GRANT, INDEX, TRIGGER</p>	None

Table 5-3 (Cont.) Common Arguments

Common Argument	Description	Default
-includeexpr,-ix	<p><i><object_type_expression></i></p> <p>Specify an expression identifying an object type or set of object types to include in the job. Only matching object types and their dependents are included in the job. Use -excludelist or -excludeexpr to exclude dependent objects. Example:</p> <pre>-includeexpr "IN ('TABLE', 'VIEW')"</pre>	None
-includelist,-il	<p><i><object_type>[,...]</i></p> <p>Specify a comma-separated-value list of object types to include in the job. Only matching object types and their dependents are included in the job. Use -excludelist or -excludeexpr to exclude dependent objects. Example:</p> <pre>-includelist TABLE,VIEW</pre>	None
-includemetadata,-im	<p>[TRUE FALSE]</p> <p>TRUE: Include metadata in the job.</p>	TRUE
-includerows,-ir	<p>[TRUE FALSE]</p> <p>TRUE: Include data in the job.</p>	TRUE
-jobname,-j	<p>Name for the data pump job. Job name is appended with a data pump generated number, unless it ends with a number. <i>jobname<n></i> is used when submitting the data pump job and as a default name for dump and log file names or object names.</p>	ESQL_<n> ISQL_<n> where <i>n</i> is a data pump generated number.
-nameexpr,-nx	<p>{<i><object-type>=<name-expression></i>}[;...]</p> <p>For specified object type, provide an expression identifying a set of object names to include in the job. Example:</p> <pre>-nameexpr TABLE="IN ('EMPLOYEES', 'DEPARTMENTS')"; PROCEDURE="IN ('ADD_JOB_HISTORY', 'SECURE_DML')"</pre>	None

Table 5-3 (Cont.) Common Arguments

Common Argument	Description	Default
-namelist,nl	<p>{<object-type>=<name>[,...]} [:...]</p> <p>For specified object type, provide a comma-separated-value list of objects to include in the job. Example: - namelist TABLE=employees,departments;PROCEDURE=add_job_history,secure_dml</p>	None
-parallel,-p	<p><degree_integer></p> <p>Adjusts the degree of parallelism within a job allowing multiple processes simultaneously. Specify the same number of files as the degree or some processes may remain idle.</p>	1
-schemas,-s	<p><schema>[,...]- The schema or list of schemas to process. For example: -schemas schema1, schema2</p>	For export, schema for the current connection. For import, the default is FULL and all objects in the dump file are imported.
-version,-v	<p>{<nn.n> COMPATIBLE LATEST}</p> <p><nn.n>: A specific database version, for example, 11.0.0. When exporting from Oracle Database 11g release 2 (11.2.0.3) or later into an Oracle Database 12 c Release 1 (12.1), specify a value of 12 to allow all existing database features, components, and options to be exported. This applies to a multitenant container database (CDB) or a non-CDB. COMPATIBLE: Uses the metadata version from the database compatibility level and the compatibility release level for the feature. LATEST: The version of the metadata corresponds to the database version.</p>	COMPATIBLE

Table 5-3 (Cont.) Common Arguments

Common Argument	Description	Default
-wait,-w	[TRUE FALSE] TRUE: Wait for the data pump job to finish and show summary results. FALSE: Submit the data pump job without waiting and without showing results.	TRUE

Table 5-4 Export Only Arguments

Export-Only Arguments	Description	Default
-compression,-cm	{ALL DATA_ONLY METADATA_ONLY NONE} Indicates if compression is needed for user data and metadata. ALL: Compress user data and metadata. DATA_ONLY: Compress only user data. METADATA_ONLY: Compress only metadata. NONE: Do not compress user data or metadata.	METADATA_ONLY
-estimate,-e	{BLOCKS STATISTICS} Specifies the estimate method for the size of the tables. It should be performed before starting the job. BLOCKS: Estimate is calculated using the count of blocks allocated to the user tables. STATISTICS: Estimate is calculated using the statistics for each table. If no statistics are available for a table, BLOCKS is used.	
-encryption,-en	{ALL DATA_ONLY ENCRYPTED_COLUMNS_ONLY METADATA_ONLY NONE} Specifying any encryption option will turn on encryption if you do not specify -encryption NONE.	NONE, or ALL if any other encryption option is specified.
-encryptionalgorithm,-ena	{AES128 AES192 AES256} Identifies the cryptographic algorithm to use.	AES128

Table 5-4 (Cont.) Export Only Arguments

Export-Only Arguments	Description	Default
-encryptionmode,-enm	{DUAL PASSWORD TRANSPARENT} Identifies the types of security used for encryption and decryption. PASSWORD encrypts the dump files using the provided password. TRANSPARENT enables encryption if the Oracle Encryption Wallet is available. DUAL enables import using the Oracle Encryption Wallet or the password. When using DUAL, -encryptionpassword must be specified.	TRANSPARENT, or PASSWORD if -encryptionpassword is specified.
-filesize,-fs	{<n>{B KB MB GB TB}} Limit for the size of files.	500 MB
-flashbackscn,-fb	[TRUE FALSE] TRUE: Use consistent database content based on system change number (SCN) at the start time of execution.	FALSE
-reusefile,-r	[TRUE FALSE] TRUE: Replace existing dump file(s) with a new file.	TRUE

Table 5-5 Import Only Arguments

Import-Only Arguments	Description	Default
-columnencryption,-ce	[TRUE FALSE] TRUE: Include column encryption clause on table metadata. FALSE Omit column encryption clause.	TRUE if supported by database
-objectid,-oid	[TRUE FALSE] TRUE: Assign the exported OID. FALSE: Assign a new OID	TRUE

Table 5-5 (Cont.) Import Only Arguments

Import-Only Arguments	Description	Default
-remapschemas,-rs	<i>{<oldSchema>=<newSchema>[,...]}</i> <oldSchema> objects in the job are moved to <newSchema>. Example: oldschema1=newschema1,old schema2=newschema2.	Not Applicable
-remaptablespaces,-rt	<i>{<oldTablespace>=<newTablespace>[,...]}</i> <oldTablespace> storage segment in the job is relocated to <newTablespace>. Example: oldtablespace1=newtablespace1,oldtablespace2=newtablespace2	Not Applicable
-segmentattributes,-sa	[TRUE FALSE] TRUE: Include segment attributes clauses (physical attributes, storage attributes, tablespace, logging).	TRUE
-skipunusableindexes,-sui	[TRUE FALSE] TRUE : Rows are inserted into tables having unusable indexes.	TRUE
-storage,-st	[TRUE FALSE] TRUE: Include storage clauses.	TRUE
-tableexists,-te	{APPEND REPLACE SKIP TRUNCATE} Action to take if table exists during import. APPEND: New rows are added to the existing rows in the table. REPLACE: Before creating the new table, the old table is dropped. SKIP: The preexisting table is left unchanged. TRUNCATE: Rows are removed from a preexisting table before inserting rows from the import.	SKIP when - includemetadata true, otherwise APPEND action is taken if table exists during import.

Table 5-5 (Cont.) Import Only Arguments

Import-Only Arguments	Description	Default
-tablecompression,-tc	[TRUE FALSE] TRUE: The table compression clause is included if supported. FALSE: The table has the default compression for the tablespace.	TRUE

5.3 Use Cases

The following use cases illustrate how to use the `DATAPUMP` command to import and export data.

Use Case 1

Copy tables, views and functions in current schema from database to database.

1. Export the current schema into `DATA_PUMP_DIR`.
2. Import the schema from `DATA_PUMP_DIR`.

```
-- Export the current schema into DATA_PUMP_DIR
SQL> connect <db-connect1-string>
SQL> dp export -dumpfile my_dump.dmp -includelist table,view,function

-- Import from DATA_PUMP_DIR
SQL> connect <db-connect2-string>
SQL> dp import -dumpfile my_dump.dmp
```

Use Case 2

Copy current schema from database to Autonomous Database. Encryption is done using prompt for password.

1. Set up for Oracle access to Oracle Object Store using an OCI profile.
2. Export current schema into an encrypted dump file in `DATA_PUMP_DIR` and copy it to the CS bucket using profile.
3. Import encrypted file from Oracle Object Store using credential.

```
-- Set up for Oracle access to Oracle Object Store using an OCI profile
SQL> oci profile my-profile
SQL> cs https://swiftobjectstorage.us-ashburn-1.oraclecloud.com/v1/
abc123/testing-bucket/

-- Export current schema into an encrypted dump file in DATA_PUMP_DIR
and copy it to the CS bucket using profile
SQL> connect <db-connect-string>
SQL> dp export -copycloud -dumpfile my_dump.dmp -encryptionpassword
```

```
-- Import encrypted file from Oracle Object Store using credential
SQL> set cloudconfig <wallet>
SQL> connect <cloud-connect-string>
SQL> dp import -dumpuri /o/my_dump.dmp -encryptionpassword -c SWIFTCRED
```

Use Case 3

Copy multiple schemas from database to Autonomous Database with remap schemas.

1. Set up for Oracle access to Oracle Object Store using an OCI profile.
2. Export schemas into database directory and copy to cloud.
3. Import from Oracle Object Store using credential. Remap the schemas.

```
-- Set up for Oracle access to Oracle Object Store using an OCI profile
SQL> oci profile my-profile
SQL> cs https://swiftobjectstorage.us-ashburn-1.oraclecloud.com/v1/abc123/
testing-bucket/

-- Export schemas into database directory and copy to cloud
SQL> connect <db-connect-string>
SQL> dp export -schemas dpumpstest1,dpumpstest11 -dumpfile DPUMPTEST1_11.DMP -
cc

-- Import from Oracle Object Store using credential. Remap the schemas
SQL> set cloudconfig <wallet>
SQL> connect <cloud-connect-string>
SQL> dp import -dumpuri /o/DPUMPTEST1_11.DMP -c SWIFTCRED -rs
dpumpstest1=dpumpstest2,dpumpstest11=dpumpstest21
```

Use Case 4

Copy multiple schemas from database to Autonomous Database with remap tablespace using OCI profile only.

1. Set up for Oracle access to Oracle Object Store using an OCI profile.
2. Export the current schema into DATA_PUMP_DIR and copy it to the CS bucket using profile.
3. Copy from Oracle Object Store into directory and import from directory. Remap the tablespace.

```
-- Set up for Oracle access to Oracle Object Store using an OCI profile
SQL> oci profile my-profile
SQL> cs https://swiftobjectstorage.us-ashburn-1.oraclecloud.com/v1/abc123/
testing-bucket/

-- Export the current schema into DATA_PUMP_DIR and copy it to the CS bucket
using profile
SQL> connect <db-connect-string>
SQL> dp export -copycloud

-- Copy from Oracle Object Store into directory and import from directory.
Remap the tablespace.
```

```
SQL> set cloudconfig <wallet>
SQL> connect <cloud-connect-string>
SQL> dp import -copycloud -dumpuri /o/ESQL_<n>.DMP -rt DATA=USERS
```

Use Case 5

Copy current schema from database to Autonomous Database using parallel processors.

1. Set up for Oracle access to Oracle Object Store using an OCI profile.
2. Export the current schema into DATA_PUMP_DIR and copy all files to the CS bucket using profile.
3. Import from Oracle Object Store using credential.

```
-- Set up for Oracle access to Oracle Object Store using an OCI profile
SQL> oci profile my-profile
SQL> cs https://swiftobjectstorage.us-ashburn-1.oraclecloud.com/v1/
abc123/testing-bucket/

-- Export the current schema into DATA_PUMP_DIR and copy all files to
the CS bucket using profile
SQL> connect <db-connect-string>
SQL> dp export -copycloud -parallel 3 -dumpfile
my_dump1.dmp,my_dump2.dmp,my_dump3.dmp

-- Import from Oracle Object Store using credential
SQL> set cloudconfig <wallet>
SQL> connect <cloud-connect-string>
SQL> dp import -dumpuri /o/my_dump1.dmp,/o/my_dump2.dmp,/o/
my_dump3.dmp -c SWIFTCRED
```

5.4 Tips and Troubleshooting

The `DATAPUMP` command builds PL/SQL that uses the `DBMS_DATAPUMP` package to execute exports and imports.

- Preview the PL/SQL and Parameters
 - Use the `-noexec` option to validate the export or import. This option shows the generated PL/SQL and parameters but does not submit the job for execution.
- Get additional information about the command processing
 - Use the `-verbose` option to see additional diagnostic information.
 - This option also provides queries that you can copy to view the last line of the log and percentage completed.
- View the job log
 - When using the `-wait` option, the log is written to the console.
 - When using `-wait false`, you can copy the log to object storage if you cannot see files in the directory.

- When using `-wait false`, you can view the log file with the following code block for Oracle Database release 12.2 and later versions:

```
var c clob;
set long 32000
begin select to_clob(BFILENAME('DATA_PUMP_DIR','ESQL_<n>.LOG'))
into :c from dual; end;
/
print c
```

- When importing or exporting as the logged-in user, it is recommended not to use the `SYS` role.
- Inserting a row into a table confirms you have quota on the tablespace. If you do not have quota, you see the following error after you run a `DATAPUMP` command: **ORA-31626: job does not exist.**

The following code snippet illustrates this problem:

```
*** Error with DataPump command

grant connect, resource, create session to user1 identified by user1;
grant read on directory DATA_PUMP_DIR to user1;
grant write on directory DATA_PUMP_DIR to user1;

SQL> connect <db-connect-string>
Connected

SQL> datapump export -schemas user1

Datapump Command Start ** at 2022.03.10-15.51.28
Initiating DATA PUMP
DATABASE TIME ZONE: VERSION:32 CON_ID:0
Log
Location: DATA_PUMP_DIR:ESQL_1614.LOG
ORA-31626: job does not exist
ORA-06512: at "SYS.DBMS_SYS_ERROR", line 79
ORA-06512: at "SYS.DBMS_DATAPUMP", line 1849
ORA-06512: at "SYS.DBMS_DATAPUMP", line 6869
ORA-06512: at line 25

** Datapump Command End ** at 2022.03.10-15.51.30
SQL> exit

***Resolve Error by Granting Tablespace Quota to User
Connected to:
Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 - Production
Version 19.3.0.0.0

SQL> alter user user1 quota 128M on users;
Grant succeeded.

SQL> connect <db-connect-string>
Connected.

SQL> datapump export -schemas user1
```

```
** Datapump Command Start ** at 2022.03.10-15.54.15
Initiating DATA PUMP
DATABASE TIME_ZONE: VERSION:32 CON_ID:0
Log Location: DATA_PUMP_DIR:ESQL_1616.LOG
Starting "USER1"."ESQL_1616":
Processing object type SCHEMA_EXPORT/TABLE/TABLE_DATA
Processing object type SCHEMA_EXPORT/TABLE/INDEX/STATISTICS/
INDEX_STATISTICS
Processing object type SCHEMA_EXPORT/TABLE/STATISTICS/
TABLE_STATISTICS
Processing object type SCHEMA_EXPORT/PRE_SCHEMA/PROCACT_SCHEMA
Processing object type SCHEMA_EXPORT/TABLE/TABLE
Processing object type SCHEMA_EXPORT/TABLE/COMMENT
Processing object type SCHEMA_EXPORT/TABLE/INDEX/INDEX
Master table "USER1"."ESQL_1616" successfully loaded/unloaded
*****
*****
Dump file set for USER1.ESQL_1616 is:
  /opt/oracle/admin/DB193C/dpdump/D9C3824B6E651CA4E053020014C3358C/
ESQL_1616.DMP
Job "USER1"."ESQL_1616" successfully completed at Thu Mar 10
15:54:52 2022 elapsed 0 00:00:33
DataPump Operation Status 'COMPLETED'
Jobname = ESQL_1616
** Datapump Command End ** at 2022.03.10-15.54.56
```

6

Using the Cloud Premigration Advisor Tool

The Cloud Premigration Advisor Tool (CPAT) helps you evaluate an existing Oracle database for compatibility with Oracle Autonomous Database before migration. CPAT identifies potential user actions, prioritizes their importance, and suggests resolutions. Oracle recommends using CPAT to accelerate your migration to Oracle Cloud.

For more information about CPAT, see the document *CPAT Analyzes Databases for Suitability of Cloud Migration* (Doc ID 2758371.1) in My Oracle Support.

You can use SQLcl to run CPAT by using the `MIGRATEADVISOR` command.

Topics:

- [Overview](#)
- [Prerequisites](#)
- [About the MIGRATEADVISOR Command](#)
- [Examples](#)
- [Tips and Troubleshooting](#)

6.1 Overview

Using the `MIGRATEADVISOR` command in SQLcl, you can:

- Analyze an Oracle database to a generic autonomous type or specific instance, and create reports identifying actions recommended for successful migration to Oracle Cloud. A report can be generated in HTML, text or JSON format.
- Optionally, generate a target properties file that will provide more details specific to an autonomous instance.

The following image shows a CPAT report in HTML format.

```
SQL> migrateadvisor advise -schemas hr -outfileprefix xschemas -targettype adws -reportformat HTML

Cloud Premigration Advisor Tool Version 22.5.6-30
-----
Cloud Premigration Advisor Check Summary
-----
Cloud Premigration Advisor Tool completed with overall result: Action Required
 38 Checks run
 79 Schemas in source DB
 1 Schemas analyzed: HR
 1 Action Required: Checks with this result typically need to be resolved before attempting migration.
    Data in Custom Tablespaces (Shared) (25 relevant objects)
 5 Review Required
 3 Review Suggested
 29 Passed
Cloud Premigration Advisor Tool generated report location(s):
/private/tmp/xschemas_premigration_advisor_report2.json
/private/tmp/xschemas_premigration_advisor_report2/premigration_advisor_report.html
/private/tmp/xschemas_premigration_advisor2.log
```

CPAT Concepts

The source analysis in CPAT is done generically for different cloud types:

- ATPS (Autonomous Transaction Processing on Shared Infrastructure)
- ATPD (Autonomous Transaction Processing on Dedicated Infrastructure)
- ADWS (Autonomous Data Warehouse on Shared Infrastructure)
- ADWD (Autonomous Data Warehouse on Dedicated Infrastructure)
- Default (Oracle Database)

The source analysis consists of a series of tests that are executed as SQL Statements. The scope of the tests fall into three categories:

- **SCHEMA:** Checks that are only applicable to data within schemas. For example, tables are checked for usage of deprecated and desupported features.
- **INSTANCE:** Checks that are only applicable to the database instance as a whole. For example, certain parameters and values in the `V$PARAMETER` table are checked.
- **UNIVERSAL:** Checks that are always run.

The source analysis can run in FULL mode, SCHEMA MODE or FULL SCHEMA mode.

- **FULL:** (Default) Executes all applicable checks in all appropriate schemas. SCHEMA, INSTANCE, and UNIVERSAL scope checks are executed.
- **SCHEMA:** Executes all applicable checks for schemas specified on the command line and UNIVERSAL checks. INSTANCE scope checks are not executed.
- **SCHEMA FULL:** Executes all applicable checks for schemas specified on the command line and UNIVERSAL and INSTANCE checks.

6.2 Prerequisites

The prerequisites for using the `migrateadvisor` command are:

- Oracle Database 11g Release 2 and later versions are supported.
- The `PROPERTIES` command is available only if the connected user is granted the `SELECT ANY DICTIONARY` privilege.
- The `ADVISE` command is available only if the connected user is granted:
 - the `SELECT ANY DICTIONARY` privilege
 - the `SELECT` privilege to access `SYSTEM.DUM$COLUMNS` and `SYSTEM.DUM$DATABASE`

Note:

You need access to the DUM\$ tables only if the source and target character sets indicate that Oracle Database Migration Assistant for Unicode (DMU) is needed.

6.3 About the MIGRATEADVISOR Command

You can run the CPAT command in SQLcl using `ma` or `migrateadvisor`.

This command includes the following sub-commands:

- **Properties:** Generates a target properties file for Oracle or Autonomous Database that provides instance-specific analysis.
- **Advise:** Analyzes the database and produce reports containing information to assist in a successful migration.
- **Info:** Shows version information for CPAT.

Syntax

```
migrateadvisor help [examples|syntax] |  
advise {{-targettype,-t} {ATPS|ATPD|ADWS|ADWD|DEFAULT} } [<-optional-  
argument>,...] |  
properties [<optional-argument>,...] |  
info
```

The following table lists the required and optional arguments for `advise`.

Argument	Description	Default
Required		
<code>-targettype,-t</code>	{ATPS ATPD ADWS ADWD DEFAULT} The type of target database to analyze for migration.	None
Optional		

Argument	Description	Default
-analysisprops,-a	<i><propertyFile></i> The path and name of a properties file.	None

 **Note:**

The full path is optional. If the full path is not specified, cd <path> is used as the root. If cd <path> is not specified, the launch path is used as

Argument	Description	Default
	<p>the root.</p> <p>A properties file that was created using the properties sub-command while connected to the target database.</p>	
-excludeschemas,-x	<p><schema>[,...]</p> <p>The schema or comma-separated-value list of schemas to exclude from analysis.</p>	None
-full, -f	<p>[TRUE:FALSE]</p> <p>Execute the full set of tests.</p>	FALSE when -schemas is not specified, otherwise the default is TRUE
-maxrelevantobjects,-m	<p><maxRelevantObjects></p> <p>The maximum number of "relevant objects" to be included in all reports.</p> <p>This option overrides -maxtextdatarows for TEXT reports.</p>	Include all objects
-maxtextdatarows,-n	<p><maxTextDataRows></p> <p>Relevant object rows to be included in text reports (does not apply to JSON reports).</p>	-maxrelevantobjects if specified, otherwise all relevant objects are included.
-migrationmethod,-mm	<p>{DATAPUMP DATAPUMP_DBLINK GOLDENGATE} [, ...]</p> <p>A comma-separated-value list of methods or tooling that will be used to do the migration. Example: DATAPUMP, GOLDENGATE</p>	DATAPUMP
-outdir,-o	<p><directory></p> <p>Identifies location for log and report files.</p>	Current SQLcl directory
-outfileprefix,-p	<p><outFilePrefix></p> <p>A prefix to the standard base file name of "premigration_advisor_report".</p>	No prefix
-reportformat,-r	<p>{HTML JSON TEXT} [, ...]</p> <p>Specify one or more <reportFormats> where <reportFormat> is HTML, JSON, or TEXT.</p>	HTML

Argument	Description	Default
-schemas,-s	<schema>[,...] The schema or comma separated value list of schemas to analyze. Example: schema1, schema2	All schemas
-sqltext,-q	Include SQL query used for checks in TEXT reports.	Do not include sql text in TEXT reports. Ignored for JSON reports.
-verbose,-ve	[TRUE FALSE] TRUE shows additional diagnostic output.	FALSE

The following table lists the optional arguments for `properties`.

Argument	Description	Default
-outdir,-o	<directory> Identifies location for log and report files.	Current SQLcl directory
-outfileprefix,-p	<outFilePrefix> A prefix to the standard base file name of "premigration_advisor_report".	No prefix

6.4 Examples

The following examples illustrate how to use the `MIGRATEADVISOR` command.

Example 1

Generate the target properties file for Autonomous Database.

```
-- Set default directory
SQL> cd <directory>
-- Connect to target
SQL> set cloudconfig <config-file>
SQL> connect <autonomous-connect-string>
-- Generate the properties file
SQL> migrateadvisor properties -outfileprefix cloud
```

Example 2

Create the HTML Advisor report for a single schema using target properties.

```
-- Set default directory
SQL> cd <directory>
-- Connect to source
SQL> connect <database-connect-string>
-- Generate the report
```



```
SQL> migrateadvisor advise -schemas hr -outfileprefix hr -targettype adws -
analysisprops <propertyFile>
```

Example 3

Create the HTML Advisor report for the full database using target properties.

```
-- Set default directory
SQL> cd <directory>
-- Connect to source
SQL> connect <database-connect-string>
-- Generate the report
SQL> migrateadvisor advise -outfileprefix fulldb -targettype adws -
analysisprops <propertyFile>
```

Example 4

Create the JSON Advisor report excluding schemas.

```
-- Set default directory
SQL> cd <directory>
-- Connect to source
SQL> connect <database-connect-string>
-- Generate the report
SQL> migrateadvisor advise -excludeschemas hr,sales -outfileprefix xschemas -
targettype adws -reportformat json
```

Example 5

Create the HTML Advisor report for multiple schemas including instance tests.

```
-- Set default directory
SQL> cd <directory>
-- Connect to source
SQL> connect <database-connect-string>
-- Generate the report
SQL> migrateadvisor advise -schemas hr,sales -full -outfileprefix fullmulti -
targettype adws -analysisprops <propertyFile>
```

Example 6

Create HTML Advisor report for a single schema for migration to an Oracle database with target properties.

```
-- Set default directory
SQL> cd <directory>
-- Connect to target
SQL> connect <database-connect-string>
-- Generate the properties file
SQL> migrateadvisor -gettargetproperties -outfileprefix cloud
-- Connect to source
SQL> connect <database-connect-string>
-- Generate the report
```

```
SQL> migrateadvisor advise -schemas hr -outfileprefix ora -targettype  
adws -analysisprops <propertyFile>
```

6.5 Tips and Troubleshooting

Some points to note are:

- If the source is an Autonomous Database, running the `ADVISE` command is not a supported use of CPAT and the result may be unpredictable.
- The `PROPERTIES` and `ADVISE` commands require that the connected user has the `SELECT ANY DICTIONARY` privilege.

If you do not have the `SELECT ANY DICTIONARY` privilege, you see the following error:

```
SQL> grant connect, resource, unlimited tablespace to jdoe  
identified by jdoe;  
Grant succeeded.
```

```
SQL> connect jdoe/jdoe  
Connected.
```

```
SQL> migrateadvisor advise -schemas hr -outfileprefix pre -  
targettype adws -reportformat json
```

```
CPAT-1004: SQL error while initializing premigration application.  
ORA-00942: table or view does not exist
```

```
--Ensure the JDBC connection information is correct. See the log  
file for more details.
```

```
Additional Information: 255: Internal error - please contact  
support.
```

```
**Exception** : /Users/xyz/pre_premigration_advisor_report.json
```

```
Log file contains:
```

```
Caused by: Error : 942, Position : 20, Sql = SELECT VERSION FROM  
V$INSTANCE,  
OriginalSql = SELECT VERSION FROM V$INSTANCE,  
Error Msg = ORA-00942: table or view does not exist
```

7

Using the PGQL Plug-in

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](#)

7.1 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.

7.2 About PGQL Commands

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

```
pgql 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:

```
pgql 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.

7.3 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]  
PGQL>
```

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;

```

NAME

```

-----
ADAMS
ALLEN
BLAKE
CLARK

```

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;

```

```

DEPARTMENT          EMPLOYEES
-----
ACCOUNTING          3

```

```
RESEARCH          5
SALES              6
```

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>
```

A

SQL Performance Troubleshooting

This appendix provides a list of SQL coding patterns that cause potential performance issues in SQL queries.

- [Columns Defined as Literal Constants in Sub-Query Joined Later in Main Query](#)
- [Redundant Table in LEFT OUTER JOIN](#)
- [Too Many Join Conditions Between Factored WITH Sub Queries](#)
- [Data Security Predicates Wrapped Inside Redundant Sub-Query](#)
- [Aggregate Functions in Correlated Scalar Sub-query](#)
- [Use XMLTYPE Data Type Instead of CLOB](#)
- [Large Number of UNION \(ALL\) Query Blocks in a Single SQL](#)
- [Function Calls in WHERE Clause Predicates](#)
- [Long CASE Expressions in SELECT and WHERE Clauses](#)
- [Long in IN-LISTS in SQL Clauses](#)
- [Scalar Sub-Queries with DISTINCT Modifier or ROWNUM Keyword](#)
- [Custom PL/SQL Calls in SELECT Clause](#)

Columns Defined as Literal Constants in Sub-Query Joined Later in Main Query

In cases where you have literal constants defined as columns in a single sub-query and later used in joins in the main query, consider passing them as direct filters instead. Refer to the following example of such usage:

```
(SELECT
    ...
    UPPER('HXT') AS DUMMY
    ...
) V1,
(SELECT
    T2.C2 AS C2
FROM T2
) V2
WHERE
    V1.DUMMY = V2.C2
...
```

The more efficient SQL design is to pass it directly to the main query:

```
(SELECT
    ...
) V1,
(SELECT
```

```

        T2.C2 AS C2
    FROM T2
) V2
WHERE
    V2.C2 = UPPER('HXT')
...

```

Redundant Table in LEFT OUTER JOIN

Some of Left Outer Joins (LOJ) may be redundant if you join two tables through LOJ but do not select any attributes from the table on the 'optional' side of the LOJ. Review the following example:

```

SELECT
    b.book_title,
    b.author,
    b.language
FROM
    books b,
    book_languages l
WHERE
    b.language = l.language (+);

```

The table `BOOK_LANGUAGES` is on the optional side of the OUTER join and no columns from it are in the `SELECT` clause. The query above is functionally equivalent (that is, it produces the same exact result set) with both the table and LOJ removed:

```

SELECT
    b.book_title,
    b.author,
    b.language
FROM
    books b;

```

Complex SQL queries with redundant OUTER joined tables may result in additional performance overhead during parse time as well as at run time. The optimizer may be unable to eliminate unused outer joined table as outer joins are usually harder to process than the ordinary inner joins. Make sure you carefully validate your functionality to evaluate the impact from removing such joins and tables in your reports.

Too Many Join Conditions Between Factored WITH Sub Queries

When you join two factored WITH sub-queries using too many join conditions, the optimizer may estimate low join cardinality for the respective tables and not choose the best execution plan. Refer to the following example, showing the sub-optimal generated SQL pattern as the result of having too many joins between two factored WITH sub-queries:

```

FROM SAWITH1 D1
    FULL OUTER JOIN SAWITH2 D2
    ON SYS_OP_MAP_NONNULL(D1.c3) = SYS_OP_MAP_NONNULL(D2.c3)
    AND SYS_OP_MAP_NONNULL(D1.c5) = SYS_OP_MAP_NONNULL(D2.c5)
    AND SYS_OP_MAP_NONNULL(D1.c12) = SYS_OP_MAP_NONNULL(D2.c12)

```



```

AND SYS_OP_MAP_NONNULL(D1.c14) = SYS_OP_MAP_NONNULL(D2.c14)
AND SYS_OP_MAP_NONNULL(D1.c11) = SYS_OP_MAP_NONNULL(D2.c11)
AND SYS_OP_MAP_NONNULL(D1.c2) = SYS_OP_MAP_NONNULL(D2.c2)
AND SYS_OP_MAP_NONNULL(D1.c13) = SYS_OP_MAP_NONNULL(D2.c13)
AND SYS_OP_MAP_NONNULL(D1.c15) = SYS_OP_MAP_NONNULL(D2.c15)
AND SYS_OP_MAP_NONNULL(D1.c9) = SYS_OP_MAP_NONNULL(D2.c9)
AND SYS_OP_MAP_NONNULL(D1.c10) = SYS_OP_MAP_NONNULL(D2.c10)
AND SYS_OP_MAP_NONNULL(D1.c8) = SYS_OP_MAP_NONNULL(D2.c8)
AND SYS_OP_MAP_NONNULL(D1.c7) = SYS_OP_MAP_NONNULL(D2.c7)
AND SYS_OP_MAP_NONNULL(D1.c18) = SYS_OP_MAP_NONNULL(D2.c18)
AND SYS_OP_MAP_NONNULL(D1.c21) = SYS_OP_MAP_NONNULL(D2.c21)
AND SYS_OP_MAP_NONNULL(D1.c4) = SYS_OP_MAP_NONNULL(D2.c4)
AND SYS_OP_MAP_NONNULL(D1.c6) = SYS_OP_MAP_NONNULL(D2.c6)
AND SYS_OP_MAP_NONNULL(D1.c22) = SYS_OP_MAP_NONNULL(D2.c22)
AND SYS_OP_MAP_NONNULL(D1.c20) = SYS_OP_MAP_NONNULL(D2.c20)
AND SYS_OP_MAP_NONNULL(D1.c16) = SYS_OP_MAP_NONNULL(D2.c16)
AND SYS_OP_MAP_NONNULL(D1.c17) = SYS_OP_MAP_NONNULL(D2.c17)
AND SYS_OP_MAP_NONNULL(D1.c19) = SYS_OP_MAP_NONNULL(D2.c19)

```

Carefully review all the joins in your SQL logic, and keep them to the bare minimum to address the functional requirements.

Data Security Predicates Wrapped Inside Redundant Sub-Query

Securing data in your reports requires very thorough analysis, and careful coding in your SQL queries. Data Security Predicates (DSP) or security clauses, that you append to ensure secure reporting in your SQLs, could have a performance impact on your SQL execution. For example, if you choose to re-use DSPs from other SQLs that pull in View Object security clauses, you could end up with the pattern described below:

```

(SELECT ...
  FROM T1,
    (SELECT ...
      FROM T2 ...
      WHERE (DSP predicate1) OR (DSP predicate2)
    )
  WHERE ...

```

In this example, table T2 got secured through two DSP predicates in a separate sub-query. As part of the overall optimization process, Oracle optimizer performs recursive optimization of each inline view (sub query) before optimizing the main query. Such a pattern could affect the query parsing time and possibly produce a less efficient execution plan. Consider using a more efficient pattern rewrite:

```

(SELECT ...
  FROM T1,
    T2, ...
  WHERE (DSP predicate1) OR (DSP predicate2))
  ...

```

Aggregate Functions in Correlated Scalar Sub-query

Aggregate functions such as MAX/MIN/COUNT in scalar subquery can be safely and efficiently replaced by performing alternative rewrites. Refer to the following example:

--Sub-optimal pattern:

```
SELECT t1.c1,
       (SELECT MAX(t2.c2) as maxc2
        FROM t2
        WHERE t2.id=t1.id
       ) as c2
FROM t1;
```

--Optimal pattern:

```
SELECT t1.c1,
       t2alias.max_c2
FROM t1,
     (SELECT MAX(t2.c2) as max_c2
      T2.id as id
      FROM t2
      GROUP BY t2.id
     ) t2alias
WHERE t2alias.id=t1.id;
```

A scalar sub-query is executed for every row returned by the enclosing query block's row sources (here t1). It means the aggregated MAX is executed as many times as the number of fetched rows in the main query, resulting in slower performance. Moving the aggregated MAX into the FROM clause of the main query will aggregate the data once and speed up the overall query.

Note:

If the number of rows returned by the enclosing block (here t1) is moderate/low and the scalar sub-query is correlated on a selective indexed column, then the aggregate operation can be kept inside the correlated scalar sub-query.

Use XMLTYPE Data Type Instead of CLOB

Avoid using CLOB data type for storing XML data. The conversion of CLOB to XML on the fly using XMLTYPE function during report runtime could be very expensive. Instead, consider using XMLTYPE for storing XML documents in the database.

Large Number of UNION (ALL) Query Blocks in a Single SQL

A single SQL with multiple UNION (or UNION ALL) query blocks should be carefully analyzed to consolidate UNIONS into fewer sub-queries. The excessive use of UNIONS is a strong indicator of logic redundancy and SQL complexity. It results in a much larger SQL statement, which would take much longer to parse and execute in the database, as each UNION query block by default is executed serially, one-by-one.

Forcing /*+ PARALLEL */ hint would not help to run multiple UNION branches at the same time. The hint /*+ PQ_CONCURRENT_UNION */ could help with parallel UNION branch executions, but it could result in more database workload, especially if the UNION branches have very expensive tables and no selective filters.

In the most cases, the Union branches may be nearly identical with minor differences such as slightly different filters or different expressions on columns in SELECT lists, and so on. Consider reworking multiple-UNION query into a much simpler shape by factoring out one or two common denominator WITH sub-queries and reusing them as per functional requirements. Such an approach results in much less logical reads, lesser database impact and faster query performance. If the same WITH factored sub-query is called more than once, Oracle would 'materialize' its result set in a temporary segment and use it throughout the SQL.

Function Calls in WHERE Clause Predicates

Expressions in WHERE clauses employ filter and join expressions to constrain rows from data sources (tables, views, inline views). When the estimated number of rows after filter/join operation using indexed attributes is low, the optimizer will choose an index to directly access the required data blocks. Applying SQL or PL/SQL functions to columns in filter/join expressions disables index usage and reverts table access to full table scan.

Alternatively, if there is a function-based index (FBI) defined, but filter or join expressions do not use the exact function in the join predicates, the optimizer chooses less optional full table scan as well. For example, the PERSON_NUMBER column in the table PER_ALL_PEOPLE_F is indexed via function-based index (FBI) using UPPER(PERSON_NUMBER). The appropriate use for PERSON_NUMBER in WHERE clause will be UPPER(PERSON_NUMBER). Refer to two separate sections on the recommended use of UPPER and TRUNC in WHERE clauses.

Consider the following example:

```
SELECT * FROM XLA_AE_HEADERS WHERE AE_HEADER_ID = '1511989';
```

There is a unique index defined on the primary key column AE_HEADER_ID, that makes access to desired data very fast and efficient through the INDEX RANGE SCAN operation:

```
-----
| Id | Operation                               | Name                | Rows |
Bytes | Cost (%CPU)| Time           |      |
-----
|  0 | SELECT STATEMENT                         |                     |    1 |
215 |      4  (0)| 00:00:01 |      |
|  1 | TABLE ACCESS BY INDEX ROWID BATCHED    | xla_ae_headers      |    1 |
215 |      4  (0)| 00:00:01 |      |
|*  2 | INDEX RANGE SCAN                         | XLA_AE_HEADERS_U1  |    1 |
|      |      3  (0)| 00:00:01 |      |
-----
```

Predicate Information (identified by operation id):

```
-----
2 - access("AE_HEADER_ID"=1511989)
```

When the function TO_CHAR() is used on AE_HEADER_ID column, the plan changes to:

```
SELECT * FROM XLA_AE_HEADERS WHERE TO_CHAR(AE_HEADER_ID) = '1511989';
```

```
-----
| Id | Operation          | Name                | Rows | Bytes | Cost
(%CPU)| Time              |                    |      |      |
-----
|  0 | SELECT STATEMENT   |                    |     1 |   215 | 5788
(1) | 00:00:01         |                    |      |      |
|*  1 | TABLE ACCESS FULL| xla_ae_headers     |     1 |   215 | 5788
(1) | 00:00:01         |                    |      |      |
-----
```

Predicate Information (identified by operation id):

```
-----
1 - filter(TO_CHAR("AE_HEADER_ID")='1511989')
```

There may be valid cases where SQL or PL/SQL functions in WHERE clause are required by functional design. For example, aggregate functions in WHERE clauses (MAX, MIN, COUNT, AVG,) may be needed for the functional logic. In such cases, ensure you have effective filters on other columns with supporting indexes to ensure optimal performance.

Long CASE Expressions in SELECT and WHERE Clauses

Complex CASE expressions can affect query performance in multiple ways. CASE expressions found in SELECT list are CPU-intensive operations. CASE expressions in WHERE clause (filter and join predicates) may result in incorrect join cardinality estimate and miscalculating the costs. As a result, sub-optimal join method can be selected causing potentially long run time of the query, increasing probability of **ORA-01555** (snapshot too old) error and significant TEMP tablespace usage by the SQL. Carefully inspect your SQL for any large CASE clauses and explore the options to simplify the logic. Refer to the following sub-optimal and rewritten CASE structures:

-- Sub-optimal structure:

```
(CASE WHEN .. THEN
  (CASE WHEN .. THEN
    (CASE WHEN .. THEN
      (...))
    END)
  END)
ELSE ... END)
```

-- Rewritten optimal structure:

```
(CASE WHEN ... THEN
  WHEN ... THEN
  WHEN ... THEN
```

```

ELSE ...
END)

```

Long in IN-LISTS in SQL Clauses

The option to pass more than one value to SQL through bind parameters makes reports very flexible and versatile. However, if the number of passed values is not limited, it could generate a SQL with very large number of IN-LIST values, possibly hitting the internal Oracle limit of maximum 1,000 IN-LIST values (and get ORA-01795 maximum number of expressions in a list is 1000).

The Oracle optimizer converts IN-list expressions into Boolean OR-expressions. For instance, the following expression: COL_A IN (1, 2, 3) is converted into COL_A = 1 OR COL_A = 2 OR COL_A = 3. Depending on how statistics are collected on a table and its columns, the optimizer may produce incorrect cardinality estimate for that IN-list expression. The more literals are in the IN-LIST, the larger the deviation from the actual cardinality. The incorrect cardinality may cause the optimizer to select less join method. Refer to the following example of long IN-LIST in CASE clause:

```

CASE WHEN dl.c40 NOT IN (
    'CALL',
    'CALL_IB',
    'DEMAND_GENERATION',
    'DEMO',
    'DEMO_IN_PERSON',
    'DISCOVERY',
    'DISCOVERY_PERSON',
    'EMAIL',
    'EMAIL_ELOQUA_ENGAGE',
    'EMAIL_ELOQUA_ENGCAMPAIGN',
    'EMAIL_IB',
    'EMAIL_OUTLOOK',
    'INPERSON_INTRO_MEETING',
    'INPERSON_MEETING',
    'INTRO_MEETING',
    'MANUAL_CALL',
    'MEETING',
    'RESEARCH',
    'SALES_CHAT',
    'SOCIAL_MEDIA',
    'TODO',
    'WORKSHOPS'
) THEN ...

```

Carefully design the parameters and lists of values that get passed to reports to avoid generating long IN-LISTS in the SQL queries. Do not create long checklists and an option to check all, as that would lead to generate such IN-clauses and affect performance. To avoid passing 'all' and causing the performance with long IN-LISTS, select 'NULL Value Passed' when you define the parameters for your data model. Then NULL is passed to the bind variable instead of the long IN-LIST:

P_APPLICATION_ID: Type: Menu

Display Label

List of Values

Number of Values to Display in List

Options Multiple Selection

Can select all

NULL Value Passed All Values Passed

Refresh other parameters on change

Scalar Sub-Queries with DISTINCT Modifier or ROWNUM Keyword

Scalar sub-query is a SQL query block that is used as a column in a SELECT clause. It is called scalar because it must produce exactly one value (a scalar) to use in the main SELECT. If a sub-query is written in such a way that it returns more than one row, ORA-01427 exception is raised.

A typical usage pattern of scalar sub-queries is to deliver a single column value by joining a table inside the sub-query to an external table using a unique (primary key) column. That guarantees a single scalar value to be returned by such a sub-query.

If a scalar sub-query produces more than one row, either DISTINCT or ROWNUM may get (wrongly) used as workarounds to enforce a single scalar value. Both workarounds could result in incorrect functionality as well as cause performance overhead, as they get applied as the last step to potentially a very large result set produced by the sub-query.

```
SELECT
  mpm.level_member_id,
  archive.archive_id,
  mat.category_name,
  (
    SELECT DISTINCT category_name
    FROM msc_catalog_categories mccl
    WHERE mccl.category_id = mat.parent_category_id
      AND mccl.parent_category_id IS NOT NULL
  ) cgt_category_name,
...
```

Note:

When you design your SQLs with correlated sub-queries in SELECT, ensure that they use index access path, as they get executed once for every single row. If a sub-query employs a full table scan due to the lack of indexes in join predicate, you end up with as many full table scans as the number of fetched rows in the main sub-queries. In that case, you should rewrite it to use the join logic in WHERE clause instead of SELECT.

Custom PL/SQL Calls in SELECT Clause

Use of PL/SQL functions in SELECT clauses could lead to slower SQL performance. The optimizer has no methods to merge the code from PL/SQL functions into the main SQL query, so the functions are called as many times as the number of rows fetched by the main query. The PL/SQL complexity multiplied by a number of its executions could become a major performance factor, often overlooked in SQL optimization.

Refer to the following example, showing the use of such function call, with another SELECT wrapped inside, with both the function and the SELECT invoked once for every fetched row from the main SELECT:

```
SELECT ...
  ff_user_tables_pkg.get_table_value(
    (SELECT l_data_grp.legislative_data_group_id
     FROM   per_legislative_data_groups_vl l_data_grp
     WHERE  l_data_grp.name = 'US'),
    'RETIREMENT_ELIGIBILITY',
    'AGE',
    to_char((months_between(sysdate, pp.date_of_birth) / 12)),
    trunc(sysdate)
  ) l_data_grp_pkg_call,
  ....
```

Ensure you review the use of such PL/SQL functions, and if their use is required by the functional logic, apply effective filters to reduce the number of fetched rows and the result number of PL/SQL executions for the SQL.

B

Third-Party License Information

Oracle SQLcl contains third-party code. Oracle is required to provide the following notices. Note, however, that the Oracle program license that accompanied this product determines your right to use the Oracle program, including the third-party software, and the terms contained in the following notices do not change those rights.

B.1 ANTLR4 Java Runtime 4.13.1

Copyright (c) 2012-2022 The ANTLR Project. All rights reserved. Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. Neither name of copyright holders nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE REGENTS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

B.2 Apache Mina SSHD-contrib 2.12

=====

Apache MINA SSHD

Copyright 2008-2022 The Apache Software Foundation

This product includes software developed at

The Apache Software Foundation (<http://www.apache.org/>).

Please refer to each LICENSE.

.txt file for the license terms of the components that Apache MINA depends on.

Message logging is provided by the SLF4J library package, which is open source software, written by Ceki GÃ¼lcÃ¼, and copyright by SLF4J.ORG and QOS.ch. The original software is available from

<http://www.slf4j.org/>

LICENSE.TXT

=====

Apache License Version 2.0
January 2004
<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including

but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS APPENDIX

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

Below are 4th party dependencies. (Some are optional)

@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

bouncycastle v1.60 (optional)

=====

Copyright (c) 2000 - 2017 The Legion Of The Bouncy Castle (<http://www.bouncycastle.org>)

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

slf4j, v1.7.25,

=====

Copyright (c) 2004-2017 QOS.ch All rights reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

@@@@@@@@@@@@@@@@@@@@

tomcat-apr, v5.5.23 (optional)

Apache Tomcat

Copyright 1999-2012 The Apache Software Foundation

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic,

verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS APPENDIX

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

B.3 Apache Mina SSHD-osgi 2.12.0

LICENSE.TXT

=====

Apache License Version 2.0
January 2004
<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and

improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS APPENDIX

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

Below are 4th party dependencies. (Some are optional)

@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

bouncycastle v1.60 (optional)

=====

Copyright (c) 2000 - 2017 The Legion Of The Bouncy Castle (<http://www.bouncycastle.org>)

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

slf4j, v1.7.25,

=====

Copyright (c) 2004-2017 QOS.ch All rights reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

tomcat-apr, v5.5.23 (optional)

Apache Tomcat

Copyright 1999-2012 The Apache Software Foundation

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and

improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS APPENDIX

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

====CopyRight =====

Apache MINA SSHD Copyright 2008-2021 The Apache Software Foundation

This product includes software developed at The Apache Software Foundation (<http://www.apache.org/>). Please refer to each LICENSE.<component>.txt file for the license terms of the components that Apache MINA depends on.

==== 4th party Dependencies =====

Dependency #1 NAME: SLF4J-API ===License=== Name: MIT All rights reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions: The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

====CopyRight===== Copyright (c) 2004-2022 QOS.ch Sarl (Switzerland) Copyright (c) 2004-2023 QOS.ch Dependency #2 NAME: JCL-OVER-SLF4J

====License===== Apache License Version 2.0, January 2004 <http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions. "License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document. "Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License. "Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity. "You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License. "Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files. "Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types. "Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below). "Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof. "Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or

otherwise designated in writing by the copyright owner as "Not a Contribution." "Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions: (a) You must give any other recipients of the Work or Derivative Works a copy of this License; and (b) You must cause any modified files to carry prominent notices stating that You changed the files; and (c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and (d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License. You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

====Copyright ===== Copyright (c) 2004-2022 QOS.ch Sarl (Switzerland)

B.4 Apache Mina SSHD-putty 2.12

=====

Apache MINA SSHD

Copyright 2008-2021 The Apache Software Foundation

This product includes software developed at

The Apache Software Foundation (<http://www.apache.org/>).

Please refer to each LICENSE.

.txt file for the license terms of the components that Apache MINA depends on.

Message logging is provided by the SLF4J library package, which is open source software, written by Ceki GÃ¼lcÃ¼, and copyright by SLF4J.ORG and QOS.ch. The original software is available from

<http://www.slf4j.org/>

LICENSE.TXT

=====

Apache License Version 2.0
January 2004
<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS APPENDIX

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

Below are 4th party dependencies. (Some are optional)

@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

bouncycastle v1.60 (optional)

=====

Copyright (c) 2000 - 2017 The Legion Of The Bouncy Castle (<http://www.bouncycastle.org>)

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

slf4j, v1.7.25,

=====

Copyright (c) 2004-2017 QOS.ch All rights reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

tomcat-apr, v5.5.23 (optional)

Apache Tomcat

Copyright 1999-2012 The Apache Software Foundation

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display,

publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for

reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS APPENDIX

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

B.5 Apache Mina SSHD-scp 2.12

=====

Apache MINA SSHD

Copyright 2008-2021 The Apache Software Foundation

This product includes software developed at

The Apache Software Foundation (<http://www.apache.org/>).

Please refer to each LICENSE.

.txt file for the license terms of the components that Apache MINA depends on.

Message logging is provided by the SLF4J library package, which is open source software, written by Ceki GÃ¼lcÃ¼, and copyright by SLF4J.ORG and QOS.ch. The original software is available from

<http://www.slf4j.org/>

LICENSE.TXT

=====

Apache License Version 2.0
January 2004
<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS APPENDIX

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

Below are 4th party dependencies. (Some are optional)

@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

bouncycastle v1.60 (optional)

=====

Copyright (c) 2000 - 2017 The Legion Of The Bouncy Castle (<http://www.bouncycastle.org>)

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

slf4j, v1.7.25,

=====

Copyright (c) 2004-2017 QOS.ch All rights reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS

BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

@@@@@@@@@@@@@@@@@@@@

tomcat-apr, v5.5.23 (optional)

Apache Tomcat

Copyright 1999-2012 The Apache Software Foundation

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS APPENDIX

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

B.6 Apache Mina SSHD-sftp 2.12

=====

This product includes software developed at

The Apache Software Foundation (<http://www.apache.org/>).

Please refer to each LICENSE.

.txt file for the license terms of the components that Apache MINA depends on.

Message logging is provided by the SLF4J library package, which is open source software, written by Ceki GÃ¼lcÃ¼, and copyright by SLF4J.ORG and QOS.ch. The original software is available from

<http://www.slf4j.org/>

LICENSE.TXT

=====

Apache License Version 2.0
January 2004
<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. **Submission of Contributions.** Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. **Trademarks.** This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. **Disclaimer of Warranty.** Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. **Limitation of Liability.** In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. **Accepting Warranty or Additional Liability.** While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify,

defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS APPENDIX

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

Below are 4th party dependencies. (Some are optional)

@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

bouncycastle v1.60 (optional)

=====

Copyright (c) 2000 - 2017 The Legion Of The Bouncy Castle (<http://www.bouncycastle.org>)

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

slf4j, v1.7.25,

=====

Copyright (c) 2004-2017 QOS.ch All rights reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

tomcat-apr, v5.5.23 (optional)

Apache Tomcat

Copyright 1999-2012 The Apache Software Foundation

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support,

warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS APPENDIX

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

B.7 Google Guava 33.0.0

Copyright (C) 2020 The Guava Authors

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except * in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

Apache License Version 2.0
January 2004
<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the

purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or

consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS APPENDIX

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

+++++ 4th party dependencies +++++

com.google.code.findbugs:jsr305:3.0.2

Copyright (c) 2007-2009, JSR305 expert group

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT HOLDER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT

LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

+++++

checker-qual, v2.11.1, MIT

Checker Framework qualifiers

Copyright 2004-present by the Checker Framework developers

MIT License:

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE. © 2020 GitHub, Inc.

+++++

error_prone_annotations, v2.3.4, Apache 2.0

** Copyright 2014 The Error Prone Authors.

** Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at <http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

+++++

j2objc-annotations, v1.3, Apache 2.0

/* * Copyright 2011 Google Inc. All Rights Reserved.

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at <http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

+++++

net.jcip.annotations

Copyright (c) 2005, Brian Goetz and Tim Peierls

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. Neither the name of the copyright holder nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT HOLDER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

+++++

listenablefuture, v9999.0-empty-to-avoid-conflict-with-guava, Apache 2.0

Copyright 2011 Google Inc. All Rights Reserved.

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at <http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

+++++

failureaccess, v1.0.1, Apache 2.0

Copyright 2011 Google Inc. All Rights Reserved.

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at <http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

B.8 HttpComponents Http Client 5.3.1

COPYRIGHT: Copyright 1999-2019 The Apache Software Foundation

Apache License Version 2.0
January 2004
<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control

systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS APPENDIX

=====
=====

This project includes Public Suffix List copied from [/publicsuffix.org/list/effective_tld_names.dat](http://publicsuffix.org/list/effective_tld_names.dat) licensed under the terms of the Mozilla Public License, v. 2.0

Full license text: [/mozilla.org/MPL/2.0/](http://mozilla.org/MPL/2.0/)>

Mozilla Public License Version 2.0

=====
=====

1. Definitions

- 1.1. "Contributor" means each individual or legal entity that creates, contributes to the creation of, or owns Covered Software.
- 1.2. "Contributor Version" means the combination of the Contributions of others (if any) used by a Contributor and that particular Contributor's Contribution.
- 1.3. "Contribution" means Covered Software of a particular Contributor.
- 1.4. "Covered Software" means Source Code Form to which the initial Contributor has attached the notice in Exhibit A, the Executable Form of such Source Code Form, and Modifications of such Source Code Form, in each case including portions thereof.
- 1.5. "Incompatible With Secondary Licenses" means
 - (a) that the initial Contributor has attached the notice described in Exhibit B to the Covered Software; or
 - (b) that the Covered Software was made available under the terms of version 1.1 or earlier of the License, but not also under the terms of a Secondary License.
- 1.6. "Executable Form" means any form of the work other than Source Code Form.
- 1.7. "Larger Work" means a work that combines Covered Software with other material, in a separate file or files, that is not Covered Software.
- 1.8. "License" means this document.
- 1.9. "Licensable" means having the right to grant, to the maximum extent possible, whether at the time of the initial grant or subsequently, any and all of the rights conveyed by this License.
- 1.10. "Modifications" means any of the following: (a) any file in Source Code Form that results from an addition to, deletion from, or modification of the contents of Covered Software; or (b) any new file in Source Code Form that contains any Covered Software.
- 1.11. "Patent Claims" of a Contributor means any patent claim(s), including without limitation, method, process, and apparatus claims, in any patent Licensable by such Contributor that would be infringed, but for the grant of the License, by the making, using, selling, offering for sale, having made, import, or transfer of either its Contributions or its Contributor Version.
- 1.12. "Secondary License" means either the GNU General Public License, Version 2.0, the GNU Lesser General Public License, Version 2.1, the GNU Affero General Public License, Version 3.0, or any later versions of those licenses.
- 1.13. "Source Code Form" means the form of the work preferred for making modifications.
- 1.14. "You" (or "Your") means an individual or a legal entity exercising rights under this License. For legal entities, "You" includes any entity that controls, is controlled by, or is under common control with You. For purposes of this definition, "control" means
 - (a) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or
 - (b) ownership of more than fifty percent (50%) of the outstanding shares or beneficial ownership of such entity.

2. License Grants and Conditions

2.1. Grants Each Contributor hereby grants You a world-wide, royalty-free, non-exclusive license:

(a) under intellectual property rights (other than patent or trademark) Licensable by such Contributor to use, reproduce, make available, modify, display, perform, distribute, and otherwise exploit its Contributions, either on an unmodified basis, with Modifications, or as part of a Larger Work; and

(b) under Patent Claims of such Contributor to make, use, sell, offer for sale, have made, import, and otherwise transfer either its Contributions or its Contributor Version.

2.2. Effective Date The licenses granted in Section 2.1 with respect to any Contribution become effective for each Contribution on the date the Contributor first distributes such Contribution.

2.3. Limitations on Grant Scope The licenses granted in this Section 2 are the only rights granted under this License. No additional rights or licenses will be implied from the distribution or licensing of Covered Software under this License. Notwithstanding Section 2.1(b) above, no patent license is granted by a Contributor: (a) for any code that a Contributor has removed from Covered Software; or (b) for infringements caused by: (i) Your and any other third party's modifications of Covered Software, or (ii) the combination of its Contributions with other software (except as part of its Contributor Version); or (c) under Patent Claims infringed by Covered Software in the absence of its Contributions. This License does not grant any rights in the trademarks, service marks, or logos of any Contributor (except as may be necessary to comply with the notice requirements in Section 3.4).

2.4. Subsequent Licenses No Contributor makes additional grants as a result of Your choice to distribute the Covered Software under a subsequent version of this License (see Section 10.2) or under the terms of a Secondary License (if permitted under the terms of Section 3.3).

2.5. Representation Each Contributor represents that the Contributor believes its Contributions are its original creation(s) or it has sufficient rights to grant the rights to its Contributions conveyed by this License.

2.6. Fair Use This License is not intended to limit any rights You have under applicable copyright doctrines of fair use, fair dealing, or other equivalents.

2.7. Conditions Sections 3.1, 3.2, 3.3, and 3.4 are conditions of the licenses granted in Section 2.1.

3. Responsibilities

3.1. Distribution of Source Form All distribution of Covered Software in Source Code Form, including any Modifications that You create or to which You contribute, must be under the terms of this License. You must inform recipients that the Source Code Form of the Covered Software is governed by the terms of this License, and how they can obtain a copy of this License. You may not attempt to alter or restrict the recipients' rights in the Source Code Form.

3.2. Distribution of Executable Form If You distribute Covered Software in Executable Form then:

(a) such Covered Software must also be made available in Source Code Form, as described in Section 3.1, and You must inform recipients of the Executable Form how they can obtain a copy of such Source Code Form by reasonable means in a timely manner, at a charge no more than the cost of distribution to the recipient; and

(b) You may distribute such Executable Form under the terms of this License, or sublicense it under different terms, provided that the license for the Executable Form does not attempt to limit or alter the recipients' rights in the Source Code Form under this License.

3.3. Distribution of a Larger Work You may create and distribute a Larger Work under terms of Your choice, provided that You also comply with the requirements of this License for the Covered Software. If the Larger Work is a combination of Covered Software with a work governed by one or more Secondary Licenses, and the Covered Software is not Incompatible With Secondary Licenses, this License permits You to additionally distribute such Covered Software under the terms of such Secondary License(s), so that the recipient of the Larger Work may, at their option, further distribute the Covered Software under the terms of either this License or such Secondary License(s).

3.4. Notices You may not remove or alter the substance of any license notices (including copyright notices, patent notices, disclaimers of warranty, or limitations of liability) contained within the Source Code Form of the Covered Software, except that You may alter any license notices to the extent required to remedy known factual inaccuracies.

3.5. Application of Additional Terms You may choose to offer, and to charge a fee for, warranty, support, indemnity or liability obligations to one or more recipients of Covered Software. However, You may do so only on Your own behalf, and not on behalf of any Contributor. You must make it absolutely clear that any such warranty, support, indemnity, or liability obligation is offered by You alone, and You hereby agree to indemnify every Contributor for any liability incurred by such Contributor as a result of warranty, support, indemnity or liability terms You offer. You may include additional disclaimers of warranty and limitations of liability specific to any jurisdiction.

4. Inability to Comply Due to Statute or Regulation

If it is impossible for You to comply with any of the terms of this License with respect to some or all of the Covered Software due to statute, judicial order, or regulation then You must: (a) comply with the terms of this License to the maximum extent possible; and (b) describe the limitations and the code they affect. Such description must be placed in a text file included with all distributions of the Covered Software under this License. Except to the extent prohibited by statute or regulation, such description must be sufficiently detailed for a recipient of ordinary skill to be able to understand it.

5. Termination

5.1. The rights granted under this License will terminate automatically if You fail to comply with any of its terms. However, if You become compliant, then the rights granted under this License from a particular Contributor are reinstated

(a) provisionally, unless and until such Contributor explicitly and finally terminates Your grants, and

(b) on an ongoing basis, if such Contributor fails to notify You of the non-compliance by some reasonable means prior to 60 days after You have come back into compliance. Moreover, Your grants from a particular Contributor are reinstated on an ongoing basis if such Contributor notifies You of the non-compliance by some reasonable means, this is the first time You have received notice of non-compliance with this License from such Contributor, and You become compliant prior to 30 days after Your receipt of the notice.

5.2. If You initiate litigation against any entity by asserting a patent infringement claim (excluding declaratory judgment actions, counter-claims, and cross-claims) alleging that a

Contributor Version directly or indirectly infringes any patent, then the rights granted to You by any and all Contributors for the Covered Software under Section 2.1 of this License shall terminate.

5.3. In the event of termination under Sections 5.1 or 5.2 above, all end user license agreements (excluding distributors and resellers) which have been validly granted by You or Your distributors under this License prior to termination shall survive termination.

***** * * *

6. Disclaimer of Warranty *

* ----- * *

Covered Software is provided under this License on an "as is" * * basis, without warranty of any kind, either expressed, implied, or * * statutory, including, without limitation, warranties that the * * Covered Software is free of defects, merchantable, fit for a * * particular purpose or non-infringing. The entire risk as to the * * quality and performance of the Covered Software is with You. * * Should any Covered Software prove defective in any respect, You * * (not any Contributor) assume the cost of any necessary servicing, * * repair, or correction. This disclaimer of warranty constitutes an * * essential part of this License. No use of any Covered Software is * * authorized under this License except under this disclaimer.

* * * *****
***** * * *

7. Limitation of Liability

* * ----- * * * *

Under no circumstances and under no legal theory, whether tort (including negligence), contract, or otherwise, shall any Contributor, or anyone who distributes Covered Software as permitted above, be liable to You for any direct, indirect, special, incidental, or consequential damages of any character including, without limitation, damages for lost profits, loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses, even if such party shall have been informed of the possibility of such damages. This limitation of liability shall not apply to liability for death or personal injury resulting from such party's negligence to the extent applicable law prohibits such limitation. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so this exclusion and limitation may not apply to You.

* * * *****

8. Litigation

Any litigation relating to this License may be brought only in the courts of a jurisdiction where the defendant maintains its principal place of business and such litigation shall be governed by laws of that jurisdiction, without reference to its conflict-of-law provisions. Nothing in this Section shall prevent a party's ability to bring cross-claims or counter-claims.

9. Miscellaneous

This License represents the complete agreement concerning the subject matter hereof. If any provision of this License is held to be unenforceable, such provision shall be reformed only to the extent necessary to make it enforceable. Any law or regulation which provides that the language of a contract shall be construed against the drafter shall not be used to construe this License against a Contributor.

10. Versions of the License

10.1. New Versions Mozilla Foundation is the license steward. Except as provided in Section 10.3, no one other than the license steward has the right to modify or publish new versions of this License. Each version will be given a distinguishing version number.

10.2. Effect of New Versions You may distribute the Covered Software under the terms of the version of the License under which You originally received the Covered Software, or under the terms of any subsequent version published by the license steward.

10.3. Modified Versions If you create software not governed by this License, and you want to create a new license for such software, you may create and use a modified version of this License if you rename the license and remove any references to the name of the license steward (except to note that such modified license differs from this License).

10.4. Distributing Source Code Form that is Incompatible With Secondary Licenses If You choose to distribute Source Code Form that is Incompatible With Secondary Licenses under the terms of this version of the License, the notice described in Exhibit B of this License must be attached.

Exhibit A - Source Code Form License Notice

This Source Code Form is subject to the terms of the Mozilla Public License, v. 2.0. If a copy of the MPL was not distributed with this file, You can obtain one at <http://mozilla.org/MPL/2.0/>.

If it is not possible or desirable to put the notice in a particular file, then You may include the notice in a location (such as a LICENSE file in a relevant directory) where a recipient would be likely to look for such a notice. You may add additional accurate notices of copyright ownership.

Exhibit B - "Incompatible With Secondary Licenses" Notice

This Source Code Form is "Incompatible With Secondary Licenses", as defined by the Mozilla Public License, v. 2.0.

4P Dependencies:

commons-codec » commons-codec 1.11

COPYRIGHT: Copyright 2002-2014

The Apache Software Foundation LICENSE: Apache 2.0 <https://github.com/apache/commons-codec/blob/1.10/LICENSE.txt>

commons-logging » commons-logging 1.2

COPYRIGHT: Copyright 2003-2014

The Apache Software Foundation LICENSE: Apache 2.0 https://github.com/apache/commons-logging/blob/LOGGING_1_2/LICENSE.txt

org.apache.httpcomponents » httpcore 4.4.11

COPYRIGHT: Copyright 2005-2019 The Apache Software Foundation

LICENSE: Apache 2.0 <https://github.com/apache/httpcomponents-core/blob/4.4.11/LICENSE.txt>

=====

Updated 4P Dependency:

commons-codec » commons-codec 1.11

COPYRIGHT: Copyright 2002-2014 The Apache Software Foundation

LICENSE: Apache 2.0 <https://github.com/apache/commons-codec/blob/commons-codec-1.11/LICENSE.txt>

B.9 HttpComponentsCore 5.2.4

COPYRIGHT: Copyright 2005-2018 The Apache Software Foundation

LICENSE: Apache 2.0

Apache License Version 2.0
January 2004
<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained

within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS APPENDIX

Copyright (C) 2016 Gary Gregory. All rights reserved.

See the NOTICE.txt file distributed with this work for additional information regarding copyright ownership.

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

B.10 jackson-annotations 2.16.1

Apache License Version 2.0
January 2004
<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is

intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the

Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS APPENDIX

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License

B.11 jackson-core 2.16.1

Apache License Version 2.0
January 2004
<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic,

verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS APPENDIX

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License

B.12 jackson-jr-objects 2.16.1

This copy of Jackson JSON processor streaming parser/generator is licensed under the Apache (Software) License, version 2.0 ("the License"). See the License for details about distribution rights, and the specific rights regarding derivate works.

Apache License Version 2.0
January 2004
<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking

systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use,

reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS APPENDIX

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

B.13 jackson-jr-stree 2.16.1

Copyright: FasterXML,LLC

License: Apache 2.0

./src/main/resources/META-INF/LICENSE

This copy of Jackson-jr library is licensed under the Apache (Software) License, version 2.0 ("the License"). See the License for details about distribution rights, and the specific rights regarding derivative works.

You may obtain a copy of the License at: <http://www.apache.org/licenses/LICENSE-2.0>

----- Separator -----

<https://www.apache.org/licenses/LICENSE-2.0>

Apache License Version 2.0
January 2004
<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations,

elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for

informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS APPENDIX

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment

syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

B.14 jakarta.json-api 2.1.3

Copyright: Eclipse Foundation License: EPL 2.0 + GPL v.2 with CPE ./LICENSE.md # Eclipse Public License - v 2.0

THE ACCOMPANYING PROGRAM IS PROVIDED UNDER THE TERMS OF THIS ECLIPSE PUBLIC LICENSE ("AGREEMENT"). ANY USE, REPRODUCTION OR DISTRIBUTION OF THE PROGRAM CONSTITUTES RECIPIENT'S ACCEPTANCE OF THIS AGREEMENT.

1. DEFINITIONS "Contribution" means: a) in the case of the initial Contributor, the initial content Distributed under this Agreement, and b) in the case of each subsequent Contributor: i) changes to the Program, and ii) additions to the Program; where such changes and/or additions to the Program originate from and are Distributed by that particular Contributor. A Contribution "originates" from a Contributor if it was added to the Program by such Contributor itself or anyone acting on such Contributor's behalf. Contributions do not include changes or additions to the Program that are not Modified Works. "Contributor" means any person or entity that Distributes the Program. "Licensed Patents" mean patent claims licensable by a Contributor which are necessarily infringed by the use or sale of its Contribution alone or when combined with the Program. "Program" means the Contributions Distributed in accordance with this Agreement. "Recipient" means anyone who receives the Program under this Agreement or any Secondary License (as applicable), including Contributors. "Derivative Works" shall mean any work, whether in Source Code or other form, that is based on (or derived from) the Program and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. "Modified Works" shall mean any work in Source Code or other form that results from an addition to, deletion from, or modification of the contents of the Program, including, for purposes of clarity any new file in Source Code form that contains any contents of the Program. Modified Works shall not include works that contain only declarations, interfaces, types, classes, structures, or files of the Program solely in each case in order to link to, bind by name, or subclass the Program or Modified Works thereof. "Distribute" means the acts of a) distributing or b) making available in any manner that enables the transfer of a copy. "Source Code" means the form of a Program preferred for making modifications, including but not limited to software source code, documentation source, and configuration files. "Secondary License" means either the GNU General Public License, Version 2.0, or any later versions of that license, including any exceptions or additional permissions as identified by the initial Contributor.

2. GRANT OF RIGHTS a) Subject to the terms of this Agreement, each Contributor hereby grants Recipient a non-exclusive, worldwide, royalty-free copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, Distribute and sublicense the Contribution of such Contributor, if any, and such Derivative Works. b) Subject to the terms of

this Agreement, each Contributor hereby grants Recipient a non-exclusive, worldwide, royalty-free patent license under Licensed Patents to make, use, sell, offer to sell, import and otherwise transfer the Contribution of such Contributor, if any, in Source Code or other form. This patent license shall apply to the combination of the Contribution and the Program if, at the time the Contribution is added by the Contributor, such addition of the Contribution causes such combination to be covered by the Licensed Patents. The patent license shall not apply to any other combinations which include the Contribution. No hardware per se is licensed hereunder. c) Recipient understands that although each Contributor grants the licenses to its Contributions set forth herein, no assurances are provided by any Contributor that the Program does not infringe the patent or other intellectual property rights of any other entity. Each Contributor disclaims any liability to Recipient for claims brought by any other entity based on infringement of intellectual property rights or otherwise. As a condition to exercising the rights and licenses granted hereunder, each Recipient hereby assumes sole responsibility to secure any other intellectual property rights needed, if any. For example, if a third party patent license is required to allow Recipient to Distribute the Program, it is Recipient's responsibility to acquire that license before distributing the Program. d) Each Contributor represents that to its knowledge it has sufficient copyright rights in its Contribution, if any, to grant the copyright license set forth in this Agreement. e) Notwithstanding the terms of any Secondary License, no Contributor makes additional grants to any Recipient (other than those set forth in this Agreement) as a result of such Recipient's receipt of the Program under the terms of a Secondary License (if permitted under the terms of Section 3).

3. REQUIREMENTS

3.1 If a Contributor Distributes the Program in any form, then: a) the Program must also be made available as Source Code, in accordance with section

3.2, and the Contributor must accompany the Program with a statement that the Source Code for the Program is available under this Agreement, and informs Recipients how to obtain it in a reasonable manner on or through a medium customarily used for software exchange; and b) the Contributor may Distribute the Program under a license different than this Agreement, provided that such license: i) effectively disclaims on behalf of all other Contributors all warranties and conditions, express and implied, including warranties or conditions of title and non-infringement, and implied warranties or conditions of merchantability and fitness for a particular purpose; ii) effectively excludes on behalf of all other Contributors all liability for damages, including direct, indirect, special, incidental and consequential damages, such as lost profits; iii) does not attempt to limit or alter the recipients' rights in the Source Code under section 3.2; and iv) requires any subsequent distribution of the Program by any party to be under a license that satisfies the requirements of this section 3. 3.2 When the Program is Distributed as Source Code: a) it must be made available under this Agreement, or if the Program (i) is combined with other material in a separate file or files made available under a Secondary License, and (ii) the initial Contributor attached to the Source Code the notice described in Exhibit A of this Agreement, then the Program may be made available under the terms of such Secondary Licenses, and b) a copy of this Agreement must be included with each copy of the Program.

3.3 Contributors may not remove or alter any copyright, patent, trademark, attribution notices, disclaimers of warranty, or limitations of liability ("notices") contained within the Program from any copy of the Program which they Distribute, provided that Contributors may add their own appropriate notices.

4. COMMERCIAL DISTRIBUTION Commercial distributors of software may accept certain responsibilities with respect to end users, business partners and the like. While

this license is intended to facilitate the commercial use of the Program, the Contributor who includes the Program in a commercial product offering should do so in a manner which does not create potential liability for other Contributors. Therefore, if a Contributor includes the Program in a commercial product offering, such Contributor ("Commercial Contributor") hereby agrees to defend and indemnify every other Contributor ("Indemnified Contributor") against any losses, damages and costs (collectively "Losses") arising from claims, lawsuits and other legal actions brought by a third party against the Indemnified Contributor to the extent caused by the acts or omissions of such Commercial Contributor in connection with its distribution of the Program in a commercial product offering. The obligations in this section do not apply to any claims or Losses relating to any actual or alleged intellectual property infringement. In order to qualify, an Indemnified Contributor must: a) promptly notify the Commercial Contributor in writing of such claim, and b) allow the Commercial Contributor to control, and cooperate with the Commercial Contributor in, the defense and any related settlement negotiations. The Indemnified Contributor may participate in any such claim at its own expense. For example, a Contributor might include the Program in a commercial product offering, Product X. That Contributor is then a Commercial Contributor. If that Commercial Contributor then makes performance claims, or offers warranties related to Product X, those performance claims and warranties are such Commercial Contributor's responsibility alone. Under this section, the Commercial Contributor would have to defend claims against the other Contributors related to those performance claims and warranties, and if a court requires any other Contributor to pay any damages as a result, the Commercial Contributor must pay those damages.

5. NO WARRANTY EXCEPT AS EXPRESSLY SET FORTH IN THIS AGREEMENT, AND TO THE EXTENT PERMITTED BY APPLICABLE LAW, THE PROGRAM IS PROVIDED ON AN "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, EITHER EXPRESS OR IMPLIED INCLUDING, WITHOUT LIMITATION, ANY WARRANTIES OR CONDITIONS OF TITLE, NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Each Recipient is solely responsible for determining the appropriateness of using and distributing the Program and assumes all risks associated with its exercise of rights under this Agreement, including but not limited to the risks and costs of program errors, compliance with applicable laws, damage to or loss of data, programs or equipment, and unavailability or interruption of operations.

6. DISCLAIMER OF LIABILITY EXCEPT AS EXPRESSLY SET FORTH IN THIS AGREEMENT, AND TO THE EXTENT PERMITTED BY APPLICABLE LAW, NEITHER RECIPIENT NOR ANY CONTRIBUTORS SHALL HAVE ANY LIABILITY FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING WITHOUT LIMITATION LOST PROFITS), HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OR DISTRIBUTION OF THE PROGRAM OR THE EXERCISE OF ANY RIGHTS GRANTED HEREUNDER, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

7. GENERAL If any provision of this Agreement is invalid or unenforceable under applicable law, it shall not affect the validity or enforceability of the remainder of the terms of this Agreement, and without further action by the parties hereto, such provision shall be reformed to the minimum extent necessary to make such provision valid and enforceable. If Recipient institutes patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Program itself (excluding combinations of the Program with other software or hardware) infringes such Recipient's patent(s), then such Recipient's rights granted under Section 2(b) shall terminate as of the date such litigation is filed. All Recipient's rights under this Agreement shall terminate if it fails to comply with any of the material terms or conditions of this Agreement and does not cure such failure in a reasonable period of time after becoming aware of such noncompliance. If all Recipient's rights under this Agreement terminate, Recipient agrees to cease use and distribution of the Program as soon as

reasonably practicable. However, Recipient's obligations under this Agreement and any licenses granted by Recipient relating to the Program shall continue and survive. Everyone is permitted to copy and distribute copies of this Agreement, but in order to avoid inconsistency the Agreement is copyrighted and may only be modified in the following manner. The Agreement Steward reserves the right to publish new versions (including revisions) of this Agreement from time to time. No one other than the Agreement Steward has the right to modify this Agreement. The Eclipse Foundation is the initial Agreement Steward. The Eclipse Foundation may assign the responsibility to serve as the Agreement Steward to a suitable separate entity. Each new version of the Agreement will be given a distinguishing version number. The Program (including Contributions) may always be Distributed subject to the version of the Agreement under which it was received. In addition, after a new version of the Agreement is published, Contributor may elect to Distribute the Program (including its Contributions) under the new version. Except as expressly stated in Sections 2(a) and 2(b) above, Recipient receives no rights or licenses to the intellectual property of any Contributor under this Agreement, whether expressly, by implication, estoppel or otherwise. All rights in the Program not expressly granted under this Agreement are reserved. Nothing in this Agreement is intended to be enforceable by any entity that is not a Contributor or Recipient. No third-party beneficiary rights are created under this Agreement. Exhibit A - Form of Secondary Licenses Notice "This Source Code may also be made available under the following Secondary Licenses when the conditions for such availability set forth in the Eclipse Public License, v. 2.0 are satisfied: {name license(s), version(s), and exceptions or additional permissions here}." Simply including a copy of this Agreement, including this Exhibit A is not sufficient to license the Source Code under Secondary Licenses. If it is not possible or desirable to put the notice in a particular file, then You may include the notice in a location (such as a LICENSE file in a relevant directory) where a recipient would be likely to look for such a notice. You may add additional accurate notices of copyright ownership. --- ## The GNU General Public License (GPL) Version 2, June 1991 Copyright (C) 1989, 1991 Free Software Foundation, Inc. 51 Franklin Street, Fifth Floor Boston, MA 02110-1335 USA Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed. Preamble The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation's software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Library General Public License instead.) You can apply it to your programs, too. When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things. To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the software, or if you modify it. For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights. We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the software. Also, for each author's protection and ours, we want to make certain that everyone understands that there is no warranty for this free software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is not the original, so

that any problems introduced by others will not reflect on the original authors' reputations. Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all. The precise terms and conditions for copying, distribution and modification follow.

TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION 0.

This License applies to any program or other work which contains a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The "Program", below, refers to any such program or work, and a "work based on the Program" means either the Program or any derivative work under copyright law: that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or translated into another language. (Hereinafter, translation is included without limitation in the term "modification".) Each licensee is addressed as "you". Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program is covered only if its contents constitute a work based on the Program (independent of having been made by running the Program). Whether that is true depends on what the Program does.

1. You may copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program. You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Program or any portion of it, thus forming a work based on the Program, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions: a) You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change. b) You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this License. c) If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.) These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it. Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Program. In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you also do one of the following: a) Accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or, b) Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or, c) Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.) The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the executable. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable. If distribution of executable or object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place counts as distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

4. You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

5. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.

6. Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.

7. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program. If any portion of this section is held invalid or

unenforceable under any particular circumstance, the balance of the section is intended to apply and the section as a whole is intended to apply in other circumstances. It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system, which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice. This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

8. If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

9. The Free Software Foundation may publish revised and/or new versions of the General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns. Each version is given a distinguishing version number. If the Program specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

10. If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally. NO WARRANTY

11. BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

12. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms. To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey

the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found. One line to give the program's name and a brief idea of what it does.

Copyright (C) <year> <name of author>

This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 2 of the License, or (at your option) any later version. This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details. You should have received a copy of the GNU General Public License along with this program; if not, write to the Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1335 USA Also add information on how to contact you by electronic and paper mail. If the program is interactive, make it output a short notice like this when it starts in an interactive mode: Gnomovision version 69, Copyright (C) year name of author Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'. This is free software, and you are welcome to redistribute it under certain conditions; type `show c' for details. The hypothetical commands `show w' and `show c' should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than `show w' and `show c'; they could even be mouse-clicks or menu items--whatever suits your program. You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the program, if necessary. Here is a sample; alter the names: Yoyodyne, Inc., hereby disclaims all copyright interest in the program `Gnomovision' (which makes passes at compilers) written by James Hacker. signature of Ty Coon, 1 April 1989 Ty Coon, President of Vice This General Public License does not permit incorporating your program into proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Library General Public License instead of this License. --- ## CLASSPATH EXCEPTION Linking this library statically or dynamically with other modules is making a combined work based on this library. Thus, the terms and conditions of the GNU General Public License version 2 cover the whole combination. As a special exception, the copyright holders of this library give you permission to link this library with independent modules to produce an executable, regardless of the license terms of these independent modules, and to copy and distribute the resulting executable under terms of your choice, provided that you also meet, for each linked independent module, the terms and conditions of the license of that module. An independent module is a module which is not derived from or based on this library. If you modify this library, you may extend this exception to your version of the library, but you are not obligated to do so. If you do not wish to do so, delete this exception statement from your version. /NOTICE.md Notices for Jakarta JSON Processing This content is produced and maintained by the Jakarta JSON Processing project. Project home: <https://projects.eclipse.org/projects/ee4j.jsonp> Trademarks Jakarta JSON Processing is a trademark of the Eclipse Foundation. Copyright All content is the property of the respective authors or their employers. For more information regarding authorship of content, please consult the listed source code repository logs. Declared Project Licenses This program and the accompanying materials are made available under the terms of the Eclipse Public License v. 2.0 which is available at <http://www.eclipse.org/legal/epl-2.0>. This Source Code may also be made available under the following Secondary Licenses when the conditions for such availability set forth in the Eclipse Public License v. 2.0 are satisfied: GNU General Public License v2.0 w/Classpath exception which is available at <https://www.gnu.org/software/classpath/license.html>. SPDX-License-Identifier: EPL-2.0 OR GPL-2.0 WITH Classpath-exception-2.0 Source Code The project maintains the

following source code repositories: <https://github.com/eclipse-ee4j/jsonp> Third-party Content
This project leverages the following third party content. javax.ws.rs-api:2.0.1 (2.0.1) License: (CDDL-1.1 OR GPL-2.0 OR GPL-2.0 WITH Classpath-exception-2.0) AND Apache-2.0
Project: <https://github.com/jax-rs/api> Source: <https://github.com/jax-rs/api> javax.ws.rs:jsr311-api:jar:1.1.1 (1.1.1) License: CDDL-1.0 AND Apache-2.0 Project: <https://github.com/jax-rs/api>
Source: <http://search.maven.org/remotecontent?filepath=javax/ws/rs/jsr311-api/1.1.1/jsr311-api-1.1.1-sources.jar> javax:javaee-web-api:jar:7.0 (7.0) License: (CDDL-1.0 OR GPL-2.0 OR GPL-2.0 WITH Classpath-exception-2.0) AND (EPL-1.0 OR BSD-3-Clause) AND Apache-2.0 AND LicenseRef-Public Domain Project: <https://javaee.github.io> Source: <http://search.maven.org/remotecontent?filepath=javax/javaee-web-api/7.0/javaee-web-api-7.0-sources.jar> JUnit (4.12) License: Eclipse Public License
Cryptography Content may contain encryption software. The country in which you are currently may have restrictions on the import, possession, and use, and/or re-export to another country, of encryption software. BEFORE using any encryption software, please check the country's laws, regulations and policies concerning the import, possession, or use, and re-export of encryption software, to see if this is permitted. ----- Separator ----- #.spec Copyright: Copyright (c) 2017, 2020 Oracle and/or its affiliates. All rights reserved. This program and the accompanying materials are made available under the terms of the Eclipse Public License v. 2.0, which is available at <http://www.eclipse.org/legal/epl-2.0>. This Source Code may also be made available under the following Secondary Licenses when the conditions for such availability set forth in the Eclipse Public License v. 2.0 are satisfied: GNU General Public License, version 2 with the GNU Classpath Exception, which is available at <https://www.gnu.org/software/classpath/license.html>. SPDX-License-Identifier: EPL-2.0 OR GPL-2.0 WITH Classpath-exception-2.0 #.spec/LICENSE "Eclipse Public License - v 2.0 THE ACCOMPANYING PROGRAM IS PROVIDED UNDER THE TERMS OF THIS ECLIPSE PUBLIC LICENSE ("AGREEMENT"). ANY USE, REPRODUCTION OR DISTRIBUTION OF THE PROGRAM CONSTITUTES RECIPIENT'S ACCEPTANCE OF THIS AGREEMENT. 1. DEFINITIONS "Contribution" means: a) in the case of the initial Contributor, the initial content Distributed under this Agreement, and b) in the case of each subsequent Contributor: i) changes to the Program, and ii) additions to the Program; where such changes and/or additions to the Program originate from and are Distributed by that particular Contributor. A Contribution "originates" from a Contributor if it was added to the Program by such Contributor itself or anyone acting on such Contributor's behalf. Contributions do not include changes or additions to the Program that are not Modified Works. "Contributor" means any person or entity that Distributes the Program. "Licensed Patents" mean patent claims licensable by a Contributor which are necessarily infringed by the use or sale of its Contribution alone or when combined with the Program. "Program" means the Contributions Distributed in accordance with this Agreement. "Recipient" means anyone who receives the Program under this Agreement or any Secondary License (as applicable), including Contributors. "Derivative Works" shall mean any work, whether in Source Code or other form, that is based on (or derived from) the Program and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. "Modified Works" shall mean any work in Source Code or other form that results from an addition to, deletion from, or modification of the contents of the Program, including, for purposes of clarity any new file in Source Code form that contains any contents of the Program. Modified Works shall not include works that contain only declarations, interfaces, types, classes, structures, or files of the Program solely in each case in order to link to, bind by name, or subclass the Program or Modified Works thereof. "Distribute" means the acts of a) distributing or b) making available in any manner that enables the transfer of a copy. "Source Code" means the form of a Program preferred for making modifications, including but not limited to software source code, documentation source, and configuration files. "Secondary License" means either the GNU General Public License, Version 2.0, or any later versions of that license, including any exceptions or additional permissions as identified by the initial Contributor. 2. GRANT OF RIGHTS a) Subject to the terms of this Agreement, each Contributor hereby grants Recipient a non-exclusive, worldwide, royalty-free copyright license

to reproduce, prepare Derivative Works of, publicly display, publicly perform, Distribute and sublicense the Contribution of such Contributor, if any, and such Derivative Works.

b) Subject to the terms of this Agreement, each Contributor hereby grants Recipient a non-exclusive, worldwide, royalty-free patent license under Licensed Patents to make, use, sell, offer to sell, import and otherwise transfer the Contribution of such Contributor, if any, in Source Code or other form. This patent license shall apply to the combination of the Contribution and the Program if, at the time the Contribution is added by the Contributor, such addition of the Contribution causes such combination to be covered by the Licensed Patents. The patent license shall not apply to any other combinations which include the Contribution. No hardware per se is licensed hereunder.

c) Recipient understands that although each Contributor grants the licenses to its Contributions set forth herein, no assurances are provided by any Contributor that the Program does not infringe the patent or other intellectual property rights of any other entity. Each Contributor disclaims any liability to Recipient for claims brought by any other entity based on infringement of intellectual property rights or otherwise. As a condition to exercising the rights and licenses granted hereunder, each Recipient hereby assumes sole responsibility to secure any other intellectual property rights needed, if any. For example, if a third party patent license is required to allow Recipient to Distribute the Program, it is Recipient's responsibility to acquire that license before distributing the Program.

d) Each Contributor represents that to its knowledge it has sufficient copyright rights in its Contribution, if any, to grant the copyright license set forth in this Agreement.

e) Notwithstanding the terms of any Secondary License, no Contributor makes additional grants to any Recipient (other than those set forth in this Agreement) as a result of such Recipient's receipt of the Program under the terms of a Secondary License (if permitted under the terms of Section 3).

3. REQUIREMENTS

3.1

If a Contributor Distributes the Program in any form, then:

- the Program must also be made available as Source Code, in accordance with section 3.2, and the Contributor must accompany the Program with a statement that the Source Code for the Program is available under this Agreement, and informs Recipients how to obtain it in a reasonable manner on or through a medium customarily used for software exchange; and
- the Contributor may Distribute the Program under a license different than this Agreement, provided that such license:
 - effectively disclaims on behalf of all other Contributors all warranties and conditions, express and implied, including warranties or conditions of title and non-infringement, and implied warranties or conditions of merchantability and fitness for a particular purpose;
 - effectively excludes on behalf of all other Contributors all liability for damages, including direct, indirect, special, incidental and consequential damages, such as lost profits;
 - does not attempt to limit or alter the recipients' rights in the Source Code under section 3.2; and
 - requires any subsequent distribution of the Program by any party to be under a license that satisfies the requirements of this section 3.

3.2

When the Program is Distributed as Source Code:

- it must be made available under this Agreement, or if the Program (i) is combined with other material in a separate file or files made available under a Secondary License, and (ii) the initial Contributor attached to the Source Code the notice described in Exhibit A of this Agreement, then the Program may be made available under the terms of such Secondary Licenses, and
- a copy of this Agreement must be included with each copy of the Program.

3.3

Contributors may not remove or alter any copyright, patent, trademark, attribution notices, disclaimers of warranty, or limitations of liability ('notices') contained within the Program from any copy of the Program which they Distribute, provided that Contributors may add their own appropriate notices.

4. COMMERCIAL DISTRIBUTION

Commercial distributors of software may accept certain responsibilities with respect to end users, business partners and the like. While this license is intended to facilitate the commercial use of the Program, the Contributor who includes the Program in a commercial product offering should do so in a manner which does not create potential liability for other Contributors. Therefore, if a

Contributor includes the Program in a commercial product offering, such Contributor (“Commercial Contributor”) hereby agrees to defend and indemnify every other Contributor (“Indemnified Contributor”) against any losses, damages and costs (collectively “Losses”) arising from claims, lawsuits and other legal actions brought by a third party against the Indemnified Contributor to the extent caused by the acts or omissions of such Commercial Contributor in connection with its distribution of the Program in a commercial product offering. The obligations in this section do not apply to any claims or Losses relating to any actual or alleged intellectual property infringement. In order to qualify, an Indemnified Contributor must: a) promptly notify the Commercial Contributor in writing of such claim, and b) allow the Commercial Contributor to control, and cooperate with the Commercial Contributor in, the defense and any related settlement negotiations. The Indemnified Contributor may participate in any such claim at its own expense. For example, a Contributor might include the Program in a commercial product offering, Product X. That Contributor is then a Commercial Contributor. If that Commercial Contributor then makes performance claims, or offers warranties related to Product X, those performance claims and warranties are such Commercial Contributor's responsibility alone. Under this section, the Commercial Contributor would have to defend claims against the other Contributors related to those performance claims and warranties, and if a court requires any other Contributor to pay any damages as a result, the Commercial Contributor must pay those damages.

5. NO WARRANTY EXCEPT AS EXPRESSLY SET FORTH IN THIS AGREEMENT, AND TO THE EXTENT PERMITTED BY APPLICABLE LAW, THE PROGRAM IS PROVIDED ON AN “AS IS” BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, EITHER EXPRESS OR IMPLIED INCLUDING, WITHOUT LIMITATION, ANY WARRANTIES OR CONDITIONS OF TITLE, NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Each Recipient is solely responsible for determining the appropriateness of using and distributing the Program and assumes all risks associated with its exercise of rights under this Agreement, including but not limited to the risks and costs of program errors, compliance with applicable laws, damage to or loss of data, programs or equipment, and unavailability or interruption of operations.

6. DISCLAIMER OF LIABILITY EXCEPT AS EXPRESSLY SET FORTH IN THIS AGREEMENT, AND TO THE EXTENT PERMITTED BY APPLICABLE LAW, NEITHER RECIPIENT NOR ANY CONTRIBUTORS SHALL HAVE ANY LIABILITY FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING WITHOUT LIMITATION LOST PROFITS), HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OR DISTRIBUTION OF THE PROGRAM OR THE EXERCISE OF ANY RIGHTS GRANTED HEREUNDER, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

7. GENERAL If any provision of this Agreement is invalid or unenforceable under applicable law, it shall not affect the validity or enforceability of the remainder of the terms of this Agreement, and without further action by the parties hereto, such provision shall be reformed to the minimum extent necessary to make such provision valid and enforceable. If Recipient institutes patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Program itself (excluding combinations of the Program with other software or hardware) infringes such Recipient's patent(s), then such Recipient's rights granted under Section 2(b) shall terminate as of the date such litigation is filed. All Recipient's rights under this Agreement shall terminate if it fails to comply with any of the material terms or conditions of this Agreement and does not cure such failure in a reasonable period of time after becoming aware of such noncompliance. If all Recipient's rights under this Agreement terminate, Recipient agrees to cease use and distribution of the Program as soon as reasonably practicable. However, Recipient's obligations under this Agreement and any licenses granted by Recipient relating to the Program shall continue and survive. Everyone is permitted to copy and distribute copies of this Agreement, but in order to avoid inconsistency the Agreement is copyrighted and may only be modified in the following manner. The Agreement Steward reserves the right to publish new versions (including revisions) of this Agreement from time to time. No one other

than the Agreement Steward has the right to modify this Agreement. The Eclipse Foundation is the initial Agreement Steward. The Eclipse Foundation may assign the responsibility to serve as the Agreement Steward to a suitable separate entity. Each new version of the Agreement will be given a distinguishing version number. The Program (including Contributions) may always be Distributed subject to the version of the Agreement under which it was received. In addition, after a new version of the Agreement is published, Contributor may elect to Distribute the Program (including its Contributions) under the new version. Except as expressly stated in Sections 2(a) and 2(b) above, Recipient receives no rights or licenses to the intellectual property of any Contributor under this Agreement, whether expressly, by implication, estoppel or otherwise. All rights in the Program not expressly granted under this Agreement are reserved. Nothing in this Agreement is intended to be enforceable by any entity that is not a Contributor or Recipient. No third-party beneficiary rights are created under this Agreement. Exhibit A – Form of Secondary Licenses Notice “This Source Code may also be made available under the following Secondary Licenses when the conditions for such availability set forth in the Eclipse Public License, v. 2.0 are satisfied: {name license(s), version(s), and exceptions or additional permissions here}.” Simply including a copy of this Agreement, including this Exhibit A is not sufficient to license the Source Code under Secondary Licenses. If it is not possible or desirable to put the notice in a particular file, then You may include the notice in a location (such as a LICENSE file in a relevant directory) where a recipient would be likely to look for such a notice. You may add additional accurate notices of copyright owners

B.15 Jansi 2.4.1

jansi (org.fusesource.jansi:jansi)

Copyright (C) 2009-2021 the original author(s).

Apache License Version 2.0
January 2004
<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this

License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

-----4th-party dependencies----- Apache HttpComponents Client
Copyright 1999-2018 The Apache Software Foundation

This product includes software developed at The Apache Software Foundation (<http://www.apache.org/>)

B.16 jLine 3.25.1

Copyright (c) 2002-2016, the original author or authors.

All rights reserved.

<http://www.opensource.org/licenses/bsd-license.php>

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

Neither the name of JLine nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

jansi 1.12 Apache 2.0

Apache License Version 2.0
January 2004
<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are

necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions.

Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS APPENDIX

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License

B.17 liquibase-core 4.26.0

Apache License Version 2.0
January 2004
<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or

consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS APPENDIX

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright 2022 Liquibase Inc.

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

=====

LIST OF FOURTH-PARTY DEPENDENCIES, its Licenses & copyright notices

=====

snakeyaml - Apache 2.0

Copyright (c) 2008, <http://www.snakeyaml.org> Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

=====

opencsv - Apache 2.0

Copyright 2005 Bytecode Pty Ltd.

=====
=====
commons-lang3

commons-text

commons-beanutils

commons-logging

commons-collections4

Apache 2.0 Licensed

Copyright © 2021 The Apache Software Foundation. All Rights Reserved.

=====
=====
picocli - Apache 2.0

Copyright 2017 Remko Popma

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

===LICENCES

Apache 2.0

Apache License

Version 2.0,

January 2004 <http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions. "License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document. "Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License. "Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity. "You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License. "Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files. "Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types. "Work" shall mean the work of authorship, whether

in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below). "Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof. "Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution." "Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions: You must give any other recipients of the Work or Derivative Works a copy of this License; and You must cause any modified files to carry prominent notices stating that You changed the files; and You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License. You may add Your own copyright

statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

```
=====  
===== javax.xml.bind:jaxb-api (2.3.2 and higher)  
=====  
===== Notices for Eclipse Project for JAXB
```

This content is produced and maintained by the Eclipse Project for JAXB project.

Project home: <https://projects.eclipse.org/projects/ee4j.jaxb>

Trademarks

Eclipse Project for JAXB is a trademark of the Eclipse Foundation.

Copyright All content is the property of the respective authors or their employers. For more information regarding authorship of content, please consult the listed source code repository logs.

Declared Project Licenses This program and the accompanying materials are made available under the terms of the Eclipse Distribution License v. 1.0 which is available at <http://www.eclipse.org/org/documents/edl-v10.php>.

SPDX-License-Identifier: BSD-3-Clause

Source Code The project maintains the following source code repositories:

<https://github.com/eclipse-ee4j/jaxb-api>

Third-party Content

This project leverages the following third party content.

None

Cryptography

Content may contain encryption software. The country in which you are currently may have restrictions on the import, possession, and use, and/or re-export to another country, of encryption software. BEFORE using any encryption software, please check the country's laws, regulations and policies concerning the import, possession, or use, and re-export of encryption software, to see if this is permitted.

License

Copyright (c) 2017, 2018 Oracle and/or its affiliates. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
- Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
- Neither the name of the Eclipse Foundation, Inc. nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

B.18 OCI SDK for Java 3.33.0

Copyright (c) 2016, 2020, Oracle and/or its affiliates. All rights reserved.

This software is dual-licensed to you under the Universal Permissive License (UPL) 1.0 as shown at <https://oss.oracle.com/licenses/upl> or Apache License 2.0 as shown at <http://www.apache.org/licenses/LICENSE-2.0>. You may choose either license.

The Universal Permissive License (UPL), Version 1.0 Copyright (c) 2016, 2018, Oracle and/or its affiliates. All rights reserved.

Subject to the condition set forth below, permission is hereby granted to any person obtaining a copy of this software, associated documentation and/or data (collectively the "Software"), free of charge and under any and all copyright rights in the Software, and any and all patent rights owned or freely licensable by each licensor hereunder covering either (i) the unmodified Software as contributed to or provided by such licensor, or (ii) the Larger Works (as defined below), to deal in both

(a) the Software, and

(b) any piece of software and/or hardware listed in the `lrgwrks.txt` file if one is included with the Software (each a "Larger Work" to which the Software is contributed by such licensors),

without restriction, including without limitation the rights to copy, create derivative works of, display, perform, and distribute the Software and make, use, sell, offer for sale, import, export, have made, and have sold the Software and the Larger Work(s), and to sublicense the foregoing rights on either these or other terms.

This license is subject to the following condition:

The above copyright notice and either this complete permission notice or at a minimum a reference to the UPL must be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

The Apache Software License, Version 2.0 Copyright (c) 2016, 2018, Oracle and/or its affiliates. All rights reserved.

Licensed under the Apache License, Version 2.0 (the "License"); You may not use this product except in compliance with the License. You may obtain a copy of the License at <http://www.apache.org/licenses/LICENSE-2.0>. A copy of the license is also reproduced below. Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

Apache License

Version 2.0, January 2004

<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions. "License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document. "Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License. "Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity. "You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License. "Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files. "Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types. "Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below). "Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof. "Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution." "Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.
2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.
3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent

licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions: You must give any other recipients of the Work or Derivative Works a copy of this License; and You must cause any modified files to carry prominent notices stating that You changed the files; and You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License. You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other

commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at <http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

----- Third Party Components -----

----- Fourth Party Components -----

----- Licenses -----

- Apache License 2.0
- BSD 3-Clause
- Common Development and Distribution License (CDDL)
- Eclipse Distribution License 1.0
- Eclipse Public License 2.0
- GNU General Public License 2.0 with Classpath Exception
- GNU Lesser General Public License 2.1
- GNU Lesser General Public License 3.0
- MIT License

----- Notices -----

----- Fourth Party Notices -----

===== Third Party Components =====

bouncycastle

-Copyright © 2000-2021 The Legion of the Bouncy Castle Inc.

-License: MIT License

-Source code: <https://github.com/bcgit/bc-java>

-Project home: <https://bouncycastle.org>

commons-codec

-Copyright © 2002-2021 The Apache Software Foundation

-License: Apache License 2.0

-Source code: <https://github.com/apache/commons-codec>

-Project home: <https://commons.apache.org/proper/commons-codec>

commons-io

-Copyright © 2002-2021 The Apache Software Foundation

-License: Apache License 2.0

-Source code: <https://github.com/apache/commons-io>

-Project home: <https://commons.apache.org/proper/commons-io>

commons-lang3

- Copyright © 2001-2021 The Apache Software Foundation

-License: Apache License 2.0

-Source code: <https://github.com/apache/commons-lang>

-Project home: <https://commons.apache.org/proper/commons-lang>

jackson-annotations

-Copyright © 2009-2011 FasterXML, LLC

-License: Apache License 2.0

-Source code: <https://github.com/FasterXML/jackson-annotations>

-Project home: <http://fasterxml.com>

jackson-core

-Copyright © 2009-2011 FasterXML, LLC

-License: Apache License 2.0

-Source code: <https://github.com/FasterXML/jackson-core>

-Project home: <http://fasterxml.com>

jackson-databind

-Copyright © 2009-2011 FasterXML, LLC

-License: Apache License 2.0

-Source code: <https://github.com/FasterXML/jackson-databind>
-Project home: <http://fasterxml.com>
jackson-datatype-jdk8
-Copyright © 2009-2011 FasterXML, LLC
-License: Apache License 2.0
-Source code: <https://github.com/FasterXML/jackson-modules-java8>
-Project home: <http://fasterxml.com>
jackson-datatype-jsr310
-Copyright © 2009-2011 FasterXML, LLC
-License: Apache License 2.0
-Source code: <https://github.com/FasterXML/jackson-modules-java8>
-Project home: <http://fasterxml.com>
jackson-jaxrs-base
-Copyright © 2009-2011 FasterXML, LLC
-License: Apache License 2.0
-Source code: <https://github.com/FasterXML/jackson-jaxrs-providers>
-Project home: <http://fasterxml.com>
jakarta.ws.rs-api
-Copyright © Eclipse Foundation
-License: Eclipse Public License 2.0 GNU General Public License 2.0 with Classpath Exception
-Source code: <https://github.com/eclipse-ee4j/jaxrs-api>
-Project home: <https://projects.eclipse.org/projects/ee4j.jaxrs>
jersey-client
-Copyright © Eclipse Foundation
-License: Eclipse Public License 2.0 GNU General Public License 2.0 with Classpath Exception
-Source code: <https://github.com/eclipse-ee4j/jersey>
-Project home: <https://projects.eclipse.org/projects/ee4j.jersey>
jersey-hk2
-Copyright © 2017-2021 Oracle and/or its affiliates
-License: Eclipse Public License 2.0; GNU General Public License 2.0 with Classpath Exception
-Project home: <https://projects.eclipse.org/projects/ee4j.jersey>

jersey-media-json-jackson

-License: Eclipse Public License 2.0; Apache License 2.0; GNU General Public License 2.0 with Classpath Exception

-Project home: <https://eclipse-ee4j.github.io/jersey.github.io/>

JSR305

-Copyright © 2007-2009 JSR305 expert group

-License: BSD 3-Clause

-Source code: <https://github.com/findbugsproject/findbugs>

-Project home: <http://findbugs.sourceforge.net/>

resilience4j-circuitbreaker

-Copyright © 2020 Robert Winkler, Bohdan Storozhuk, and others

-License: Apache License 2.0

-Source code: <https://github.com/resilience4j/resilience4j>

-Project home: <https://resilience4j.readme.io>

resilience4j-core

-Copyright © 2020 Robert Winkler, Bohdan Storozhuk, and others

-License: Apache License 2.0

-Source code: <https://github.com/resilience4j/resilience4j>

-Project home: <https://resilience4j.readme.io>

slf4j

-Copyright © 2004-2019 QOS.ch

-License: MIT License

-Source code: <https://github.com/qos-ch/slf4j>

-Project home: <http://www.slf4j.org/>

Vavr

-Copyright © 2014-2021

-License: Apache License 2.0

-Source code: <https://github.com/vavr-io/vavr>

-Project home: <https://www.vavr.io>

==== Fourth Party Components
=====

com.fasterxml.jackson.jaxrs:jackson-jaxrs-json-provider

-Copyright © 2009-2011 FasterXML, LLC

-License: Apache License 2.0

com.fasterxml.jackson.module:jackson-module-jaxb-annotations *

-Copyright © 2009-2011 FasterXML, LLC

-License: Apache License 2.0

com.github.stephenc.jcip:jcip-annotations

-Copyright © 2013 Stephen Connolly

-License: Apache License 2.0

-Source code: <https://github.com/stephenc/jcip-annotations>

com.sun.activation:jakarta.activation

-Copyright © 2018 Oracle and/or its affiliates. All rights reserved.

-License: Eclipse Distribution License 1.0

commons-logging:commons-logging

-Copyright © 2001-2014 The Apache Software Foundation. All rights reserved.

-License: Apache License 2.0

io.vavr:vavr-match

-Copyright © 2014-2021

Vavr

-License: Apache License 2.0

jakarta.activation:jakarta.activation-api

-Copyright © 2018 Oracle and/or its affiliates. All rights reserved.

-License: Eclipse Distribution License 1.0

jakarta.annotation:jakarta.annotation-api

-Copyright © 2012, 2020 Oracle and/or its affiliates. All rights reserved.

-Licenses: Eclipse Public License 2.0 GNU General Public License 2.0 with Classpath Exception

jakarta.validation:jakarta.validation-api

-Copyright © Eclipse Foundation

-License: Apache License 2.0

jakarta.xml.bind:jakarta.xml.bind-api

-Copyright © 2018, 2019 Oracle and/or its affiliates. All rights reserved.

-License: Eclipse Distribution License 1.0

net.jodah:failsafe

-Copyright © 2016 Jonathan Halterman and friends

-License: Apache License 2.0

-Source code: <https://github.com/jhalterman/failsafe/>

net.minidev:accessors-smart

-Copyright © 2011 JSON-SMART authors

-License: Apache License 2.0

-Source code: <https://github.com/netplex/json-smart-v2/tree/master/accessors-smart>

net.minidev:json-smart

-Copyright © 2011 JSON-SMART authors

-License: Apache License 2.0

-Source code: <https://github.com/netplex/json-smart-v2>

org.apache.httpcomponents:httpclient

-Copyright © 2005–2021 The Apache Software Foundation. All rights reserved.

-License: Apache License 2.0 org.

bouncycastle:bcpkix-jdk15to18

-Copyright © 2000-2021 The Legion of the Bouncy Castle Inc

-License: MIT License org.bouncycastle:bcprov-jdk15to18

-Copyright © 2000-2021 The Legion of the Bouncy Castle Inc

-License: MIT License

org.glassfish.hk2:hk2-api

-Copyright © 2012, 2018 Oracle and/or its affiliates. All rights reserved.

-Licenses: Eclipse Public License 2.0 GNU General Public License 2.0 with Classpath Exception

-Source code: <https://github.com/eclipse-ee4j/glassfish-hk2>

org.glassfish.hk2:hk2-locator

-Copyright © 2012, 2018 Oracle and/or its affiliates. All rights reserved.

-Licenses: Eclipse Public License 2.0 GNU General Public License 2.0 with Classpath Exception

-Source code: <https://github.com/eclipse-ee4j/glassfish-hk2>

org.glassfish.hk2:hk2-utils

-Copyright © 2012, 2018 Oracle and/or its affiliates. All rights reserved.

-Licenses: Eclipse Public License 2.0 GNU General Public License 2.0 with Classpath Exception

-Source code: <https://github.com/eclipse-ee4j/glassfish-hk2>

org.glassfish.hk2:osgi-resource-locator

-Copyright © 2010-2017 Oracle and/or its affiliates. All rights reserved.

-Licenses: Eclipse Public License 2.0 GNU General Public License 2.0 with Classpath Exception

org.glassfish.hk2.external:aopalliance-repackaged

-Copyright © "2013, 2018 Oracle and/or its affiliates. All rights reserved. 2019 Payara Services Ltd

-Licenses: Eclipse Public License 2.0 GNU General Public License 2.0 with Classpath Exception

org.glassfish.hk2.external:jakarta.inject

-Copyright © 2010, 2018 Oracle and/or its affiliates. All rights reserved.

-Licenses: Eclipse Public License 2.0 GNU General Public License 2.0 with Classpath Exception

org.glassfish.jersey.connectors:jersey-apache-connector

-Copyright © 2013, 2021 Oracle and/or its affiliates. All rights reserved.

-Licenses: Eclipse Public License 2.0 GNU General Public License 2.0 with Classpath Exception

-Source code: <https://github.com/eclipse-ee4j/jersey>

org.glassfish.jersey.core:jersey-common

-Copyright © 2013, 2021 Oracle and/or its affiliates. All rights reserved.

-Licenses: Eclipse Public License 2.0 GNU General Public License 2.0 with Classpath Exception

-Source code: <https://github.com/eclipse-ee4j/jersey>

org.glassfish.jersey.ext:jersey-entity-filtering

-Copyright © 2013, 2021 Oracle and/or its affiliates. All rights reserved.

-Licenses: Eclipse Public License 2.0 GNU General Public License 2.0 with Classpath Exception

-Source code: <https://github.com/eclipse-ee4j/jersey>

org.glassfish.jersey.inject:jersey-hk2

-Copyright © 2013, 2021 Oracle and/or its affiliates. All rights reserved.

-Licenses: Eclipse Public License 2.0 GNU General Public License 2.0 with Classpath Exception

-Source code: <https://github.com/eclipse-ee4j/jersey>

org.javassist:javassist

-Copyright © 1999-2021 by Shigeru Chiba

-Licenses: Apache License 2.0 GNU Lesser General Public License 2.1

-Source code: <https://github.com/jboss-javassist/javassist>

org.jboss.logging:jboss-logging

-Copyright © 2010 Red Hat, Inc., and individual contributors

-License: Apache License 2.0

-Source code: <https://github.com/jboss-logging/jboss-logging>
org.jboss.resteasy:resteasy-client
-License: Apache License 2.0
-Source code: <https://github.com/resteasy/Resteasy>
org.jboss.resteasy:resteasy-jaxrs
-License: Apache License 2.0
-Source code: <https://github.com/resteasy/Resteasy>
org.jboss.spec.javax.annotation:jboss-annotations-api_1.3_spec
-Copyright © 2012, 2019 Oracle and/or its affiliates. All rights reserved.
-Licenses: Eclipse Public License 2.0 GNU General Public License 2.0 with Classpath Exception
-Source code: https://github.com/jboss/jboss-jakarta-annotations-api_spec
org.jboss.spec.javax.ws.rs:jboss-jaxrs-api_2.1_spec
-Copyright © 2011, 2019 Oracle and/or its affiliates. All rights reserved.
-License: Common Development and Distribution License (CDDL) GNU General Public License 2.0 with Classpath Exception
-Source code: https://github.com/jboss/jboss-jaxrs-api_spec
org.jboss.spec.javax.xml.bind:jboss-jaxb-api_2.3_spec
-Copyright © 2018, 2019 Oracle and/or its affiliates. All rights reserved.
-License: Eclipse Distribution License 1.0 org.ow2.asm:asm
-Copyright © 2000-2011
INRIA, France Telecom
-License: BSD 3-Clause org.reactivestreams:reactive-streams Copyright ©
-License: MIT License
-Source code: <https://github.com/reactive-streams/reactive-streams-jvm>
org.slf4j:slf4j-api
-Copyright © 2004-2019 QOS.ch
-License: MIT License
org.slf4j:slf4j-simple -
-Copyright © 2004-2019 QOS.ch
-License: MIT License
==== Licensess
====
----- Apache License 2.0 -----

Apache License Version 2.0, January 2004 <http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions. "License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document. "Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License. "Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity. "You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License. "Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files. "Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types. "Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below). "Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof. "Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution." "Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions: (a) You must give any other recipients of the Work or Derivative Works a copy of this License; and (b) You must cause any modified files to carry prominent notices stating that You changed the files; and (c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and (d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License. You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS APPENDIX:

How to apply the Apache License to your work. To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner] Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at <http://www.apache.org/licenses/LICENSE-2.0> Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

BSD 3-Clause

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. Neither the name of the copyright holder nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT HOLDER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Common Development and Distribution License (CDDL) -----

COMMON DEVELOPMENT AND DISTRIBUTION LICENSE (CDDL) Version 1.0 1. Definitions. 1.1. "Contributor" means each individual or entity that creates or contributes to the creation of Modifications. 1.2. "Contributor Version" means the combination of the Original Software, prior Modifications used by a Contributor (if any), and the Modifications made by that particular Contributor. 1.3. "Covered Software" means (a) the Original Software, or (b) Modifications, or (c) the combination of files containing Original Software with files containing Modifications, in each case including portions thereof. 1.4. "Executable" means the Covered Software in any form other than Source Code. 1.5. "Initial Developer" means the individual or entity that first makes Original Software available under this License. 1.6. "Larger Work" means a work which combines Covered Software or portions thereof with code not governed by the terms of this License. 1.7. "License" means this document. 1.8. "Licensable" means having the right to grant, to the maximum extent possible, whether at the time of the initial grant or subsequently acquired, any and all of the rights conveyed herein. 1.9. "Modifications" means the Source Code and Executable form of any of the following: A. Any file that results from an addition to, deletion from or modification of the contents of a file containing Original Software or previous Modifications; B. Any new file that contains any part of the Original Software or previous Modification; or C. Any new file that is contributed or otherwise made available under the terms of this License. 1.10. "Original Software" means the Source Code and Executable form of computer software code that is originally released under this License. 1.11. "Patent Claims" means any patent claim(s), now owned or hereafter acquired, including without limitation, method, process, and apparatus claims, in any patent Licensable by grantor. 1.12. "Source Code" means (a) the common form of computer software code in which modifications are made and (b) associated documentation included in or with such code. 1.13. "You" (or "Your") means an individual or a legal entity exercising rights under, and complying with all of the terms of, this License. For legal entities, "You" includes any entity which controls, is controlled by, or is under common control with You. For purposes of this definition, "control" means (a) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (b) ownership of more than fifty percent (50%) of the outstanding shares or beneficial ownership of such entity. 2. License Grants. 2.1. The Initial Developer Grant. Conditioned upon Your compliance with Section 3.1 below and subject to third party intellectual property claims, the Initial Developer hereby grants You a world-wide, royalty-free, non-exclusive license: (a) under intellectual property rights (other than patent or trademark) Licensable by Initial Developer, to use, reproduce, modify, display, perform, sublicense and distribute the Original Software (or portions thereof), with or without Modifications, and/or as part of a Larger Work; and (b) under Patent Claims infringed by the making, using or selling of Original Software, to make, have made, use, practice, sell, and offer for sale, and/or otherwise dispose of the Original Software (or portions thereof). (c) The licenses granted in Sections 2.1(a) and (b) are effective on the date Initial Developer first distributes or otherwise makes the Original Software available to a third party under the terms of this License. (d) Notwithstanding Section 2.1(b) above, no patent license is granted: (1) for code that You delete from the Original Software, or (2) for infringements caused by: (i) the modification of the Original Software, or (ii) the combination of the Original Software with other software or devices. 2.2. Contributor Grant. Conditioned upon Your compliance with Section 3.1 below and subject to third party intellectual property claims, each Contributor hereby grants You a world-wide, royalty-free, non-exclusive license: (a) under intellectual property rights (other than patent or trademark) Licensable by Contributor to use, reproduce, modify, display, perform, sublicense and distribute the Modifications created by such Contributor (or portions thereof), either on an unmodified basis, with other Modifications, as Covered Software and/or as part of a Larger Work; and (b)

under Patent Claims infringed by the making, using, or selling of Modifications made by that Contributor either alone and/or in combination with its Contributor Version (or portions of such combination), to make, use, sell, offer for sale, have made, and/or otherwise dispose of: (1) Modifications made by that Contributor (or portions thereof); and (2) the combination of Modifications made by that Contributor with its Contributor Version (or portions of such combination). (c) The licenses granted in Sections 2.2(a) and 2.2(b) are effective on the date Contributor first distributes or otherwise makes the Modifications available to a third party. (d) Notwithstanding Section 2.2(b) above, no patent license is granted: (1) for any code that Contributor has deleted from the Contributor Version; (2) for infringements caused by: (i) third party modifications of Contributor Version, or (ii) the combination of Modifications made by that Contributor with other software (except as part of the Contributor Version) or other devices; or (3) under Patent Claims infringed by Covered Software in the absence of Modifications made by that Contributor.

3. Distribution Obligations.

3.1. Availability of Source Code.

Any Covered Software that You distribute or otherwise make available in Executable form must also be made available in Source Code form and that Source Code form must be distributed only under the terms of this License. You must include a copy of this License with every copy of the Source Code form of the Covered Software You distribute or otherwise make available. You must inform recipients of any such Covered Software in Executable form as to how they can obtain such Covered Software in Source Code form in a reasonable manner on or through a medium customarily used for software exchange.

3.2. Modifications.

The Modifications that You create or to which You contribute are governed by the terms of this License. You represent that You believe Your Modifications are Your original creation(s) and/or You have sufficient rights to grant the rights conveyed by this License.

3.3. Required Notices.

You must include a notice in each of Your Modifications that identifies You as the Contributor of the Modification. You may not remove or alter any copyright, patent or trademark notices contained within the Covered Software, or any notices of licensing or any descriptive text giving attribution to any Contributor or the Initial Developer.

3.4. Application of Additional Terms.

You may not offer or impose any terms on any Covered Software in Source Code form that alters or restricts the applicable version of this License or the recipients' rights hereunder. You may choose to offer, and to charge a fee for, warranty, support, indemnity or liability obligations to one or more recipients of Covered Software. However, you may do so only on Your own behalf, and not on behalf of the Initial Developer or any Contributor. You must make it absolutely clear that any such warranty, support, indemnity or liability obligation is offered by You alone, and You hereby agree to indemnify the Initial Developer and every Contributor for any liability incurred by the Initial Developer or such Contributor as a result of warranty, support, indemnity or liability terms You offer.

3.5. Distribution of Executable Versions.

You may distribute the Executable form of the Covered Software under the terms of this License or under the terms of a license of Your choice, which may contain terms different from this License, provided that You are in compliance with the terms of this License and that the license for the Executable form does not attempt to limit or alter the recipient's rights in the Source Code form from the rights set forth in this License. If You distribute the Covered Software in Executable form under a different license, You must make it absolutely clear that any terms which differ from this License are offered by You alone, not by the Initial Developer or Contributor. You hereby agree to indemnify the Initial Developer and every Contributor for any liability incurred by the Initial Developer or such Contributor as a result of any such terms You offer.

3.6. Larger Works.

You may create a Larger Work by combining Covered Software with other code not governed by the terms of this License and distribute the Larger Work as a single product. In such a case, You must make sure the requirements of this License are fulfilled for the Covered Software.

4. Versions of the License.

4.1. New Versions.

Sun Microsystems, Inc. is the initial license steward and may publish revised and/or new versions of this License from time to time. Each version will be given a distinguishing version number. Except as provided in Section 4.3, no one other than the license steward has the right to modify this License.

4.2. Effect of New Versions.

You may always continue to use, distribute or otherwise make the Covered Software available under the terms of the version of the License under which You originally received the Covered Software. If the Initial Developer

includes a notice in the Original Software prohibiting it from being distributed or otherwise made available under any subsequent version of the License, You must distribute and make the Covered Software available under the terms of the version of the License under which You originally received the Covered Software. Otherwise, You may also choose to use, distribute or otherwise make the Covered Software available under the terms of any subsequent version of the License published by the license steward.

4.3. Modified Versions. When You are an Initial Developer and You want to create a new license for Your Original Software, You may create and use a modified version of this License if You: (a) rename the license and remove any references to the name of the license steward (except to note that the license differs from this License); and (b) otherwise make it clear that the license contains terms which differ from this License.

5. DISCLAIMER OF WARRANTY. COVERED SOFTWARE IS PROVIDED UNDER THIS LICENSE ON AN "AS IS" BASIS, WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, WARRANTIES THAT THE COVERED SOFTWARE IS FREE OF DEFECTS, MERCHANTABILITY, FIT FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE COVERED SOFTWARE IS WITH YOU. SHOULD ANY COVERED SOFTWARE PROVE DEFECTIVE IN ANY RESPECT, YOU (NOT THE INITIAL DEVELOPER OR ANY OTHER CONTRIBUTOR) ASSUME THE COST OF ANY NECESSARY SERVICING, REPAIR OR CORRECTION. THIS DISCLAIMER OF WARRANTY CONSTITUTES AN ESSENTIAL PART OF THIS LICENSE. NO USE OF ANY COVERED SOFTWARE IS AUTHORIZED HEREUNDER EXCEPT UNDER THIS DISCLAIMER.

6. TERMINATION.

6.1. This License and the rights granted hereunder will terminate automatically if You fail to comply with terms herein and fail to cure such breach within 30 days of becoming aware of the breach. Provisions which, by their nature, must remain in effect beyond the termination of this License shall survive.

6.2. If You assert a patent infringement claim (excluding declaratory judgment actions) against Initial Developer or a Contributor (the Initial Developer or Contributor against whom You assert such claim is referred to as "Participant") alleging that the Participant Software (meaning the Contributor Version where the Participant is a Contributor or the Original Software where the Participant is the Initial Developer) directly or indirectly infringes any patent, then any and all rights granted directly or indirectly to You by such Participant, the Initial Developer (if the Initial Developer is not the Participant) and all Contributors under Sections 2.1 and/or 2.2 of this License shall, upon 60 days notice from Participant terminate prospectively and automatically at the expiration of such 60 day notice period, unless if within such 60 day period You withdraw Your claim with respect to the Participant Software against such Participant either unilaterally or pursuant to a written agreement with Participant.

6.3. If You assert a patent infringement claim against Participant alleging that the Participant Software directly or indirectly infringes any patent where such claim is resolved (such as by license or settlement) prior to the initiation of patent infringement litigation, then the reasonable value of the licenses granted by such Participant under Sections 2.1 or 2.2 shall be taken into account in determining the amount or value of any payment or license.

6.4. In the event of termination under Sections 6.1 or 6.2 above, all end user licenses that have been validly granted by You or any distributor hereunder prior to termination (excluding licenses granted to You by any distributor) shall survive termination.

7. LIMITATION OF LIABILITY. UNDER NO CIRCUMSTANCES AND UNDER NO LEGAL THEORY, WHETHER TORT (INCLUDING NEGLIGENCE), CONTRACT, OR OTHERWISE, SHALL YOU, THE INITIAL DEVELOPER, ANY OTHER CONTRIBUTOR, OR ANY DISTRIBUTOR OF COVERED SOFTWARE, OR ANY SUPPLIER OF ANY OF SUCH PARTIES, BE LIABLE TO ANY PERSON FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY CHARACTER INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF GOODWILL, WORK STOPPAGE, COMPUTER FAILURE OR MALFUNCTION, OR

ANY AND ALL OTHER COMMERCIAL DAMAGES OR LOSSES, EVEN IF SUCH PARTY SHALL HAVE BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. THIS LIMITATION OF LIABILITY SHALL NOT APPLY TO LIABILITY FOR DEATH OR PERSONAL INJURY RESULTING FROM SUCH PARTY'S NEGLIGENCE TO THE EXTENT APPLICABLE LAW PROHIBITS SUCH LIMITATION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THIS EXCLUSION AND LIMITATION MAY NOT APPLY TO YOU.

8. U.S. GOVERNMENT END USERS. The Covered Software is a "commercial item," as that term is defined in 48 C.F.R. 2.101 (Oct. 1995), consisting of "commercial computer software" (as that term is defined at 48 C.F.R. § 252.227-7014(a)(1)) and "commercial computer software documentation" as such terms are used in 48 C.F.R. 12.212 Sept. 1995). Consistent with 48 C.F.R. 12.212 and 48 C.F.R. 227.7202-1 through 227.7202-4 (June 1995), all U.S. Government End Users acquire Covered Software with only those rights set forth herein. This U.S. Government Rights clause is in lieu of, and supersedes, any other FAR, DFAR, or other clause or provision that addresses Government rights in computer software under this License.

9. MISCELLANEOUS. This License represents the complete agreement concerning subject matter hereof. If any provision of this License is held to be unenforceable, such provision shall be reformed only to the extent necessary to make it enforceable. This License shall be governed by the law of the jurisdiction specified in a notice contained within the Original Software (except to the extent applicable law, if any, provides otherwise), excluding such jurisdiction's conflict-of-law provisions. Any litigation relating to this License shall be subject to the jurisdiction of the courts located in the jurisdiction and venue specified in a notice contained within the Original Software, with the losing party responsible for costs, including, without limitation, court costs and reasonable attorneys' fees and expenses. The application of the United Nations Convention on Contracts for the International Sale of Goods is expressly excluded. Any law or regulation which provides that the language of a contract shall be construed against the drafter shall not apply to this License. You agree that You alone are responsible for compliance with the United States export administration regulations (and the export control laws and regulation of any other countries) when You use, distribute or otherwise make available any Covered Software.

10. RESPONSIBILITY FOR CLAIMS. As between Initial Developer and the Contributors, each party is responsible for claims and damages arising, directly or indirectly, out of its utilization of rights under this License and You agree to work with Initial Developer and Contributors to distribute such responsibility on an equitable basis. Nothing herein is intended or shall be deemed to constitute any admission of liability.

----- NOTICE PURSUANT TO SECTION 9 OF THE COMMON DEVELOPMENT AND DISTRIBUTION LICENSE (CDDL) The code released under the CDDL shall be governed by the laws of the State of California (excluding conflict-of-law provisions). Any litigation relating to this License shall be subject to the jurisdiction of the Federal Courts of the Northern District of California and the state courts of the State of California, with venue lying in Santa Clara County, California. -----

----- Eclipse Distribution License 1.0 ----- Copyright (c) 2007, Eclipse Foundation, Inc. and its licensors. All rights reserved. Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met: Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution. Neither the name of the Eclipse Foundation, Inc. nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission. THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO,

PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE. -----

Eclipse Public License 2.0 ----- Eclipse Public License - v 2.0 THE ACCOMPANYING PROGRAM IS PROVIDED UNDER THE TERMS OF THIS ECLIPSE PUBLIC LICENSE ("AGREEMENT"). ANY USE, REPRODUCTION OR DISTRIBUTION OF THE PROGRAM CONSTITUTES RECIPIENT'S ACCEPTANCE OF THIS AGREEMENT. 1. DEFINITIONS "Contribution" means: a) in the case of the initial Contributor, the initial content Distributed under this Agreement, and b) in the case of each subsequent Contributor: i) changes to the Program, and ii) additions to the Program; where such changes and/or additions to the Program originate from and are Distributed by that particular Contributor. A Contribution "originates" from a Contributor if it was added to the Program by such Contributor itself or anyone acting on such Contributor's behalf. Contributions do not include changes or additions to the Program that are not Modified Works. "Contributor" means any person or entity that Distributes the Program. "Licensed Patents" mean patent claims licensable by a Contributor which are necessarily infringed by the use or sale of its Contribution alone or when combined with the Program. "Program" means the Contributions Distributed in accordance with this Agreement. "Recipient" means anyone who receives the Program under this Agreement or any Secondary License (as applicable), including Contributors. "Derivative Works" shall mean any work, whether in Source Code or other form, that is based on (or derived from) the Program and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. "Modified Works" shall mean any work in Source Code or other form that results from an addition to, deletion from, or modification of the contents of the Program, including, for purposes of clarity any new file in Source Code form that contains any contents of the Program. Modified Works shall not include works that contain only declarations, interfaces, types, classes, structures, or files of the Program solely in each case in order to link to, bind by name, or subclass the Program or Modified Works thereof. "Distribute" means the acts of a) distributing or b) making available in any manner that enables the transfer of a copy. "Source Code" means the form of a Program preferred for making modifications, including but not limited to software source code, documentation source, and configuration files. "Secondary License" means either the GNU General Public License, Version 2.0, or any later versions of that license, including any exceptions or additional permissions as identified by the initial Contributor. 2. GRANT OF RIGHTS a) Subject to the terms of this Agreement, each Contributor hereby grants Recipient a non-exclusive, worldwide, royalty-free copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, Distribute and sublicense the Contribution of such Contributor, if any, and such Derivative Works. b) Subject to the terms of this Agreement, each Contributor hereby grants Recipient a non-exclusive, worldwide, royalty-free patent license under Licensed Patents to make, use, sell, offer to sell, import and otherwise transfer the Contribution of such Contributor, if any, in Source Code or other form. This patent license shall apply to the combination of the Contribution and the Program if, at the time the Contribution is added by the Contributor, such addition of the Contribution causes such combination to be covered by the Licensed Patents. The patent license shall not apply to any other combinations which include the Contribution. No hardware per se is licensed hereunder. c) Recipient understands that although each Contributor grants the licenses to its Contributions set forth herein, no assurances are provided by any Contributor that the Program does not infringe the patent or other intellectual property rights of any other entity. Each Contributor disclaims any liability to Recipient for claims brought by any other entity

based on infringement of intellectual property rights or otherwise. As a condition to exercising the rights and licenses granted hereunder, each Recipient hereby assumes sole responsibility to secure any other intellectual property rights needed, if any. For example, if a third party patent license is required to allow Recipient to Distribute the Program, it is Recipient's responsibility to acquire that license before distributing the Program. d) Each Contributor represents that to its knowledge it has sufficient copyright rights in its Contribution, if any, to grant the copyright license set forth in this Agreement. e) Notwithstanding the terms of any Secondary License, no Contributor makes additional grants to any Recipient (other than those set forth in this Agreement) as a result of such Recipient's receipt of the Program under the terms of a Secondary License (if permitted under the terms of Section 3).

REQUIREMENTS 3.1 If a Contributor Distributes the Program in any form, then: a) the Program must also be made available as Source Code, in accordance with section 3.2, and the Contributor must accompany the Program with a statement that the Source Code for the Program is available under this Agreement, and informs Recipients how to obtain it in a reasonable manner on or through a medium customarily used for software exchange; and b) the Contributor may Distribute the Program under a license different than this Agreement, provided that such license: i) effectively disclaims on behalf of all other Contributors all warranties and conditions, express and implied, including warranties or conditions of title and non-infringement, and implied warranties or conditions of merchantability and fitness for a particular purpose; ii) effectively excludes on behalf of all other Contributors all liability for damages, including direct, indirect, special, incidental and consequential damages, such as lost profits; iii) does not attempt to limit or alter the recipients' rights in the Source Code under section 3.2; and iv) requires any subsequent distribution of the Program by any party to be under a license that satisfies the requirements of this section 3. 3.2 When the Program is Distributed as Source Code: a) it must be made available under this Agreement, or if the Program (i) is combined with other material in a separate file or files made available under a Secondary License, and (ii) the initial Contributor attached to the Source Code the notice described in Exhibit A of this Agreement, then the Program may be made available under the terms of such Secondary Licenses, and b) a copy of this Agreement must be included with each copy of the Program. 3.3 Contributors may not remove or alter any copyright, patent, trademark, attribution notices, disclaimers of warranty, or limitations of liability ('notices') contained within the Program from any copy of the Program which they Distribute, provided that Contributors may add their own appropriate notices. 4. **COMMERCIAL DISTRIBUTION** Commercial distributors of software may accept certain responsibilities with respect to end users, business partners and the like. While this license is intended to facilitate the commercial use of the Program, the Contributor who includes the Program in a commercial product offering should do so in a manner which does not create potential liability for other Contributors. Therefore, if a Contributor includes the Program in a commercial product offering, such Contributor ("Commercial Contributor") hereby agrees to defend and indemnify every other Contributor ("Indemnified Contributor") against any losses, damages and costs (collectively "Losses") arising from claims, lawsuits and other legal actions brought by a third party against the Indemnified Contributor to the extent caused by the acts or omissions of such Commercial Contributor in connection with its distribution of the Program in a commercial product offering. The obligations in this section do not apply to any claims or Losses relating to any actual or alleged intellectual property infringement. In order to qualify, an Indemnified Contributor must: a) promptly notify the Commercial Contributor in writing of such claim, and b) allow the Commercial Contributor to control, and cooperate with the Commercial Contributor in, the defense and any related settlement negotiations. The Indemnified Contributor may participate in any such claim at its own expense. For example, a Contributor might include the Program in a commercial product offering, Product X. That Contributor is then a Commercial Contributor. If that Commercial Contributor then makes performance claims, or offers warranties related to Product X, those performance claims and warranties are such Commercial Contributor's responsibility alone. Under this section, the Commercial Contributor would have to defend claims against the other Contributors related to those performance claims and warranties, and if a court requires any other Contributor to pay

any damages as a result, the Commercial Contributor must pay those damages. 5. NO WARRANTY EXCEPT AS EXPRESSLY SET FORTH IN THIS AGREEMENT, AND TO THE EXTENT PERMITTED BY APPLICABLE LAW, THE PROGRAM IS PROVIDED ON AN "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, EITHER EXPRESS OR IMPLIED INCLUDING, WITHOUT LIMITATION, ANY WARRANTIES OR CONDITIONS OF TITLE, NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Each Recipient is solely responsible for determining the appropriateness of using and distributing the Program and assumes all risks associated with its exercise of rights under this Agreement, including but not limited to the risks and costs of program errors, compliance with applicable laws, damage to or loss of data, programs or equipment, and unavailability or interruption of operations. 6. DISCLAIMER OF LIABILITY EXCEPT AS EXPRESSLY SET FORTH IN THIS AGREEMENT, AND TO THE EXTENT PERMITTED BY APPLICABLE LAW, NEITHER RECIPIENT NOR ANY CONTRIBUTORS SHALL HAVE ANY LIABILITY FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING WITHOUT LIMITATION LOST PROFITS), HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OR DISTRIBUTION OF THE PROGRAM OR THE EXERCISE OF ANY RIGHTS GRANTED HEREUNDER, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. 7. GENERAL If any provision of this Agreement is invalid or unenforceable under applicable law, it shall not affect the validity or enforceability of the remainder of the terms of this Agreement, and without further action by the parties hereto, such provision shall be reformed to the minimum extent necessary to make such provision valid and enforceable. If Recipient institutes patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Program itself (excluding combinations of the Program with other software or hardware) infringes such Recipient's patent(s), then such Recipient's rights granted under Section 2(b) shall terminate as of the date such litigation is filed. All Recipient's rights under this Agreement shall terminate if it fails to comply with any of the material terms or conditions of this Agreement and does not cure such failure in a reasonable period of time after becoming aware of such noncompliance. If all Recipient's rights under this Agreement terminate, Recipient agrees to cease use and distribution of the Program as soon as reasonably practicable. However, Recipient's obligations under this Agreement and any licenses granted by Recipient relating to the Program shall continue and survive. Everyone is permitted to copy and distribute copies of this Agreement, but in order to avoid inconsistency the Agreement is copyrighted and may only be modified in the following manner. The Agreement Steward reserves the right to publish new versions (including revisions) of this Agreement from time to time. No one other than the Agreement Steward has the right to modify this Agreement. The Eclipse Foundation is the initial Agreement Steward. The Eclipse Foundation may assign the responsibility to serve as the Agreement Steward to a suitable separate entity. Each new version of the Agreement will be given a distinguishing version number. The Program (including Contributions) may always be Distributed subject to the version of the Agreement under which it was received. In addition, after a new version of the Agreement is published, Contributor may elect to Distribute the Program (including its Contributions) under the new version. Except as expressly stated in Sections 2(a) and 2(b) above, Recipient receives no rights or licenses to the intellectual property of any Contributor under this Agreement, whether expressly, by implication, estoppel or otherwise. All rights in the Program not expressly granted under this Agreement are reserved. Nothing in this Agreement is intended to be enforceable by any entity that is not a Contributor or Recipient. No third-party beneficiary rights are created under this Agreement. Exhibit A – Form of Secondary Licenses Notice "This Source Code may also be made available under the following Secondary Licenses when the conditions

for such availability set forth in the Eclipse Public License, v. 2.0 are satisfied: {name license(s), version(s), and exceptions or additional permissions here}." Simply including a copy of this Agreement, including this Exhibit A is not sufficient to license the Source Code under Secondary Licenses. If it is not possible or desirable to put the notice in a particular file, then You may include the notice in a location (such as a LICENSE file in a relevant directory) where a recipient would be likely to look for such a notice. You may add additional accurate notices of copyright ownership. -----

GNU General Public License 2.0 with Classpath Exception ----- GNU GENERAL PUBLIC LICENSE Version 2, June 1991 Copyright (C) 1989, 1991 Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed. Preamble The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation's software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Lesser General Public License instead.) You can apply it to your programs, too. When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things. To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the software, or if you modify it. For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights. We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the software. Also, for each author's protection and ours, we want to make certain that everyone understands that there is no warranty for this free software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is not the original, so that any problems introduced by others will not reflect on the original authors' reputations. Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all. The precise terms and conditions for copying, distribution and modification follow. This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 2 of the License, or (at your option) any later version. This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details. You should have received a copy of the GNU General Public License along with this program; if not, write to the Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA. This General Public License does not permit incorporating your program into proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Lesser General Public License instead of this License. CLASSPATH EXCEPTION Linking this library statically or dynamically with other modules is making a combined work based on this library. Thus, the terms and conditions of the GNU General Public License version 2 cover the whole combination. As a special exception, the copyright holders of this library give you permission to link this library with independent modules to produce an executable, regardless of the license terms of these independent modules, and to copy and distribute the

resulting executable under terms of your choice, provided that you also meet, for each linked independent module, the terms and conditions of the license of that module. An independent module is a module which is not derived from or based on this library. If you modify this library, you may extend this exception to your version of the library, but you are not obligated to do so. If you do not wish to do so, delete this exception statement from your version. -----

----- GNU Lesser General Public License 2.1 ----- GNU LESSER GENERAL PUBLIC LICENSE Version 2.1, February 1999 Copyright (C) 1991, 1999 Free Software Foundation, Inc. 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed. [This is the first released version of the Lesser GPL. It also counts as the successor of the GNU Library Public License, version 2, hence the version number 2.1.] Preamble The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public Licenses are intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users. This license, the Lesser General Public License, applies to some specially designated software packages--typically libraries--of the Free Software Foundation and other authors who decide to use it. You can use it too, but we suggest you first think carefully about whether this license or the ordinary General Public License is the better strategy to use in any particular case, based on the explanations below. When we speak of free software, we are referring to freedom of use, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish); that you receive source code or can get it if you want it; that you can change the software and use pieces of it in new free programs; and that you are informed that you can do these things. To protect your rights, we need to make restrictions that forbid distributors to deny you these rights or to ask you to surrender these rights. These restrictions translate to certain responsibilities for you if you distribute copies of the library or if you modify it. For example, if you distribute copies of the library, whether gratis or for a fee, you must give the recipients all the rights that we gave you. You must make sure that they, too, receive or can get the source code. If you link other code with the library, you must provide complete object files to the recipients, so that they can relink them with the library after making changes to the library and recompiling it. And you must show them these terms so they know their rights. We protect your rights with a two-step method: (1) we copyright the library, and (2) we offer you this license, which gives you legal permission to copy, distribute and/or modify the library. To protect each distributor, we want to make it very clear that there is no warranty for the free library. Also, if the library is modified by someone else and passed on, the recipients should know that what they have is not the original version, so that the original author's reputation will not be affected by problems that might be introduced by others. Finally, software patents pose a constant threat to the existence of any free program. We wish to make sure that a company cannot effectively restrict the users of a free program by obtaining a restrictive license from a patent holder. Therefore, we insist that any patent license obtained for a version of the library must be consistent with the full freedom of use specified in this license. Most GNU software, including some libraries, is covered by the ordinary GNU General Public License. This license, the GNU Lesser General Public License, applies to certain designated libraries, and is quite different from the ordinary General Public License. We use this license for certain libraries in order to permit linking those libraries into non-free programs. When a program is linked with a library, whether statically or using a shared library, the combination of the two is legally speaking a combined work, a derivative of the original library. The ordinary General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General Public License permits more lax criteria for linking other code with the library. We call this license the "Lesser" General Public

License because it does Less to protect the user's freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances. For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License. In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system. Although the Lesser General Public License is Less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library. The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, whereas the latter must be combined with the library in order to run. GNU LESSER GENERAL PUBLIC LICENSE TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION 0. This License Agreement applies to any software library or other program which contains a notice placed by the copyright holder or other authorized party saying it may be distributed under the terms of this Lesser General Public License (also called "this License"). Each licensee is addressed as "you". A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables. The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification".) "Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library. Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does. 1. You may copy and distribute verbatim copies of the Library's complete source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and distribute a copy of this License along with the Library. You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee. 2. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions: a) The modified work must itself be a software library. b) You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change. c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License. d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the

facility still operates, and performs whatever part of its purpose remains meaningful. (For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.) These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it. Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library. In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices. Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General Public License applies to all subsequent copies and derivative works made from that copy. This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange. If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License. However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables. When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law. If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.) Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you

may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications. You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things: a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.) b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with. c) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution. d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place. e) Verify that the user has already received a copy of these materials or that you have already sent this user a copy. For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable. It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute. 7. You may place library facilities that are a work based on the Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things: a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities. This must be distributed under the terms of the Sections above. b) Give prominent notice with the combined library of the fact that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work. 8. You may not copy, modify, sublicense, link with, or distribute the Library except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, link with, or distribute the Library is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance. 9. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Library or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Library (or any work based on the Library), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Library or works based on it. 10. Each time you redistribute the Library (or any work based on the Library), the recipient automatically receives a license from the original licensor to copy, distribute, link

with or modify the Library subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties with this License. 11. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Library at all. For example, if a patent license would not permit royalty-free redistribution of the Library by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Library. If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply, and the section as a whole is intended to apply in other circumstances. It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice. This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License. 12. If the distribution and/or use of the Library is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Library under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License. 13. The Free Software Foundation may publish revised and/or new versions of the Lesser General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns. Each version is given a distinguishing version number. If the Library specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Library does not specify a license version number, you may choose any version ever published by the Free Software Foundation. 14. If you wish to incorporate parts of the Library into other free programs whose distribution conditions are incompatible with these, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally. NO WARRANTY 15. BECAUSE THE LIBRARY IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE LIBRARY, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE LIBRARY "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE LIBRARY IS WITH YOU. SHOULD THE LIBRARY PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION. 16. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR

REDISTRIBUTE THE LIBRARY AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE LIBRARY (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE LIBRARY TO OPERATE WITH ANY OTHER SOFTWARE), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS -----

----- GNU Lesser General Public License 3.0 ----- GNU LESSER GENERAL PUBLIC LICENSE Version 3, 29 June 2007 Copyright (C) 2007 Free Software Foundation, Inc. <<https://fsf.org/>> Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed. This version of the GNU Lesser General Public License incorporates the terms and conditions of version 3 of the GNU General Public License, supplemented by the additional permissions listed below.

0. Additional Definitions. As used herein, "this License" refers to version 3 of the GNU Lesser General Public License, and the "GNU GPL" refers to version 3 of the GNU General Public License. "The Library" refers to a covered work governed by this License, other than an Application or a Combined Work as defined below. An "Application" is any work that makes use of an interface provided by the Library, but which is not otherwise based on the Library. Defining a subclass of a class defined by the Library is deemed a mode of using an interface provided by the Library. A "Combined Work" is a work produced by combining or linking an Application with the Library. The particular version of the Library with which the Combined Work was made is also called the "Linked Version". The "Minimal Corresponding Source" for a Combined Work means the Corresponding Source for the Combined Work, excluding any source code for portions of the Combined Work that, considered in isolation, are based on the Application, and not on the Linked Version. The "Corresponding Application Code" for a Combined Work means the object code and/or source code for the Application, including any data and utility programs needed for reproducing the Combined Work from the Application, but excluding the System Libraries of the Combined Work.

1. Exception to Section 3 of the GNU GPL. You may convey a covered work under sections 3 and 4 of this License without being bound by section 3 of the GNU GPL.

2. Conveying Modified Versions. If you modify a copy of the Library, and, in your modifications, a facility refers to a function or data to be supplied by an Application that uses the facility (other than as an argument passed when the facility is invoked), then you may convey a copy of the modified version:

- under this License, provided that you make a good faith effort to ensure that, in the event an Application does not supply the function or data, the facility still operates, and performs whatever part of its purpose remains meaningful, or
- under the GNU GPL, with none of the additional permissions of this License applicable to that copy.

3. Object Code Incorporating Material from Library Header Files. The object code form of an Application may incorporate material from a header file that is part of the Library. You may convey such object code under terms of your choice, provided that, if the incorporated material is not limited to numerical parameters, data structure layouts and accessors, or small macros, inline functions and templates (ten or fewer lines in length), you do both of the following:

- Give prominent notice with each copy of the object code that the Library is used in it and that the Library and its use are covered by this License.
- Accompany the object code with a copy of the GNU GPL and this license document.

4. Combined Works. You may convey a Combined Work under terms of your choice that, taken together, effectively do not restrict modification of the portions of the Library contained in the Combined Work and reverse engineering for debugging such modifications, if you also do each of the following:

- Give prominent notice with each copy of the Combined Work that the Library is used in it and that the Library and its use are covered by this License.
- Accompany the Combined Work with a copy of the GNU GPL and this license document.
- For a Combined Work that displays copyright notices during execution, include the copyright notice for the Library among these notices, as well as a reference directing the user to the copies of the GNU GPL and this license document.
- Do one of the following: 0) Convey the Minimal Corresponding Source under the terms of this License, and the Corresponding

Application Code in a form suitable for, and under terms that permit, the user to recombine or relink the Application with a modified version of the Linked Version to produce a modified Combined Work, in the manner specified by section 6 of the GNU GPL for conveying Corresponding Source. 1) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (a) uses at run time a copy of the Library already present on the user's computer system, and (b) will operate properly with a modified version of the Library that is interface-compatible with the Linked Version. e) Provide Installation Information, but only if you would otherwise be required to provide such information under section 6 of the GNU GPL, and only to the extent that such information is necessary to install and execute a modified version of the Combined Work produced by recombining or relinking the Application with a modified version of the Linked Version. (If you use option 4d0, the Installation Information must accompany the Minimal Corresponding Source and Corresponding Application Code. If you use option 4d1, you must provide the Installation Information in the manner specified by section 6 of the GNU GPL for conveying Corresponding Source.) 5. Combined Libraries. You may place library facilities that are a work based on the Library side by side in a single library together with other library facilities that are not Applications and are not covered by this License, and convey such a combined library under terms of your choice, if you do both of the following: a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities, conveyed under the terms of this License. b) Give prominent notice with the combined library that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work. 6. Revised Versions of the GNU Lesser General Public License. The Free Software Foundation may publish revised and/or new versions of the GNU Lesser General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns. Each version is given a distinguishing version number. If the Library as you received it specifies that a certain numbered version of the GNU Lesser General Public License "or any later version" applies to it, you have the option of following the terms and conditions either of that published version or of any later version published by the Free Software Foundation. If the Library as you received it does not specify a version number of the GNU Lesser General Public License, you may choose any version of the GNU Lesser General Public License ever published by the Free Software Foundation. If the Library as you received it specifies that a proxy can decide whether future versions of the GNU Lesser General Public License shall apply, that proxy's public statement of acceptance of any version is permanent authorization for you to choose that version for the Library.

----- MIT License ----- Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions: The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software. THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

```

===== Notices =====
commons-codec Apache Commons Codec Copyright 2002-2021 The Apache Software
Foundation This product includes software developed at The Apache Software Foundation
(https://www.apache.org/). src/test/org/apache/commons/codec/language/
DoubleMetaphoneTest.java contains test data from http://aspell.net/test/orig/batch0.tab.
Copyright (C) 2002 Kevin Atkinson (kevina@gnu.org) The content of package
org.apache.commons.codec.language.bm has been translated from the original php source
code available at http://stevemorse.org/phoneticinfo.htm with permission from the original
authors. Original source copyright: Copyright (c) 2008 Alexander Beider & Stephen P. Morse.
----- commons-io Apache Commons IO
Copyright 2002-2021 The Apache Software Foundation This product includes software
developed at The Apache Software Foundation (https://www.apache.org/).
----- commons-lang3 Apache Commons
Lang Copyright 2001-2018 The Apache Software Foundation This product includes software
developed at The Apache Software Foundation (http://www.apache.org/).
----- jackson-annotations jackson-core
jackson-databind jackson-jaxrs-base jackson-datatype-jsr310 jackson-datatype-jdk8 jackson-
module-jaxb-annotations # Jackson JSON processor Jackson is a high-performance, Free/
Open Source JSON processing library. It was originally written by Tatu Saloranta
(tatu.saloranta@iki.fi), and has been in development since 2007. It is currently developed by
a community of developers. ## Licensing Jackson 2.x core and extension components are
licensed under Apache License 2.0 To find the details that apply to this artifact see the
accompanying LICENSE file. ## Credits A list of contributors may be found from
CREDITS(-2.x) file, which is included in some artifacts (usually source distributions); but is
always available from the source code management (SCM) system project uses.
----- Jackson can be used for any purpose,
but to (re)distribute it, distributors (such as libraries and frameworks that use Jackson) will
need to choose which License they want to apply to distribution, and to use appropriate jars
that enclose license documentation. No work needed beyond choosing the appropriate jar(s).
Currently two Open Source licenses are available for use: * Apache License 2.0 (AL 2.0) *
Lesser/Library General Public License (LGPL 2.1) These licenses have proven adequate to
cover all current use cases. -----
jakarta.ws.rs-api # Notices for Jakarta RESTful Web Services This content is produced and
maintained by the **Jakarta RESTful Web Services** project. * Project home: https://
projects.eclipse.org/projects/ee4j.jaxrs ## Trademarks **Jakarta RESTful Web Services** is a
trademark of the Eclipse Foundation. ## Copyright All content is the property of the
respective authors or their employers. For more information regarding authorship of content,
please consult the listed source code repository logs. ## Declared Project Licenses This
program and the accompanying materials are made available under the terms of the Eclipse
Public License v. 2.0 which is available at http://www.eclipse.org/legal/epl-2.0. This Source
Code may also be made available under the following Secondary Licenses when the
conditions for such availability set forth in the Eclipse Public License v. 2.0 are satisfied: GNU
General Public License, version 2 with the GNU Classpath Exception which is available at
https://www.gnu.org/software/classpath/license.html. SPDX-License-Identifier: EPL-2.0 OR
GPL-2.0 WITH Classpath-exception-2.0 ## Source Code The project maintains the following
source code repositories: * https://github.com/eclipse-ee4j/jaxrs-api ## Third-party Content
This project leverages the following third party content. javaee-api (7.0) * License:
Apache-2.0 AND W3C JUnit (4.11) * License: Common Public License 1.0 Mockito (2.16.0) *
Project: http://site.mockito.org * Source: https://github.com/mockito/mockito/releases/tag/
v2.16.0 ## Cryptography Content may contain encryption software. The country in which you
are currently may have restrictions on the import, possession, and use, and/or re-export to
another country, of encryption software. BEFORE using any encryption software, please
check the country's laws, regulations and policies concerning the import, possession, or use,
and re-export of encryption software, to see if this is permitted.
----- jersey-client jersey-hk2 jersey-media-

```

json-jackson # Notice for Jersey This content is produced and maintained by the Eclipse Jersey project. * Project home: <https://projects.eclipse.org/projects/ee4j.jersey> ## Trademarks Eclipse Jersey is a trademark of the Eclipse Foundation. ## Copyright All content is the property of the respective authors or their employers. For more information regarding authorship of content, please consult the listed source code repository logs. ## Declared Project Licenses This program and the accompanying materials are made available under the terms of the Eclipse Public License v. 2.0 which is available at <http://www.eclipse.org/legal/epl-2.0>. This Source Code may also be made available under the following Secondary Licenses when the conditions for such availability set forth in the Eclipse Public License v. 2.0 are satisfied: GNU General Public License, version 2 with the GNU Classpath Exception which is available at <https://www.gnu.org/software/classpath/license.html>. SPDX-License-Identifier: EPL-2.0 OR GPL-2.0 WITH Classpath-exception-2.0 ## Source Code The project maintains the following source code repositories: * <https://github.com/eclipse-ee4j/jersey> ## Third-party Content Angular JS, v1.6.6 * License MIT (<http://www.opensource.org/licenses/mit-license.php>) * Project: <http://angularjs.org> * Coyright: (c) 2010-2017 Google, Inc. aopalliance Version 1 * License: all the source code provided by AOP Alliance is Public Domain. * Project: <http://aopalliance.sourceforge.net> * Copyright: Material in the public domain is not protected by copyright Bean Validation API 2.0.2 * License: Apache License, 2.0 * Project: <http://beanvalidation.org/1.1/> * Copyright: 2009, Red Hat, Inc. and/or its affiliates, and individual contributors * by the @authors tag. Hibernate Validator CDI, 6.1.2.Final * License: Apache License, 2.0 * Project: <https://beanvalidation.org/> * Repackaged in org.glassfish.jersey.server.validation.internal.hibernate Bootstrap v3.3.7 * License: MIT license (<https://github.com/twbs/bootstrap/blob/master/LICENSE>) * Project: <http://getbootstrap.com> * Copyright: 2011-2016 Twitter, Inc javax.inject Version: 1 * License: Apache License, 2.0 * Copyright (C) 2009 The JSR-330 Expert Group Javassist Version 3.25.0-GA * License: Apache License, 2.0 * Project: <http://www.javassist.org/> * Copyright (C) 1999- Shigeru Chiba. All Rights Reserved. Jackson JAX-RS Providers Version 2.10.1 * License: Apache License, 2.0 * Project: <https://github.com/FasterXML/jackson-jaxrs-providers> * Copyright: (c) 2009-2011 FasterXML, LLC. All rights reserved unless otherwise indicated. jQuery v1.12.4 * License: jquery.org/license * Project: jquery.org * Copyright: (c) jQuery Foundation jQuery Barcode plugin 0.3 * License: MIT & GPL (<http://www.opensource.org/licenses/mit-license.php> & <http://www.gnu.org/licenses/gpl.html>) * Project: <http://www.pasella.it/projects/jquery/barcode> * Copyright: (c) 2009 Antonello Pasella antonello.pasella@gmail.com JSR-166 Extension - JEP 266 * License: CC0 * No copyright * Written by Doug Lea with assistance from members of JCP JSR-166 Expert Group and released to the public domain, as explained at <http://creativecommons.org/publicdomain/zero/1.0/> KineticJS, v4.7.1 * License: MIT license (<http://www.opensource.org/licenses/mit-license.php>) * Project: <http://www.kineticjs.com>, <https://github.com/ericdrowell/KineticJS> * Copyright: Eric Rowell org.objectweb.asm Version 8.0 * License: Modified BSD (<https://asm.ow2.io/license.html>) * Copyright (c) 2000-2011 INRIA, France Telecom. All rights reserved. org.osgi.core version 6.0.0 * License: Apache License, 2.0 * Copyright (c) OSGi Alliance (2005, 2008). All Rights Reserved. org.glassfish.jersey.server.internal.monitoring.core * License: Apache License, 2.0 * Copyright (c) 2015-2018 Oracle and/or its affiliates. All rights reserved. * Copyright 2010-2013 Coda Hale and Yammer, Inc. W3.org documents * License: W3C License * Copyright: Copyright (c) 1994-2001 World Wide Web Consortium, (Massachusetts Institute of Technology, Institut National de Recherche en Informatique et en Automatique, Keio University). All Rights Reserved. <http://www.w3.org/Consortium/Legal/> -----
===== Fourth Party Notices
===== commons-logging Apache Commons Logging
Copyright 2003-2016 The Apache Software Foundation This product includes software

developed at The Apache Software Foundation (<http://www.apache.org/>).

----- jakarta.validation-api Notices for
Eclipse Jakarta Bean Validation This content is produced and maintained by the Eclipse
Jakarta Bean Validation project. Project home: <https://projects.eclipse.org/projects/ee4j.bean-validation> -
Trademarks Jakarta Bean Validation is a trademark of the Eclipse Foundation. -
Copyright All content is the property of the respective authors or their employers. For more
information regarding authorship of content, please consult the listed source code repository
logs. - Declared Project Licenses This program and the accompanying materials are made
available under the terms of the Apache License, Version 2.0 which is available at <https://www.apache.org/licenses/LICENSE-2.0>. SPDX-License-Identifier: Apache-2.0 - Source Code
The project maintains the following source code repositories: The specification repository The
API repository The TCK repository - Third-party Content This project leverages the following
third party content. Test dependencies: TestNG - Apache License 2.0 JCommander - Apache
License 2.0 SnakeYAML - Apache License 2.0

=====
==

B.19 StringTemplate 4.3.4

The BSD License]

Copyright (c) 2011- 2013 Terence Parr

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

Neither the name of the author nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Developer's Certificate of Origin

All contributors to StringTemplate v4 must formally agree to abide by the certificate of origin by signing on the bottom of that document. To contribute:

fork the StringTemplate v4 github repository

make your changes

[first time contributors]: sign contributors.txt by adding your github userid, full name, email address (you can obscure your e-mail, but it must be computable by human), and date.

commit your changes

send a pull request

After you have signed once, you don't have to sign future pull requests. We can merge by simply checking to see your name is in the contributors file.

B.20 Eclipse Parsson

Eclipse Parsson (org.eclipse.parsson:parsson) Copyright (c) 2011, 2023 Oracle and/or its affiliates. All rights reserved.

This program and the accompanying materials are made available under the terms of the Eclipse Public License v. 2.0, which is available at <http://www.eclipse.org/legal/epl-2.0>.

This Source Code may also be made available under the following Secondary Licenses when the conditions for such availability set forth in the Eclipse Public License v. 2.0 are satisfied: GNU General Public License, version 2 with the GNU Classpath Exception, which is available at <https://www.gnu.org/software/classpath/license.html>.

SPDX-License-Identifier: Eclipse Public License 2.0 + GPL v.2 with CPE

Eclipse Public License 2.0 + GPL v.2 with CPE

Notices for Eclipse Parsson

This content is produced and maintained by the Eclipse Parsson project.

* Project home: <https://projects.eclipse.org/projects/ee4j.parsson> ## Trademarks
Eclipse Parsson is a trademark of the Eclipse Foundation.

Copyright All content is the property of the respective authors or their employers.
For more information regarding authorship of content, please consult the listed source code repository logs. ## Declared Project Licenses

This program and the accompanying materials are made available under the terms of the Eclipse Public License v. 2.0 which is available at <https://www.eclipse.org/legal/epl-2.0>. SPDX-License-Identifier: EPL-2.0 ## Source Code The project maintains the following source code repositories: * <https://github.com/eclipse-ee4j/parsson> ## Third-party Content This project leverages the following third party content. None ## Cryptography Content may contain encryption software. The country in which you are currently may have restrictions on the import, possession, and use, and/or re-export to another country, of encryption software. BEFORE using any encryption software, please check the country's laws, regulations and policies concerning the import, possession, or use, and re-export of encryption software, to see if this is permitted.

Eclipse Public License - v 2.0

THE ACCOMPANYING PROGRAM IS PROVIDED UNDER THE TERMS OF THIS ECLIPSE PUBLIC LICENSE ("AGREEMENT"). ANY USE, REPRODUCTION OR DISTRIBUTION OF THE PROGRAM CONSTITUTES RECIPIENT'S ACCEPTANCE OF THIS AGREEMENT.

1. DEFINITIONS "Contribution" means: a) in the case of the initial Contributor, the initial content Distributed under this Agreement, and b) in the case of each subsequent Contributor: i) changes to the Program, and ii) additions to the Program; where such changes and/or additions to the Program originate from and are Distributed by that particular Contributor. A Contribution "originates" from a Contributor if it was added to the Program by such Contributor itself or anyone acting on such Contributor's behalf. Contributions do not include changes or additions to the Program that are not Modified Works. "Contributor" means any person or entity that Distributes the Program. "Licensed Patents" mean patent claims licensable by a Contributor which are necessarily infringed by the use or sale of its Contribution alone or when combined with the Program. "Program" means the Contributions Distributed in accordance with this Agreement. "Recipient" means anyone who receives the Program under this Agreement or any Secondary License (as applicable), including Contributors. "Derivative Works" shall mean any work, whether in Source Code or other form, that is based on (or derived from) the Program and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. "Modified Works" shall mean any work in Source Code or other form that results from an addition to, deletion from, or modification of the contents of the Program, including, for purposes of clarity any new file in Source Code form that contains any contents of the Program. Modified Works shall not include works that contain only declarations, interfaces, types, classes, structures, or files of the Program solely in each case in order to link to, bind by name, or subclass the Program or Modified Works thereof. "Distribute" means the acts of a) distributing or b) making available in any manner that enables the transfer of a copy. "Source Code" means the form of a Program preferred for making modifications, including but not limited to software source code, documentation source, and configuration files. "Secondary License" means either the GNU General Public License, Version 2.0, or any later versions of that license, including any exceptions or additional permissions as identified by the initial Contributor.

2. GRANT OF RIGHTS a) Subject to the terms of this Agreement, each Contributor hereby grants Recipient a non-exclusive, worldwide, royalty-free copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, Distribute and sublicense the Contribution of such Contributor, if any, and such Derivative Works. b) Subject to the terms of this Agreement, each Contributor hereby grants Recipient a non-exclusive, worldwide, royalty-free patent license under Licensed Patents to make, use, sell, offer to sell, import and otherwise transfer the Contribution of such Contributor, if any, in Source Code or other form. This patent license shall apply to the combination of the Contribution and the Program if, at the time the Contribution is added by the Contributor, such addition of the Contribution causes such combination to be covered by the Licensed Patents. The patent license shall not apply to any other combinations which include the Contribution. No hardware per se is licensed hereunder. c) Recipient understands that although each Contributor grants the licenses to its Contributions set forth herein, no assurances are provided by any Contributor that the Program does not infringe the patent or other intellectual property rights of any other entity. Each Contributor disclaims any liability to Recipient for claims brought by any other entity based on infringement of intellectual property rights or otherwise. As a condition to exercising the rights and licenses granted hereunder, each Recipient hereby assumes sole responsibility to secure any other intellectual property rights needed, if any. For example, if a third party patent license is required to allow Recipient to Distribute the Program, it is Recipient's responsibility to acquire that license before distributing the Program. d) Each Contributor represents that to its knowledge it has sufficient copyright rights in its Contribution, if any, to grant the copyright license set forth in this Agreement. e) Notwithstanding the terms of any Secondary License, no Contributor makes additional grants to any Recipient (other than those set forth in this Agreement) as a result of such Recipient's

receipt of the Program under the terms of a Secondary License (if permitted under the terms of Section 3).

3. REQUIREMENTS 3.1 If a Contributor Distributes the Program in any form, then: a) the Program must also be made available as Source Code, in accordance with section 3.2, and the Contributor must accompany the Program with a statement that the Source Code for the Program is available under this Agreement, and informs Recipients how to obtain it in a reasonable manner on or through a medium customarily used for software exchange; and b) the Contributor may Distribute the Program under a license different than this Agreement, provided that such license: i) effectively disclaims on behalf of all other Contributors all warranties and conditions, express and implied, including warranties or conditions of title and non-infringement, and implied warranties or conditions of merchantability and fitness for a particular purpose; ii) effectively excludes on behalf of all other Contributors all liability for damages, including direct, indirect, special, incidental and consequential damages, such as lost profits; iii) does not attempt to limit or alter the recipients' rights in the Source Code under section 3.2; and iv) requires any subsequent distribution of the Program by any party to be under a license that satisfies the requirements of this section 3. 3.2 When the Program is Distributed as Source Code: a) it must be made available under this Agreement, or if the Program (i) is combined with other material in a separate file or files made available under a Secondary License, and (ii) the initial Contributor attached to the Source Code the notice described in Exhibit A of this Agreement, then the Program may be made available under the terms of such Secondary Licenses, and b) a copy of this Agreement must be included with each copy of the Program. 3.3 Contributors may not remove or alter any copyright, patent, trademark, attribution notices, disclaimers of warranty, or limitations of liability ("notices") contained within the Program from any copy of the Program which they Distribute, provided that Contributors may add their own appropriate notices.

4. COMMERCIAL DISTRIBUTION Commercial distributors of software may accept certain responsibilities with respect to end users, business partners and the like. While this license is intended to facilitate the commercial use of the Program, the Contributor who includes the Program in a commercial product offering should do so in a manner which does not create potential liability for other Contributors. Therefore, if a Contributor includes the Program in a commercial product offering, such Contributor ("Commercial Contributor") hereby agrees to defend and indemnify every other Contributor ("Indemnified Contributor") against any losses, damages and costs (collectively "Losses") arising from claims, lawsuits and other legal actions brought by a third party against the Indemnified Contributor to the extent caused by the acts or omissions of such Commercial Contributor in connection with its distribution of the Program in a commercial product offering. The obligations in this section do not apply to any claims or Losses relating to any actual or alleged intellectual property infringement. In order to qualify, an Indemnified Contributor must: a) promptly notify the Commercial Contributor in writing of such claim, and b) allow the Commercial Contributor to control, and cooperate with the Commercial Contributor in, the defense and any related settlement negotiations. The Indemnified Contributor may participate in any such claim at its own expense. For example, a Contributor might include the Program in a commercial product offering, Product X. That Contributor is then a Commercial Contributor. If that Commercial Contributor then makes performance claims, or offers warranties related to Product X, those performance claims and warranties are such Commercial Contributor's responsibility alone. Under this section, the Commercial Contributor would have to defend claims against the other Contributors related to those performance claims and warranties, and if a court requires any other Contributor to pay any damages as a result, the Commercial Contributor must pay those damages.

5. NO WARRANTY EXCEPT AS EXPRESSLY SET FORTH IN THIS AGREEMENT, AND TO THE EXTENT PERMITTED BY APPLICABLE LAW, THE PROGRAM IS PROVIDED ON AN "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, EITHER EXPRESS OR IMPLIED INCLUDING, WITHOUT LIMITATION, ANY WARRANTIES OR CONDITIONS OF TITLE, NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Each Recipient is solely responsible for determining the appropriateness of using and distributing the Program and assumes all risks associated with its exercise of rights under this Agreement, including but not limited to the risks and costs of program errors, compliance with applicable laws, damage to or loss of data, programs or equipment, and unavailability or interruption of operations.

6. DISCLAIMER OF LIABILITY EXCEPT AS EXPRESSLY SET FORTH IN THIS AGREEMENT, AND TO THE EXTENT PERMITTED BY APPLICABLE LAW, NEITHER RECIPIENT NOR ANY CONTRIBUTORS SHALL HAVE ANY LIABILITY FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING WITHOUT LIMITATION LOST PROFITS), HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OR DISTRIBUTION OF THE PROGRAM OR THE EXERCISE OF ANY RIGHTS GRANTED HEREUNDER, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

7. GENERAL If any provision of this Agreement is invalid or unenforceable under applicable law, it shall not affect the validity or enforceability of the remainder of the terms of this Agreement, and without further action by the parties hereto, such provision shall be reformed to the minimum extent necessary to make such provision valid and enforceable. If Recipient institutes patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Program itself (excluding combinations of the Program with other software or hardware) infringes such Recipient's patent(s), then such Recipient's rights granted under Section 2(b) shall terminate as of the date such litigation is filed. All Recipient's rights under this Agreement shall terminate if it fails to comply with any of the material terms or conditions of this Agreement and does not cure such failure in a reasonable period of time after becoming aware of such noncompliance. If all Recipient's rights under this Agreement terminate, Recipient agrees to cease use and distribution of the Program as soon as reasonably practicable. However, Recipient's obligations under this Agreement and any licenses granted by Recipient relating to the Program shall continue and survive. Everyone is permitted to copy and distribute copies of this Agreement, but in order to avoid inconsistency the Agreement is copyrighted and may only be modified in the following manner. The Agreement Steward reserves the right to publish new versions (including revisions) of this Agreement from time to time. No one other than the Agreement Steward has the right to modify this Agreement. The Eclipse Foundation is the initial Agreement Steward. The Eclipse Foundation may assign the responsibility to serve as the Agreement Steward to a suitable separate entity. Each new version of the Agreement will be given a distinguishing version number. The Program (including Contributions) may always be Distributed subject to the version of the Agreement under which it was received. In addition, after a new version of the Agreement is published, Contributor may elect to Distribute the Program (including its Contributions) under the new version. Except as expressly stated in Sections 2(a) and 2(b) above, Recipient receives no rights or licenses to the intellectual property of any Contributor under this Agreement, whether expressly, by implication, estoppel or otherwise. All rights in the Program not expressly granted under this Agreement are reserved. Nothing in this Agreement is intended to be enforceable by any entity that is not a Contributor or Recipient. No third-party beneficiary rights are created under this Agreement. Exhibit A - Form of Secondary Licenses Notice "This Source Code may also be made available under the following Secondary Licenses when the conditions for such availability set forth in the Eclipse Public License, v. 2.0 are satisfied: {name license(s), version(s), and exceptions or additional permissions here}." Simply including a copy of this Agreement, including this Exhibit A is not sufficient to license the Source Code under Secondary Licenses. If it is not possible or

desirable to put the notice in a particular file, then You may include the notice in a location (such as a LICENSE file in a relevant directory) where a recipient would be likely to look for such a notice. You may add additional accurate notices of copyright ownership.

GNU GENERAL PUBLIC LICENSE Version 2, June 1991 Copyright (C) 1989, 1991 Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed. Preamble The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation's software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Lesser General Public License instead.) You can apply it to your programs, too. When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things. To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the software, or if you modify it. For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights. We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the software. Also, for each author's protection and ours, we want to make certain that everyone understands that there is no warranty for this free software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is not the original, so that any problems introduced by others will not reflect on the original authors' reputations. Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all. The precise terms and conditions for copying, distribution and modification follow. GNU GENERAL PUBLIC LICENSE TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION 0. This License applies to any program or other work which contains a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The "Program", below, refers to any such program or work, and a "work based on the Program" means either the Program or any derivative work under copyright law: that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or translated into another language. (Hereinafter, translation is included without limitation in the term "modification".) Each licensee is addressed as "you". Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program is covered only if its contents constitute a work based on the Program (independent of having been made by running the Program). Whether that is true depends on what the Program does.

1. You may copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program. You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.
2. You may modify your copy or copies of the Program or any portion of it, thus forming a work based on the Program, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions: a) You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change. b) You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this License. c) If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.) These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it. Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Program. In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.
3. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you also do one of the following: a) Accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or, b) Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or, c) Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.) The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the executable. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable. If distribution of executable or object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place counts as

distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

4. You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

5. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.

6. Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.

7. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program. If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply and the section as a whole is intended to apply in other circumstances. It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system, which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice. This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

8. If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

9. The Free Software Foundation may publish revised and/or new versions of the General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns. Each version is given a distinguishing version number. If the Program specifies a version number of this License which applies to it and "any later version", you have the

option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

10. If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

11. BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

12. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms. To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found. <one line to give the program's name and a brief idea of what it does.> Copyright (C) <year> <name of author> This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 2 of the License, or (at your option) any later version.

This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details. You should have received a copy of the GNU General Public License along with this program; if not, write to the Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA. Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this when it starts in an interactive mode: Gnomovision version 69, Copyright (C) year name of author Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'. This is free software,

and you are welcome to redistribute it under certain conditions; type ``show c'` for details. The hypothetical commands ``show w'` and ``show c'` should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than ``show w'` and ``show c'`; they could even be mouse-clicks or menu items--whatever suits your program. You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the program, if necessary. Here is a sample; alter the names: Yoyodyne, Inc., hereby disclaims all copyright interest in the program ``Gnomovision'` (which makes passes at compilers) written by James Hacker. <signature of Ty Coon>, 1 April 1989 Ty Coon, President of Vice This General Public License does not permit incorporating your program into proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Lesser General Public License instead of this License. CLASSPATH EXCEPTION Linking this library statically or dynamically with other modules is making a combined work based on this library. Thus, the terms and conditions of the GNU General Public License version 2 cover the whole combination. As a special exception, the copyright holders of this library give you permission to link this library with independent modules to produce an executable, regardless of the license terms of these independent modules, and to copy and distribute the resulting executable under terms of your choice, provided that you also meet, for each linked independent module, the terms and conditions of the license of that module. An independent module is a module which is not derived from or based on this library. If you modify this library, you may extend this exception to your version of the library, but you are not obligated to do so. If you do not wish to do so, delete this exception statement from your version.

----- Fourth Party Dependencies

"Jakarta JSON Processing API" (jakarta.json:jakarta.json-api) Copyright (c) 2011, 2023 Oracle and/or its affiliates. All rights reserved.

This program and the accompanying materials are made available under the terms of the Eclipse Public License v. 2.0, which is available at <http://www.eclipse.org/legal/epl-2.0>.

This Source Code may also be made available under the following Secondary Licenses when the conditions for such availability set forth in the Eclipse Public License v. 2.0 are satisfied: GNU General Public License, version 2 with the GNU Classpath Exception, which is available at <https://www.gnu.org/software/classpath/license.html>.

SPDX-License-Identifier: Eclipse Public License 2.0 + GPL v.2 with CPE Licenses:
Eclipse Public License 2.0 + GPL v.2 with CPE
