Oracle® Fusion Middleware

Reference for Oracle GoldenGate for Windows and UNIX

12*c* (12.2.0.1)

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Contents

Preface

This guide contains reference information, with usage and syntax guidelines, for:

- Oracle GoldenGate GGSCI commands.
- Oracle GoldenGate configuration parameters.
- Oracle GoldenGate column-conversion functions.
- Oracle GoldenGate user exit functions.

Audience

This guide is intended for the person or persons who are responsible for operating Oracle GoldenGate and maintaining its performance. This audience typically includes, but is not limited to, systems administrators and database administrators.

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`.

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Related Information

The Oracle GoldenGate Product Documentation Libraries are found at

Oracle GoldenGate

Oracle GoldenGate Application Adapters

Oracle GoldenGate for Big Data

Oracle GoldenGate Plug-in for EMCC

Oracle GoldenGate Monitor

Oracle GoldenGate for HP NonStop (Guardian)

Oracle GoldenGate Veridata

Oracle GoldenGate Studio

Additional Oracle GoldenGate information, including best practices, articles, and solutions, is found at:

Oracle GoldenGate A-Team Chronicles

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, such as "From the File menu, select **Save**." Boldface also is used for terms defined in text or in the glossary.
italic `*italic*`	Italic type indicates placeholder variables for which you supply particular values, such as in the parameter statement: `TABLE` *`table_name`*. Italic type also is used for book titles and emphasis.
`monospace` `MONOSPACE`	Monospace type indicates code components such as user exits and scripts; the names of files and database objects; URL paths; and input and output text that appears on the screen. Uppercase monospace type is generally used to represent the names of Oracle GoldenGate parameters, commands, and user-configurable functions, as well as SQL commands and keywords.
UPPERCASE	Uppercase in the regular text font indicates the name of a utility unless the name is intended to be a specific case.
{ }	Braces within syntax enclose a set of options that are separated by pipe symbols, one of which must be selected, for example: `{`*`option1`*` | `*`option2`*` | `*`option3`*`}`.
[ ]	Brackets within syntax indicate an optional element. For example in this syntax, the `SAVE` clause is optional: `CLEANUP REPLICAT` *`group_name`* `[, SAVE` *`count`*`]`. Multiple options within an optional element are separated by a pipe symbol, for example: `[`*`option1`*` | `*`option2`*`]`.

1 Oracle GoldenGate GGSCI Commands

This chapter describes the commands that can be issued through the Oracle GoldenGate Software Command Interface (GGSCI). This is the command interface between users and Oracle GoldenGate functional components.

1.1 Summary of Oracle GoldenGate Commands

This section summarizes the GGSCI commands and includes the following topics:

Topics:

1.1.1 Summary of Manager Commands

Use the Manager commands to control the Manager process. Manager is the parent process of Oracle GoldenGate and is responsible for the management of its processes and files, resources, user interface, and the reporting of thresholds and errors.

Table 1-1 Manager Commands

Command	Description
INFO MANAGER	Returns information about the Manager port and child processes.
SEND MANAGER	Returns information about a running Manager process.
START MANAGER	Starts the Manager process.
STATUS MANAGER	Returns the state of the Manager process.
STOP MANAGER	Stops the Manager process.

1.1.2 Summary of Extract Commands

Use the Extract commands to create and manage Extract groups. The Extract process captures either full data records or transactional data changes, depending on configuration parameters, and then sends the data to a trail for further processing by a downstream process, such as a data-pump Extract or the Replicat process.

Table 1-2 Extract Commands

Command	Description
ADD EXTRACT	Creates an Extract group.
ALTER EXTRACT	Changes attributes of an Extract group
CLEANUP EXTRACT	Deletes run history for an Extract group
DELETE EXTRACT	Deletes an Extract group.
INFO EXTRACT	Returns information about an Extract group.

Table 1-2 (Cont.) Extract Commands

Command	Description
KILL EXTRACT	Forcibly terminates the run of an Extract group.
LAG EXTRACT	Returns information about Extract lag.
REGISTER EXTRACT	Registers an Extract group with an Oracle database.
SEND EXTRACT	Sends instructions to, or returns information about, a running Extract group.
START EXTRACT	Starts an Extract group.
STATS EXTRACT	Returns processing statistics for an Extract group.
STATUS EXTRACT	Returns the state of an Extract group.
STOP EXTRACT	Stops an Extract group.
UNREGISTER EXTRACT	Unregisters an Extract group from an Oracle database.

1.1.3 Summary of Replicat Commands

Use the Replicat commands to create and manage Replicat groups. The Replicat process reads data extracted by the Extract process and applies it to target tables or prepares it for use by another application, such as a load application.

Table 1-3 Replicat Commands

Command	Description
ADD REPLICAT	Adds a Replicat group.
ALTER REPLICAT	Changes attributes of a Replicat group.
CLEANUP REPLICAT	Deletes run history of a Replicat group.
DELETE REPLICAT	Deletes a Replicat group.
INFO REPLICAT	Returns information about a Replicat group.
KILL REPLICAT	Forcibly terminates a Replicat group.
LAG REPLICAT	Returns information about Replicat lag.
REGISTER REPLICAT	Registers a Replicat group with an Oracle database.
SEND REPLICAT	Sends instructions to, or returns information about, a running Replicat group.
START REPLICAT	Starts a Replicat group.
STATS REPLICAT	Returns processing statistics for a Replicat group.
STATUS REPLICAT	Returns the state of a Replicat group.
STOP REPLICAT	Stops a Replicat group.
SYNCHRONIZE REPLICAT	Returns all threads of a coordinated Replicat to a uniform start point after an unclean shutdown of the Replicat process.
UNREGISTER REPLICAT	Unregisters a Replicat group from an Oracle database.

1.1.4 Summary of the ER Command

Use the ER command to issue standard Extract and Replicat commands to multiple Extract and Replicat groups as a unit. See "ER" for how to use this command.

Table 1-4 ER Commands

Command	Description
INFO ER *	Returns information about the specified wildcarded groups.
KILL ER *	Forcibly terminates the specified wildcarded groups.
LAG ER *	Returns lag information about the specified wildcarded groups.
SEND ER *	Sends instructions to, or returns information about, the specified wildcarded groups.
START ER *	Starts the specified wildcarded groups.
STATS ER *	Returns processing statistics for the specified wildcarded groups.
STATUS ER *	Returns the state of the specified wildcarded groups.
STOP ER *	Stops the specified wildcarded groups.

1.1.5 Summary of Wallet Commands

Use the wallet commands to manage the master-key wallet that stores Oracle GoldenGate master encryptions keys, and to add master keys to this wallet.

Table 1-5 Wallet Commands

Command	Description
CREATE WALLET	Creates a wallet that stores master encryption keys.
OPEN WALLET	Opens a master-key wallet.
PURGE WALLET	Permanently removes from a wallet the master keys that are marked as deleted.
ADD MASTERKEY	Adds a master key to a master-key wallet.
INFO MASTERKEY	Returns information about master keys.
RENEW MASTERKEY	Adds a new version of a master key.
DELETE MASTERKEY	Marks a master key for deletion.
UNDELETE MASTERKEY	Changes the state of a master key from being marked as deleted to marked as available.

1.1.6 Summary of Credential Store Commands

Use the credential store commands to manage an Oracle GoldenGate credential store and to add credentials to the credential store.

Table 1-6 Credential Store Commands

Command	Description
ADD CREDENTIALSTORE	Creates a credentials store (wallet) that stores encrypted database user credentials.
ALTER CREDENTIALSTORE	Changes the contents of a credentials store.
INFO CREDENTIALSTORE	Returns information about a credentials store.
DELETE CREDENTIALSTORE	Deletes the wallet that serves as a credentials store.

1.1.7 Summary of Trail Commands

Use the trail commands to create and manage Oracle GoldenGate trails. A trail is a series of files in which Oracle GoldenGate temporarily stores extracted data on disk until it has been applied to the target location.

Table 1-7 Trail Commands

Command	Description
ADD EXTTRAIL	Adds a local trail to the Oracle GoldenGate configuration.
ADD RMTTRAIL	Adds a remote trail to the Oracle GoldenGate configuration.
ALTER EXTTRAIL	Changes attributes of a local trail.
ALTER RMTTRAIL	Changes attributes of a remote trail.
DELETE EXTTRAIL	Removes a local trail from the Oracle GoldenGate configuration.
DELETE RMTTRAIL	Removes a remote trail from the Oracle GoldenGate configuration.
INFO EXTTRAIL	Returns information about a local trail.
INFO RMTTRAIL	Returns information about a remote trail.

1.1.8 Summary of Parameter Commands

Use the parameter commands to view and manage Oracle GoldenGate parameter files. See *Administering Oracle GoldenGate for Windows and UNIX* for more information about how to work with parameter files.

Table 1-8 Parameter Commands

Command	Description
EDIT PARAMS	Opens a parameter file for editing in the default text editor.
SET EDITOR	Sets the default text editor program for editing parameter files.
VIEW PARAMS	Displays the contents of a parameter file in read-only mode on-screen.
INFO PARAM	Queries for and displays static information.
GETPARAMINFO	Displays currently-running parameter values.

1.1.9 Summary of Database Commands

Use the database commands to interact with the database from GGSCI.

Table 1-9 Database Commands

Command	Description
DBLOGIN	Logs the GGSCI session into a database so that other commands that affect the database can be issued.
DUMPDDL	Shows the data in the Oracle GoldenGate DDL history table.
ENCRYPT PASSWORD	Encrypts a database login password.
FLUSH SEQUENCE	Updates an Oracle sequence so that initial redo records are available at the time that Extract starts capturing transaction data after the instantiation of the replication environment.
LIST TABLES	Lists the tables in the database with names that match the input specification.
MININGDBLOGIN	Specifies the credentials of the user that an Oracle GoldenGate process uses to log into an Oracle mining database.
SET NAMECCSID	Sets the CCSID of the GGSCI session in a DB2 for i environment.

1.1.10 Summary of Trandata Commands

Use trandata commands to configure the appropriate database components to provide the transaction information that Oracle GoldenGate needs to replicate source data operations.

Table 1-10 Trandata Commands

Command	Description
ADD SCHEMATRANDATA	Enables schema-level supplemental logging.
ADD TRANDATA	Enables table-level supplemental logging.
DELETE SCHEMATRANDATA	Disables schema-level supplemental logging.
DELETE TRANDATA	Disables table-level supplemental logging.
INFO SCHEMATRANDATA	Returns information about the state of schema-level supplemental logging.
INFO TRANDATA	Returns information about the state of table-level supplemental logging.
SET_INSTANTIATION_CSN	Sets whether and how table instantiation CSN filtering is used.
CLEAR_INSTANTIATION_CSN	Clears table instantiation CSN filtering.

1.1.11 Summary of Checkpoint Table Commands

Use the checkpoint table commands to manage the checkpoint table that is used by Oracle GoldenGate to track the current position of Replicat in the trail.

For more information about checkpoints and using a checkpoint table, see Administering Oracle GoldenGate for Windows and UNIX.

Table 1-11 Checkpoint Table Commands

Command	Description
ADD CHECKPOINTTABLE	Creates a checkpoint table in a database.
CLEANUP CHECKPOINTTABLE	Removes checkpoint records that are no longer needed.
DELETE CHECKPOINTTABLE	Removes a checkpoint table from a database.
INFO CHECKPOINTTABLE	Returns information about a checkpoint table.
UPGRADE CHECKPOINTTABLE	Adds a supplemental checkpoint table when upgrading Oracle GoldenGate from version 11.2.1.0.0 or earlier.

1.1.12 Summary of Oracle Trace Table Commands

Use the trace table commands to manage the Oracle GoldenGate trace table that is used with bidirectional synchronization of Oracle databases. Replicat generates an operation in the trace table at the start of each transaction. Extract ignores all transactions that begin with an operation to the trace table. Ignoring Replicat's operations prevents data from looping back and forth between the source and target tables.

For more information about bidirectional synchronization, see *Administering Oracle GoldenGate for Windows and UNIX*.

Table 1-12 Oracle Trace Table Commands

Command	Description
ADD TRACETABLE	Creates a trace table.
DELETE TRACETABLE	Removes a trace table.
INFO TRACETABLE	Returns information about a trace table.

1.1.13 Summary of Oracle GoldenGate Data Store Commands

Use the data store commands to control the data store that Oracle GoldenGate uses to store monitoring information for use by Oracle GoldenGate Monitor.

Table 1-13 Oracle GoldenGate Veridata Data Store Commands

Command	Description
ALTER DATASTORE	Changes the memory model that is used for interprocess communication by the data store.
CREATE DATASTORE	Creates the data store.
DELETE DATASTORE	Removes the data store.
INFO DATASTORE	Returns information about the data store.
REPAIR DATASTORE	Repairs the data store after an upgrade or if it is corrupt.

1.1.14 Summary of Oracle GoldenGate Monitor JAgent Commands

Use the JAgent commands to control the Oracle GoldenGate Monitor JAgent.

Table 1-14 JAgent Commands

Command	Description
INFO JAGENT	Returns information about the JAgent.
START JAGENT	Starts the JAgent.
STATUS JAGENT	Returns the state of the JAgent.
STOP JAGENT	Stops the JAgent.

1.1.15 Summary of Oracle GoldenGate Automatic Heartbeat Commands

Use the heartbeat table commands to control the Oracle GoldenGate automatic heartbeat functionality.

Table 1-15 Heartbeat Table Commands

Command	Description
ADD HEARTBEATTABLE	Creates the objects required for automatic heartbeat functionality.
ALTER HEARTBEATTABLE	Alters existing heartbeat objects.
DELETE HEARTBEATTABLE	Deletes existing heartbeat objects.
DELETE HEARTBEATENTRY	Deletes entries in the heartbeat table.
INFO HEARTBEATTABLE	Displays heartbeat table information.

1.1.16 Summary of Miscellaneous Oracle GoldenGate Commands

Use the following commands to control various other aspects of Oracle GoldenGate.

Table 1-16 Miscellaneous Commands

Command	Description
!	Executes a previous GGSCI command without modifications.
ALLOWNESTED | NOALLOWNESTED	Enables or disables the use of nested `OBEY` files.
CREATE SUBDIRS	Creates the default directories within the Oracle GoldenGate home directory.
DEFAULTJOURNAL	Sets a default journal for multiple tables or files for the `ADD TRANDATA` command when used for a DB2 for i database.
FC	Allows the modification and re-execution of a previously issued GGSCI command.

Table 1-16 (Cont.) Miscellaneous Commands

Command	Description
HELP	Provides assistance with syntax and usage of GGSCI commands.
HISTORY	Shows a list of the most recently issued commands since the startup of the GGSCI session.
INFO ALL	Displays status and lag for all Oracle GoldenGate processes on a system.
INFO MARKER	Displays recently processed markers from a NonStop system.
OBEY	Processes a file that contains a list of Oracle GoldenGate commands.
SHELL	Executes shell commands from within the GGSCI interface.
SHOW	Displays the attributes of the Oracle GoldenGate environment.
VERSIONS	Displays information about the operating system and database.
VIEW GGSEVT	Displays the Oracle GoldenGate error log (`ggserr.log` file).
VIEW REPORT	Displays the process report or the discard file that is generated by Extract or Replicat.

1.2 INFO MANAGER

Use `INFO MANAGER` (or `INFO MGR`) to determine whether or not the Manager process is running and the process ID. If Manager is running, the port number is displayed. This command is an alias for `STATUS MANAGER`.

Syntax

```
INFO MANAGER
INFO MGR
```

1.3 SEND MANAGER

Use `SEND MANAGER` to retrieve the status of the active Manager process or to retrieve dynamic port information as configured in the Manager parameter file.

Syntax

```
SEND MANAGER
[CHILDSTATUS [DEBUG]]
[GETPORTINFO [DETAIL]
[GETPURGEOLDEXTRACTS]
```

`CHILDSTATUS [DEBUG]`
Retrieves status information about processes started by Manager. `DEBUG` returns the port numbers that are allocated to processes.

GETPORTINFO [DETAIL]
By default, retrieves the current list of ports that have been allocated to processes and their corresponding process IDs. `DETAIL` provides a list of all the ports defined using the `DYNAMICPORTLIST` parameter.

GETPURGEOLDEXTRACTS
Displays information about trail maintenance rules that are set with the `PURGEOLDEXTRACTS` parameter in the Manager parameter file. For more information, see "PURGEOLDEXTRACTS for Extract and Replicat".

Examples

Example 1

`SEND MANAGER CHILDSTATUS DEBUG` returns a child process status similar to the following. The basic `CHILDSTATUS` option returns the same display, without the `Port` column.

```
ID  Group   Process  Retry  Retry Time  Start Time           Port
1   ORAEXT  2400     0      None        2011/01/21 21:08:32  7840
2   ORAEXT  2245     0      None        2011/01/23 21:08:33  7842
```

Example 2

`SEND MANAGER GETPORTINFO DETAIL` returns a dynamic port list similar to the following.

```
Entry  Port   Error   Process   Assigned             Program
0      8000   0       2387      2011-01-01 10:30:23
1      8001   0
2      8002   0
```

Example 3

`SEND MANAGER GETPURGEOLDEXTRACTS` outputs information similar to the following.

```
PurgeOldExtracts Rules
Fileset                      MinHours MaxHours MinFiles MaxFiles UseCP
S:\GGS\DIRDAT\EXTTRAIL\P4\*         0        0        1        0     Y
S:\GGS\DIRDAT\EXTTRAIL\P2\*         0        0        1        0     Y
S:\GGS\DIRDAT\EXTTRAIL\P1\*         0        0        1        0     Y
S:\GGS\DIRDAT\REPTRAIL\P4\*         0        0        1        0     Y
S:\GGS\DIRDAT\REPTRAIL\P2\*         0        0        1        0     Y
S:\GGS\DIRDAT\REPTRAIL\P1\*         0        0        1        0     Y
OK
Extract Trails
Filename                        Oldest_Chkpt_Seqno  IsTable  IsVamTwoPhaseCommit
S:\GGS\8020\DIRDAT\RT                          3        0        0
S:\GGS\8020\DIRDAT\REPTRAIL\P1\RT            13        0        0
S:\GGS\8020\DIRDAT\REPTRAIL\P2\RT            13        0        0
S:\GGS\8020\DIRDAT\REPTRAIL\P4\RT            13        0        0
S:\GGS\8020\DIRDAT\EXTTRAIL\P1\ET            14        0        0
S:\GGS\8020\DIRDAT\EXTTRAIL\P2\ET            14        0        0
S:\GGS\8020\DIRDAT\EXTTRAIL\P4\ET            14        0        0
```

1.4 START MANAGER

Use `START MANAGER` to start the Manager process. This applies to a non-clustered environment. In a Windows cluster, you should stop Manager from the Cluster Administrator.

Syntax

```
START MANAGER
[, CPU number]
[, PRI number]
[, HOMETERM device_name]
[, PROCESSNAME process_name]
```

`CPU` ***`number`***
Valid for SQL/MX. Specifies the number of the CPU to be used for the process. Valid values are numbers `0` - `15` and `-1` is default, which is assigned 1 higher than the last Manager started.

`PRI` ***`number`***
Valid for SQL/MX. Specifies the Extract process priority. Valid values are numbers are `1` - `199` and `-1` is the default, and is the same as the manager process priority.

`HOMETERM` ***`device_name`***
Valid for SQL/MX. Specifies the name of the device to be used and must be a terminal or process. It can be entered in either Guardian `$` or OSS `/G/xxxxx` form. The default is `$zhome` or the current session `HOMETERM` when `$zhome` is not defined.

`PROCESSNAME` ***`process_name`***
Valid for SQL/MX. Specifies the name of the process as alphanumeric string up to five characters and can be entered in either Guardian `$` or OSS `/G/xxxxx` form. The default is a system generated process name.

Examples

Example 1

```
START MANAGER, CPU 2, PRI 148, HOMETERM /G/zhome, PROCESSNAME $ogmgr
```

1.5 STATUS MANAGER

Use `STATUS MANAGER` to see if the Manager process is running and any associate process ID. If Manager is running, the port number is displayed.

Syntax

```
STATUS MANAGER
```

1.6 STOP MANAGER

Use `STOP MANAGER` to stop the Manager process. This applies to non-clustered environments. In a Windows cluster, Manager must be stopped through the Cluster Administrator.

Syntax

```
STOP MANAGER [!]
```

!
(Exclamation point) Bypasses the prompt that confirms the intent to shut down Manager.

1.7 ADD EXTRACT

Use `ADD EXTRACT` to create an Extract group. Unless a `SOURCEISTABLE` task or an alias Extract is specified, `ADD EXTRACT` creates an online group that uses checkpoints so that processing continuity is maintained from run to run.

For DB2 for i, this command establishes a global start point for all journals and is a required first step. After issuing the `ADD EXTRACT` command, you can then optionally position any given journal at a specific journal sequence number by using the `ALTER EXTRACT` command with an appropriate journal option.

For Informix, this command initializes the position in the Informix logical log to capture the CDC record. When the first DML is processed, the Informix CDC record is contained in the logical log. Each record in the log is associated with a position, which is called LSN (Log Sequence Number). Only when initialization is complete will it be able to honor the positioning based on the LSN. The very first time you add an Extract, you *must* ensure that the has initialization completed (the duration depends on number of tables in your Extract parameter file) using the `INFO EXTRACT` command. Then ensure that the LSN number displayed matches the LSN displayed as the first record processed in the Extract report file. For example, if the LSN number returned by `INFO EXTRACT` is `LSN: 892:0X1235018`, then the message in the report file must be `Position of first record processed LSN: 892:0X1235018, Apr 16, 2014 2:56:58 AM`. When the initial Extract log positioning is complete, you can issue a stop or kill command *though not before*; doing so before results in any capture restart always starting from the EOF position of the database logs.

Oracle GoldenGate supports up to 5,000 concurrent Extract and Replicat groups per instance of Oracle GoldenGate Manager. At the supported level, all groups can be controlled and viewed in full with GGSCI commands such as the `INFO` and `STATUS` commands. Oracle GoldenGate recommends keeping the combined number of Extract and Replicat groups at the default level of 300 or below in order to manage your environment effectively.

This command cannot exceed 500 bytes in size for all keywords and input, including any text that you enter for the `DESC` option.

Syntax for a Regular, Passive, or Data Pump Extract

```
ADD EXTRACT group_name
{, SOURCEISTABLE |
    , TRANLOG [bsds_name         | LRI_number] |
    , INTEGRATED TRANLOG |
    , VAM |
    , EXTFILESOURCE file_name |
    , EXTTRAILSOURCE trail_name |
    , VAMTRAILSOURCE VAM_trail_name}
[, BEGIN {NOW | yyyy-mm-dd[ hh:mi:[ss[.cccccc]]]} |
[, EXTSEQNO sequence_number, EXTRBA relative_byte_address |
[, EOF |
[, LSN value |
[, EXTRBA relative_byte_address |
[, EOF | LSN value |
[, PAGE data_page, ROW row_ID |
[, SEQNO sequence_number
[, SCN value]
[, THREADS n]
[, PASSIVE]
[, PARAMS file_name]
[, REPORT file_name]
[, DESC 'description']
[, CPU number]
[, PRI number]
[, HOMETERM device_name]
[, PROCESSNAME process_name]
[, SOCKSPROXY {host_name | IP_address}[:port] [PROXYCSALIAS credential_store_alias
[PROXYCSDOMAIN credential_store_domain]]]
[, RMTNAME passive_Extract_name]
[, DESC 'description']
```

group_name
The name of the Extract group. The name of an Extract group can contain up to eight characters. See *Administering Oracle GoldenGate for Windows and UNIX* for group naming conventions.

SOURCEISTABLE
Creates an Extract task that extracts entire records from the database for an initial load using the Oracle GoldenGate direct load method or the direct bulk load to SQL*Loader method. If `SOURCEISTABLE` is not specified, `ADD EXTRACT` creates an online change-synchronization process, and one of the other data source options must be specified. When using `SOURCEISTABLE`, do not specify any service options. Task parameters must be specified in the parameter file.
For more information about initial load methods, see *Administering Oracle GoldenGate for Windows and UNIX*.

TRANLOG [*bsds_name* | LRI_*NUMBER*]
Specifies the transaction log as the data source. Use this option for all databases except Informix and Teradata. `TRANLOG` requires the `BEGIN` option.
(DB2 on z/OS) You can use the *`bsds_name`* option for DB2 on a z/OS system to specify the Bootstrap Data Set file name of the transaction log, though it is not required and is not used. You do not need to change existing `TRANLOG` parameters.
(DB2 LUW) You can use the `LRI_`*`NUMBER`* option for DB2 LUW systems to specify the LRI record value for the checkpoint transaction log.
(Oracle) As of Oracle Standard or Enterprise Edition 11.2.0.3, this mode is known as *classic capture* mode. Extract reads the Oracle redo logs directly. See `INTEGRATED TRANLOG` for an alternate configuration.

INTEGRATED TRANLOG
(Oracle) Adds this Extract in integrated capture mode. In this mode, Extract integrates with the database logmining server, which passes logical change records (LCRs) directly to Extract. Extract does not read the redo log. Before using `INTEGRATED TRANLOG`, use the `REGISTER EXTRACT` command. For information about integrated capture, see *Installing and Configuring Oracle GoldenGate for Oracle Database*.

VAM
(Informix, MySQL, and Teradata) Specifies that the Extract API known as the *Vendor Access Module* (VAM) will be used to transfer change data to Extract.

EXTFILESOURCE *file_name*
Specifies an extract file as the data source. Use this option with a secondary Extract group (data pump) that acts as an intermediary between a primary Extract group and the target system.
For *`file_name`*, specify the relative or fully qualified path name of the file, for example `dirdat\extfile` or `c:\ggs\dirdat\extfile`.

`EXTTRAILSOURCE` ***`trail_name`***
Specifies a trail as the data source. Use this option with a secondary Extract group (data pump) that acts as an intermediary between a primary Extract group and the target system.
For *`trail_name`*, specify the relative or fully qualified path name of the trail, for example `dirdat\aa` or `c:\ggs\dirdat\aa`.

`VAMTRAILSOURCE` ***`VAM_trail_name`***
(Teradata) Specifies a VAM trail. Use this option when using Teradata maximum protection mode.
For *`VAM_trail_name`*, specify the relative or fully qualified path name of the VAM trail to which the primary Extract group is writing. Use a VAM-sort Extract group to read the VAM trail and send the data to the target system.

`BEGIN {NOW |` ***`yyyy-mm-dd[ hh:mi:[ss[.cccccc]]]`*****`}`**
Specifies a timestamp in the data source at which to begin processing.

`NOW`
For all databases except DB2 LUW, `NOW` specifies the time at which the `ADD EXTRACT` command is issued.
For DB2 LUW, `NOW` specifies the time at which `START EXTRACT` takes effect. It positions to the first record that *approximately* matches the date and time. This is because the only log records that contain timestamps are the commit and abort transaction records, so the starting position can only be calculated relative to those timestamps. This is a limitation of the API that is used by Oracle GoldenGate.
Do not use `NOW` for a data pump Extract except to bypass data that was captured to the trail prior to the `ADD EXTRACT` statement.

`yyyy-mm-dd[ hh:mi:[ss[.cccccc]]]`
A date and time (timestamp) in the given form. For an Oracle Extract in integrated mode, the timestamp value must be greater than the timestamp at which the Extract was registered with the database.

- Positioning by timestamp in a SQL Server transaction log is affected by the following characteristics of SQL Server:
  - The timestamps recorded in the SQL Server transaction log use a 3.3333 microsecond (ms) granularity. This level of granularity may not allow positioning by time between two transactions, if the transactions began in the same 3.3333 ms time interval.
  - Timestamps are not recorded in every SQL Server log record, but only in the records that begin and commit the transaction, as well as some others that do not contain data.
  - SQL Server timestamps are not from the system clock, but instead are from an internal clock that is specific to the individual processors in use. This clock updates several times a second, but between updates it could get out of sync with the system clock. This further reduces the precision of positioning by time.

  - Timestamps recorded for log backup files may not precisely correspond to times recorded inside the backup (however this imprecision is less than a second).

  Positioning to an LSN is precise.

- Positioning by timestamp in a Sybase transaction log is affected by the following characteristics of Sybase:

  Sybase only records timestamps in `BEGIN` and `COMMIT` records. Regardless of the actual timestamp that is specified, the start position will be the first record of the transaction that starts closest to, or at, the specified timestamp. The Extract report will display the following positions:

  Positioning To: This is the specified begin time, for example:

  ```
  Positioning to begin time Jan 1, 2011 12:13:33 PM.
  ```

  Positioned To: If the specified timestamp is less than, or equal to, the timestamp of the transaction log that contains the `BEGIN` or `COMMIT` record, `Positioned To Page` is displayed as in this example:

  ```
  2011-01-01 12:13:39  INFO    OGG-01516  Positioned to
  Page #: 0004460243
  Row #: 00111, Jan 1, 2011 12:13:38 PM.
  ```

  First Record Position: This is the position of the first valid record at, or after, the `Positioned To` position, as in this example:

  ```
  2011-01-01 12:13:39  INFO OGG-01517  Position of first record processed
  Page #: 0004460243
  Row #: 00111, Jan 1, 2011 12:13:38 PM.
  ```

EXTSEQNO *sequence_number*, EXTRBA *relative_byte_address*
Valid for a primary Extract in classic capture mode for Oracle, a primary Extract for NonStop SQL/MX, and a data pump Extract. Not supported for an Oracle Extract in integrated mode. Specifies either of the following:

- sequence number of an Oracle redo log and RBA within that log at which to begin capturing data.
- the NonStop SQL/MX TMF audit trail sequence number and relative byte address within that file at which to begin capturing data. Together these specify the location in the TMF Master Audit Trail (MAT).
- the file in a trail in which to begin capturing data (for a data pump). Specify the sequence number, but not any zeroes used for padding. For example, if the trail file is `c:\ggs\dirdat\aa000026`, you would specify `EXTSEQNO 26`. By default, processing begins at the beginning of a trail unless this option is used.

Contact Oracle Support before using this option. For more information, go to `http://support.oracle.com`.

EXTRBA *relative_byte_address*
Valid for DB2 on z/OS. Specifies the relative byte address within a transaction log at which to begin capturing data. The required format is `0X`*`nnn`*, where *`nnn`* is a 1 to 20 digit hexadecimal number (the first character is the digit zero, and the second character can be upper or lower case letter `x`).

EOF
Valid for SQL Server and DB2 for i. Configures processing to start at the end of the log files (or journals) that the next record will be written to. Any active transactions will not be captured.

LSN *value*
Valid for Informix and SQL Server. Specifies the LSN in a transaction log at which to start capturing data. The specified LSN should exist in a log backup or the online log. An alias for this option is `EXTLSN`.
For SQL Server, an LSN is composed of one of these, depending on how the database returns it:

- Colon separated hex string (`8:8:4`) padded with leading zeroes and `0X` prefix, as in `0X00000d7e:0000036b:01bd`
- Colon separated decimal string (`10:10:5`) padded with leading zeroes, as in `0000003454:0000000875:00445`
- Colon separated hex string with `0X` prefix and without leading zeroes, as in `0Xd7e:36b:1bd`
- Colon separated decimal string without leading zeroes, as in `3454:875:445`
- Decimal string, as in `3454000000087500445`

In the preceding, the first value is the virtual log file number, the second is the segment number within the virtual log, and the third is the entry number.
You can find the LSN for named transactions by using a query like:

```
select [Current LSN], [Transaction Name], [Begin Time]
  from fn_dblog(null, null)
 where Operation = 'LOP_BEGIN_XACT'
   and [Begin Time] >= 'time'
```

The time format that you should use in the query should be similar to '2015/01/30 12:00:00.000' and not '2015-01-30 12:00:00.000'.
You can determine the time that a particular transaction started, then find the relevant LSN, and then position between two transactions with the same begin time.

EOF | LSN *value*
Valid for DB2 LUW. Specifies a start position in the transaction logs when Extract starts.

> **EOF**
> Configures processing to start at the active LSN in the log files. The active LSN is the position at the end of the log files that the next record will be written to. Any active transactions will not be captured.
>
> **LSN *value***
> Configures processing to start at an exact LSN if a valid log record exists there. If one does not exist, Extract will abend. Note that, although Extract might position to a given LSN, that LSN might not necessarily be the first one that Extract will process. There are numerous record types in the log files that Extract ignores, such as DB2 internal log records. Extract will report the actual starting LSN to the Extract report file.

PAGE *data_page*, ROW *row_ID*
Valid for Sybase. Specifies a data page and row that together define a start position in a Sybase transaction log. Because the start position must be the first record of the

transaction that starts closest to, or at, the specified `PAGE` and `ROW`, the Extract report will display the following positions:

- **Positioning To** is the position of the record that is specified with `PAGE` and `ROW`.
- **Positioned To** is the position where the first `BEGIN` record is found at, or after, the `Positioning To` position.
- **First Record Position** is the position of the first valid record at, or after, the `Positioned To` position.

`SEQNO` ***`sequence_number`***
Valid for DB2 for i. Starts capture at, or just after, a system sequence number, which is a decimal number up to 20 digits in length.

`SCN` ***`value`***
Valid for Oracle. Starts Extract at the transaction in the redo log that has the specified Oracle system change number (SCN). This option is valid for Extract both in classic capture and integrated modes. For Extract in integrated mode, the SCN value must be greater than the SCN at which the Extract was registered with the database. For more information, see REGISTER EXTRACT.

`PARAMS` ***`file_name`***
Specifies the full path name of an Extract parameter file in a location other than the default of `dirprm` within the Oracle GoldenGate directory.

`REPORT` ***`file_name`***
Specifies the full path name of an Extract report file in a location other than the default of `dirrpt` within the Oracle GoldenGate directory.

`THREADS` ***`n`***
Valid for Oracle classic capture mode. Specifies the number of producer threads that Extract maintains to read redo logs.
Required in an Oracle RAC configuration to specify the number of producer threads. These are the Extract threads that read the different redo logs on the various RAC nodes. The value must be the same as the number of nodes from which you want to capture redo data.

`PASSIVE`
Specifies that this Extract group runs in passive mode and can only be started and stopped by starting or stopping an alias Extract group on the target system. Source-target connections will be established not by this group, but by the alias Extract from the target.
This option can be used for a regular Extract group or a data-pump Extract group. It should only be used by whichever Extract on the source system is the one that will be sending the data across the network to a remote trail on the target.
For instructions on how to configure passive and alias Extract groups, see *Administering Oracle GoldenGate for Windows and UNIX*.

`DESC` ***`'description'`***
Specifies a description of the group, such as `'Extracts account_tab on Serv1'`. Enclose the description within single quotes. You may use the abbreviated keyword `DESC` or the full word `DESCRIPTION`.

`CPU` ***`number`***
Valid for SQL/MX. Specifies the number of the CPU to be used for the process. Valid values are numbers `0` - `15` and `-1` is default, which is assigned 1 higher than the last Manager started.

`PRI` ***`number`***
Valid for SQL/MX. Specifies the Extract process priority. Valid values are numbers are `1` - `199` and `-1` is the default, and is the same as the manager process priority.

`HOMETERM` ***`device_name`***
Valid for SQL/MX. Specifies the name of the device to be used and must be a terminal or process. It can be entered in either Guardian `$` or OSS `/G/`*`xxxxx`* form. The default is `$zhome` or the current session `HOMETERM` when `$zhome` is not defined.

`PROCESSNAME` ***`process_name`***
Valid for SQL/MX. Specifies the name of the process as alphanumeric string up to five characters and can be entered in either Guardian `$` or OSS `/G/`*`xxxxx`* form. The default is a system generated process name.

`SOCKSPROXY {`*`host_name`*` | `*`IP_address`*`}[:`*`port`*`] [PROXYCSALIAS `*`credential_store_alias`*` [PROXYCSDOMAIN `*`credential_store_domain`*`]`
Use for an alias Extract. Specifies the DNS host name or IP address of the proxy server. You can use either one to define the host though you must use the IP address if your DNS server is unreachable. If you are using an IP address, use either an IPv6 or IPv4 mapped address, depending on the stack of the destination system. You must specify the `PROXYCSALIAS`. In addition, you can specify the port to use, and the credential store domain.

`RMTNAME` ***`passive_extract_name`***
Use for an alias Extract. Specifies the passive Extract name, if different from that of the alias Extract.

Examples

Example 1

The following creates an Extract group named `finance` that extracts database changes from the transaction logs. Extraction starts with records generated at the time when the group was created with `ADD EXTRACT`.

```
ADD EXTRACT finance, TRANLOG, BEGIN NOW
```

Example 2

The following creates an Extract group named `finance` that extracts database changes from Oracle RAC logs. Extraction starts with records generated at the time when the group was created. There are four RAC instances, meaning there will be four Extract threads.

```
ADD EXTRACT finance, TRANLOG, BEGIN NOW, THREADS 4
```

Example 3

The following creates an Extract group named `finance` that extracts database changes from the transaction logs. Extraction starts with records generated at 8:00 on January 21, 2011.

```
ADD EXTRACT finance, TRANLOG, BEGIN 2011-01-21 08:00
```

Example 4
The following creates an integrated capture Extract group.

```
ADD EXTRACT finance, INTEGRATED TRANLOG, BEGIN NOW
```

Example 5
The following creates an Extract group named `finance` that interfaces with a Teradata TAM in either maximum performance or maximum protection mode. No `BEGIN` point is used for Teradata sources.

```
ADD EXTRACT finance, VAM
```

Example 6
The following creates a VAM-sort Extract group named `finance`. The process reads from the VAM trail `/ggs/dirdat/vt`.

```
ADD EXTRACT finance, VAMTRAILSOURCE dirdat/vt
```

Example 7
The following creates a data-pump Extract group named `finance`. It reads from the Oracle GoldenGate trail `c:\ggs\dirdat\lt`.

```
ADD EXTRACT finance, EXTTRAILSOURCE dirdat\lt
```

Example 8
The following creates an initial-load Extract named `load`.

```
ADD EXTRACT load, SOURCEISTABLE
```

Example 9
The following creates a passive Extract group named `finance` that extracts database changes from the transaction logs.

```
ADD EXTRACT finance, TRANLOG, BEGIN NOW, PASSIVE
```

Example 10
The following creates an alias Extract group named `financeA`. The alias Extract is associated with a passive extract named `finance` on source system `sysA`. The Manager on that system is using port 7800.

```
ADD EXTRACT financeA, RMTHOST sysA, MGRPORT 7800, RMTNAME finance
```

Example 11
The following examples create and position Extract at a specific Oracle system change number (SCN) in the redo log.

```
ADD EXTRACT finance TRANLOG SCN 123456
ADD EXTRACT finance INTEGRATED TRANLOG SCN 123456
```

Example 12
The following example creates an alias Extract specifying the host to use.

```
ADD EXTRACT apmp desc "alias extract" RMTHOST lc01abc MGRPORT 7813 RMTNAME
ppmp SOCKSPROXY lc02def:3128 PROXYCSALIAS proxyAlias
```

Example 13
The following example creates an Extract on a SQL/MX system.

```
ADD EXTRACT ext exttcp, CPU 3, PRI 148, HOMETERM $ZTN0.#PTHBP32,  PROCESSNAME $ext1
```

Example 14
The following example creates an Extract on a DB2 LUW system.

```
ADD EXTRACT extcust, TRANLOG LRI 8066.322711
```

1.8 ALTER EXTRACT

Use `ALTER EXTRACT` for the following purposes:

- To change the attributes of an Extract group created with the `ADD EXTRACT` command.
- To increment a trail to the next file in the sequence.
- To upgrade to an integrated capture configuration.
- To downgrade from an integrated capture configuration.
- To position any given IBM for i journal at a specific journal sequence number.
- To position any given Informix logical log at a specific LSN.

Before using this command, stop the Extract with the `STOP EXTRACT` *`group_name`* command.

Syntax

```
ALTER EXTRACT group_name
[, ADD_EXTRACT_attribute]
[, TRANLOG LRI LRI_number]
[, UPGRADE INTEGRATED TRANLOG]
[, DOWNGRADE INTEGRATED TRANLOG [THREADS number]]
[, THREAD number]
[, LSN value]
[, SCN value]
[, ETROLLOVER]
```

The following `ALTER EXTRACT` options are supported for DB2 for i to position Extract for a given journal:

```
ALTER EXTRACT {BEGIN {NOW | yyyy-mm-dd[ hh:mi:[ss[.cccccc]]]}
[JOURNAL journal_library/journal_name [JRNRCV receiver_library/
  receiver_name]] |
, EOF [JOURNAL journal_library/journal_name
  [JRNRCV receiver_library/receiver_name]] |
, SEQNO sequence_number [JOURNAL journal_library/journal_name
  [JRNRCV receiver_library/receiver_name]]}
```

`group_name`
The name of the Extract group that is to be altered.

`ADD_EXTRACT_attribute`
You can change any of the attributes specified with the `ADD EXTRACT` command, except for the following:

- Altering an Extract specified with the `EXTTRAILSOURCE` option.
- Altering the number of RAC threads specified with the `THREADS` option.

For these exceptions, delete the Extract group and then add it again.
If using the `BEGIN` option, do not combine other options in the statement. Issue separate statements, for example:

```
ALTER EXTRACT finance, BEGIN 2011-01-01
ALTER EXTRACT finance, ETROLLOVER
ALTER EXTRACT finance, SCN 789000
```

If using the `SCN` or `BEGIN` option for Integrated Extract, it requires a `DBLOGIN`, and the SCN or timestamp value specified cannot be below the outbound server's first SCN or timestamp. To find the outbound server's first SCN, issue the following command:

```
INFO EXTRACT group_name, SHOWCH DETAIL
```

The first SCN value is listed as shown in the following example:

```
Integrated Extract outbound server first scn: 0.665884 (665884)
```

`TRANLOG LRI LRI_`*`number`*
(DB2 LUW) You can use this option for DB2 LUW systems to specify the LRI record value for the checkpoint transaction log.

`UPGRADE INTEGRATED TRANLOG`
Upgrades the Extract group from classic capture to integrated capture. To support the upgrade, the transaction log that contains the start of the oldest open transaction must be available on the source or downstream mining system. For instructions on making the transition from classic to integrated capture, see the full procedure in *Administering Oracle GoldenGate for Windows and UNIX*.

`DOWNGRADE INTEGRATED TRANLOG [THREADS`*`number`*`]`
Downgrades the Extract group from integrated capture to classic capture. When downgrading on a RAC system, the `THREADS` option must be used to specify the number of RAC threads. On a non-RAC system, you can optionally specify `THREADS 1` to cause the downgraded classic Extract to run in threaded mode with one thread, which is similar to doing an `ADD EXTRACT` with `THREADS 1` on a non-RAC system.
See *Administering Oracle GoldenGate for Windows and UNIX* for the full procedure for performing the transition from integrated to classic capture.
To support the downgrade, the transaction log that contains the start of the oldest open transaction must be available on the source or downstream mining system. For information about integrated capture, see Installing and Configuring Oracle GoldenGate for Oracle Database.

`THREAD`*`number`*
Valid for classic capture mode. In an Oracle RAC configuration, alters Extract only for the specified redo thread. Only one thread number can be specified.

`LSN`*`value`*
Valid for Informix. Repositions Extract to by the specified LSN to begin from the EOF in the logical log. This option is valid classic capture mode.

`SCN`*`value`*
Valid for Oracle. Repositions Extract to the transaction in the redo log that has the specified Oracle system change number (SCN). This option is valid both for integrated capture mode and classic capture mode.

`ETROLLOVER`
Causes Extract to increment to the next file in the trail sequence when restarting. For example, if the current file is `ET000002`, the current file will be `ET000003` when Extract restarts. A trail can be incremented from 000001 through 999999, and then the sequence numbering starts over at 000000.

CPU ***number***
Valid for SQL/MX. Specifies the number of the CPU to be used for the process. Valid values are numbers `0` - `15` and `-1` is default, which is assigned 1 higher than the last Manager started.

PRI ***number***
Valid for SQL/MX. Specifies the Extract process priority. Valid values are numbers are `1` - `199` and `-1` is the default, and is the same as the manager process priority.

HOMETERM ***device_name***
Valid for SQL/MX. Specifies the name of the device to be used and must be a terminal or process. It can be entered in either Guardian `$` or OSS `/G/xxxxx` form. The default is `$zhome` or the current session `HOMETERM` when `$zhome` is not defined.

PROCESSNAME ***process_name***
Valid for SQL/MX. Specifies the name of the process as alphanumeric string up to five characters and can be entered in either Guardian `$` or OSS `/G/xxxxx` form. The default is a system generated process name.

BEGIN {NOW | ***yyyy-mm-dd[hh:mi:[ss[.cccccc]]]}***
[JOURNAL journal_library/journal_name
[JRNRCV ***receiver_library/ receiver_name*****]] |**
, EOF [JOURNAL ***journal_library/journal_name***
[JRNRCV ***receiver_library/receiver_name*****]] |**
, SEQNO ***sequence_number*** **[JOURNAL** ***journal_library/journal_name***
[JRNRCV ***receiver_library/receiver_name*****]]**
These IBM for i options allow journal-specific Extract positioning after the global start point is issued with `ADD EXTRACT`. A specific journal position set with `ALTER EXTRACT` does not affect any global position that was previously set with `ADD EXTRACT` or `ALTER EXTRACT`; however a global position set with `ALTER EXTRACT` overrides any specific journal positions that were previously set in the same Extract configuration.

> **Note:**
>
> `SEQNO`, when used with a journal in `ALTER EXTRACT`, is the journal sequence number that is relative to that specific journal, not the system sequence number that is global across journals.

Examples

Example 1
The following alters Extract to start processing data from January 1, 2011.

```
ALTER EXTRACT finance, BEGIN 2011-01-01
```

Example 2
The following alters Extract to start processing at a specific location in the trail.

```
ALTER EXTRACT finance, EXTSEQNO 26, EXTRBA 338
```

Example 3
The following alters Extract in an Oracle RAC environment, and applies the new begin point only for redo thread 4.

```
ALTER EXTRACT accounts, THREAD 4, BEGIN 2011-01-01
```

Example 4
The following alters Extract in a SQL Server environment to start at a specific LSN.

```
ALTER EXTRACT sales, LSN 3454:875:445
```

Example 5
The following alters Extract to increment to the next file in the trail sequence.

```
ALTER EXTRACT finance, ETROLLOVER
```

Example 6
The following alters Extract to upgrade to integrated capture.

```
ALTER EXTRACT finance, UPGRADE INTEGRATED TRANLOG
```

Example 7
The following alters Extract to downgrade to classic capture in a RAC environment.

```
ALTER EXTRACT finance, DOWNGRADE INTEGRATED TRANLOG THREADS 3
```

Example 8
The following alters Extract in an Oracle environment to start processing data from source database SCN 778899.

```
ALTER EXTRACT finance, SCN 778899
```

Example 9
The following shows `ALTER EXTRACT` for an IBM for i journal start point.

```
ALTER EXTRACT finance, SEQNO 1234  JOURNAL accts/acctsjrn
```

Example 10
The following shows `ALTER EXTRACT` for an IBM for i journal and receiver start point.

```
ALTER EXTRACT finance, SEQNO 1234 JOURNAL accts/acctsjrn JRNRCV accts/jrnrcv0005
```

Example 11
The following alters an Extract on a SQL/MX NonStop platform.

```
ALTER EXTRACT exttcp, CPU 1, PRI 150, HOMETERM /G/zhome,  PROCESSNAME $ose01
```

Example 12
The following example alters an Extract on a DB2 LUW system.

```
ALTER EXTRACT extcust, TRANLOG LRI 8066.322711
```

1.9 CLEANUP EXTRACT

Use `CLEANUP EXTRACT` to delete run history for the specified Extract group. The cleanup keeps the last run record intact so that Extract can resume processing from where it left off. Before using this command, stop Extract by issuing the `STOP EXTRACT` command.

Syntax

```
CLEANUP EXTRACT group_name [, SAVE count]
```

group_name
The name of an Extract group or a wildcard (`*`) to specify multiple groups. For example, `T*` cleans up all Extract groups whose names start with T.

`SAVE` *`count`*
Excludes the specified number of the most recent records from the cleanup.

Examples

Example 1
The following deletes all but the last record.

```
CLEANUP EXTRACT finance
```

Example 2
The following deletes all but the most recent five records.

```
CLEANUP EXTRACT *, SAVE 5
```

1.10 DELETE EXTRACT

Use `DELETE EXTRACT` to delete an Extract group. This command deletes the checkpoint file that belongs to the group, but leaves the parameter file intact. You can then re-create the group or delete the parameter file as needed.

Before using `DELETE EXTRACT`, stop Extract with the `STOP EXTRACT` command.

To delete the trail files that are associated with the Extract group, delete them manually through the operating system.

Syntax

```
DELETE EXTRACT group_name [!]
```

`group_name`
The name of an Extract group or a wildcard specification (`*`) to specify multiple groups. For example, `T*` deletes all Extract groups whose names start with T.

`!`
(Exclamation point) Deletes all Extract groups associated with a wildcard without prompting.

1.11 INFO EXTRACT

Use `INFO EXTRACT` to view the following information.

- The status of Extract (`STARTING`, `RUNNING`, `STOPPED` or `ABENDED`). `STARTING` means that the process has started but has not yet locked the checkpoint file for processing.
- Approximate Extract lag.
- Checkpoint information.
- Process run history.
- The trail(s) to which Extract is writing.
- Status of upgrade to, or downgrade from, Integrated Extract

Extract can be running or stopped when `INFO EXTRACT` is issued. In the case of a running process, the status of `RUNNING` can mean one of the following:

- Active: Running and processing (or able to process) data. This is the normal state of a process after it is started.

- Suspended: The process is running, but suspended due to an `EVENTACTIONS SUSPEND` action. In a suspended state, the process is not active, and no data can be processed, but the state of the current run is preserved and can be continued by issuing the `SEND EXTRACT` command with the `RESUME` option in GGSCI. The RBA in the `INFO` command reflects the last checkpointed position before the suspend action. To determine whether the state is active or suspended, issue the `SEND EXTRACT` command with the `STATUS` option.

The basic command displays information only for online (continuous) Extract processes. Tasks are excluded.

About Extract Lag

The `Checkpoint Lag` field of the `INFO EXTRACT` output reflects the lag, in seconds, at the time that the last checkpoint was written to the trail. For example, if the following is true...

- Current time = 15:00:00
- Last checkpoint = 14:59:00
- Timestamp of the last record processed = 14:58:00

...then the lag is reported as 00:01:00 (one minute, the difference between 14:58 and 14:59).

A lag value of `UNKNOWN` indicates that the process could be running but has not yet processed records, or that the source system's clock is ahead of the target system's clock (due to clock imperfections, not time zone differences).

For more precise lag information, use `LAG EXTRACT` (see "LAG EXTRACT").

Syntax

```
INFO EXTRACT group_name
[, SHOWCH [n]]
[, DETAIL]
[, TASKS | ALLPROCESSES]
[, UPGRADE | DOWNGRADE]
```

`group_name`
The name of an Extract group or a wildcard (*) to specify multiple groups. For example, T* shows information for all Extract groups whose names start with T.

`SHOWCH [`*`n`*`]`
The basic command shows information about the current Extract checkpoints. Extract checkpoint positions are composed of read checkpoints in the data source and write checkpoints in the trail. The trail type (`RMTTRAIL` or `EXTTRAIL`) is also noted. Optionally, specify a value for *`n`* to include the specified number of previous checkpoints as well as the current one.

> **Note:**
>
> You might see irregular indents and spacing in the output. This is normal and does not affect the accuracy of the information.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about checkpoints, including descriptions of the types of checkpoints made by each process and the internal metadata entries that are included in the display.

`DETAIL`
Displays the following:

- Extract run history, including start and stop points in the data source, expressed as a time.
- Trails to which Extract is writing.

`TASKS`
Displays only Extract tasks. Tasks that were specified by a wildcard argument are not displayed by `INFO EXTRACT`.

`ALLPROCESSES`
Displays all Extract groups, including tasks.

`UPGRADE | DOWNGRADE`
Valid for an Oracle database only.

- `UPGRADE` displays whether the Extract can be upgraded from classic capture mode to integrated capture mode.
- `DOWNGRADE` displays whether the Extract can be downgraded from integrated capture mode to classic capture mode.

If Extract cannot be upgraded or downgraded, the reason why is displayed.
A wildcarded Extract name is not allowed with this option.
Before using this command, issue the `DBLOGIN` command.

Examples

Example 1

```
INFO EXTRACT fin*, SHOWCH
```

Example 2

```
INFO EXTRACT *, TASKS
```

Example 3 (Oracle only)

```
INFO EXTRACT finance UPGRADE
```

Example 4

The following example shows basic `INFO EXTRACT` output.

```
EXTRACT                   EXTCUST Last Started 2011-01-05 16:09 Status RUNNING
Checkpoint Lag            00:01:30 (updated 97:16:45 ago)
Log Read Checkpoint File  /rdbms/data/oradata/redo03a.log
                          2011-01-05 16:05:17  Seqno 2952, RBA 7598080
```

Example 5

The following is an example of the output of `INFO EXTRACT` with `DETAIL`.

```
EXTRACT     ORAEXT    Last Started 2011-01-15 16:16   Status STOPPED
Checkpoint Lag        00:00:00 (updated 114:24:48 ago)
Log Read Checkpoint   File C:\ORACLE\ORADATA\ORA920\REDO03.LOG
```

```
                     2011-01-15 16:17:53 Seqno 46, RBA 3757568

Target Extract Trails:

Trail Name                            Seqno    RBA   Max MB   Trail Type

  c:\goldengate802\dirdat\xx              0  57465       10     RMTTRAIL
  c:\goldengate802\dirdat\jm              0  19155       10     RMTTRAIL

Extract Source                        Begin            End

C:\ORACLE\ORADATA\ORA920\REDO03.LOG    2011-01-15 16:07 2011-01-15 16:17
C:\ORACLE\ORADATA\ORA920\REDO03.LOG    2011-01-15 15:55  2011-01-15 16:07
C:\ORACLE\ORADATA\ORA920\REDO03.LOG    2011-01-15 15:42  2011-01-15 15:55
C:\ORACLE\ORADATA\ORA920\REDO03.LOG   2011-01-15 15:42  2011-01-15 15:42
  Not Available                         * Initialized *   2011-01-15 15:42

Current directory    C:\GoldenGate802

Report file          C:\GoldenGate802\dirrpt\ORAEXT.rpt
Parameter file       C:\GoldenGate802\dirprm\ORAEXT.prm
Checkpoint file      C:\GoldenGate802\dirchk\ORAEXT.cpe
Process file         C:\GoldenGate802\dirpcs\ORAEXT.pce
Error log            C:\GoldenGate802\ggserr.log
```

1.12 KILL EXTRACT

Use `KILL EXTRACT` to kill an Extract process running in regular or `PASSIVE` mode. Use this command only if a process cannot be stopped gracefully with the `STOP EXTRACT` command. The Manager process will not attempt to restart a killed Extract process.

Syntax

```
KILL EXTRACT group_name
```

`group_name`
The name of an Extract group or a wildcard (`*`) to specify multiple groups. For example, `T*` kills all Extract processes whose group names start with T.

Example

```
KILL EXTRACT finance
```

1.13 LAG EXTRACT

Use `LAG EXTRACT` to determine a true lag time between Extract and the data source. `LAG EXTRACT` calculates the lag time more precisely than `INFO EXTRACT` because it communicates with Extract directly, rather than reading a checkpoint position in the trail.

For Extract, lag is the difference, in seconds, between the time that a record was processed by Extract (based on the system clock) and the timestamp of that record in the data source.

If the heartbeat functionality is enabled, you can view the associated lags.

Syntax

```
LAG EXTRACT
[, group_name]
[, GLOBAL]
```

group_name
The name of an Extract group or a wildcard (*) to specify multiple groups. For example, T* determines lag time for all Extract groups whose names start with T.

GLOBAL
Displays the lags in the GG_LAGS view.

Examples

Example 1

```
LAG EXTRACT *
```

Example 2

```
LAG EXTRACT *fin*
```

Example 3

The following is sample output for LAG EXTRACT.

```
Sending GETLAG request to EXTRACT CAPTPCC...
Last record lag: 2 seconds.
At EOF, no more records to process.
```

1.14 REGISTER EXTRACT

Use REGISTER EXTRACT to register a primary Extract group with an Oracle database to:

- Enable integrated capture mode
- Specify options for integrated Extract from a multitenant container database
- Enable Extract in classic capture mode to work with Oracle Recovery Manager to retain the archive logs needed for recovery

REGISTER EXTRACT is not valid for a data pump Extract.

To unregister an Extract group from the database, use the UNREGISTER EXTRACT command (see "UNREGISTER EXTRACT").

See *Installing and Configuring Oracle GoldenGate for Oracle Database* for more information about using REGISTER EXTRACT.

Syntax

For classic Extract:

```
REGISTER EXTRACT group_name LOGRETENTION
```

For integrated Extract:

```
RREGISTER EXTRACT <group-name>
 ( LOGRETENTION | DATABASE
          ( [ CONTAINER <container-list> |
              ADD   CONTAINER <container-list> |
              DROP  CONTAINER <container-list> ]
            [ SCN   <scn>   ]
            [ SHARE ( AUTOMATIC | <group-name> | NONE ) ]
            [ [NO]OPTIMIZED ]
)
)
```

The default value is `NOOPTIMIZED`.

group_name
The name of the Extract group that is to be registered. Do not use a wildcard.

DATABASE [
CONTAINER (*container*[, ...]) |
ADD CONTAINER (*container*[, ...]) |
DROP CONTAINER (*container*[, ...])
[
Without options, `DATABASE` enables integrated capture from a non-CDB database for the Extract group. In this mode, Extract integrates with the database logmining server to receive change data in the form of logical change records (LCR). Extract does not read the redo logs. Extract performs capture processing, transformation, and other requirements. The DML filtering is performed by the Logmining server. For support information and configuration steps, see *Installing and Configuring Oracle GoldenGate for Oracle Database*.
Before using `REGISTER EXTRACT` with `DATABASE`, use the DBLOGIN command for all Extracts with the privileges granted using the `dbms_goldengate_auth.grant_admin_privilege` procedure. If you have a downstream configuration, then you must also issue the MININGDBLOGIN command. If the source database you are registering is a CDB database and Extract will fetch data, then `grant_admin_privilege` must be called with the `CONTAINER=>'ALL'` parameter.
After using `REGISTER EXTRACT`, use `ADD EXTRACT` with the `INTEGRATED TRANLOG` option to create an Extract group of the same name. You must register an Extract group before adding it.

CONTAINER (*container*[, ...])
Applies the registration to a list of one or more pluggable databases (containers) of a multitenant container database (CDB). Specify one or more pluggable databases as a comma-delimited list within parentheses, for example: `CONTAINER (pdb1, pdb2, pdb3)`. All of the pluggable databases must exist in the database, and all names must be explicit, not wildcarded.

ADD CONTAINER (*container*[, ...])
Adds the specified pluggable database to an existing Extract capture configuration. Specify one or more pluggable databases as a comma-delimited list within parentheses, for example: `ADD CONTAINER (pdb1, pdb2, pdb3)`. Before issuing `REGISTER EXTRACT` with this option, stop the Extract group.
For Oracle, adding `CONTAINERs` at particular SCN on an existing Extract is not supported.

DROP CONTAINER (*container*[, ...])
Drops the specified pluggable database from an existing Extract capture configuration. Specify one or more pluggable databases as a comma-delimited list within parentheses, for example: `DROP CONTAINER (pdb1, pdb2, pdb3)`. Before issuing `REGISTER EXTRACT` with this option, stop the Extract group.

`LOGRETENTION`
Valid for classic Extract only. Enables an Extract group in classic capture mode to work with Oracle Recovery Manager (RMAN) to retain the logs that Extract needs for recovery. `LOGRETENTION` is ignored if the Extract group is configured for integrated capture.
`LOGRETENTION` creates an underlying Oracle Streams capture process that is dedicated to the Extract group and has a similar name. This capture is used only for the purpose of log retention.
The logs are retained from the time that `REGISTER EXTRACT` is issued, based on the current database SCN. The log-retention feature is controlled with the `LOGRETENTION` option of the `TRANLOGOPTIONS` parameter.
Before using `REGISTER EXTRACT` with `LOGRETENTION`, issue the `DBLOGIN` command with the privileges shown in "DBLOGIN".

`SCN` *`system_change_number`*
Registers Extract to begin capture at a specific system change number (SCN) in the past. Without this option, capture begins from the time that `REGISTER EXTRACT` is issued. The specified SCN must correspond to the begin SCN of a dictionary build operation in a log file. You can issue the following query to find all valid SCN values:

```
SELECT first_change#
   FROM v$archived_log
   WHERE dictionary_begin = 'YES' AND
      standby_dest = 'NO' AND
      name IS NOT NULL AND
      status = 'A';
```

When used alone, the SCN value is the beginning SCN of the dictionary build operation in a log file.
When used in conjunction with `SHARE AUTOMATIC` or `SHARE` *`extract_name`*, then the specified SCN is the `start_scn` for the capture session and has the following restrictions:

- Should be lesser than or equal to the current SCN.
- Should be greater than the minimum (first SCN) of the existing captures.

**`{SHARE [`
`AUTOMATIC |`
`extract` `|`
`NONE]}`**
Registers the Extract to return to an existing LogMiner data dictionary build with a specified SCN creating a clone. This allows for faster creation of Extracts by leveraging existing dictionary builds.
`SHARE` cannot be used on a CDB.
The following GGSCI commands are supported:

```
REGISTER EXTRACT extract database SCN #### SHARE AUTOMATIC
REGISTER EXTRACT extract database SCN #### SHARE extract
REGISTER EXTRACT extract database SHARE NONE
REGISTER EXTRACT extract database SCN #### SHARE NONE
```

Or

```
REGISTER EXTRACT extract DATABASE SHARE NONE
REGISTER EXTRACT extract DATABASE SCN #### SHARE NONE
```

In contrast, the following GGSCI commands are *not* supported in a downstream configuration:

```
REGISTER EXTRACT extract DATABASE SHARE AUTOMATIC
REGISTER EXTRACT extract DATABASE SHARE extract
```

`AUTOMATIC`
Clone from the existing closest capture. If no suitable clone candidate is found, then a new build is created.

`extract`
Clone from the capture session associated for the specified Extract. If this is not possible, then an error occurs the register does not complete.

`NONE`
Does not clone or create a new build; this is the default.

In a downstream configuration, the `SHARE` clause *must* be used in conjunction with the `SCN` clause when registering for Extract.

Examples

Example 1

```
REGISTER EXTRACT sales LOGRETENTION
```

Example 2

```
REGISTER EXTRACT sales DATABASE
```

Example 3

```
REGISTER EXTRACT sales DATABASE CONTAINER (sales, finance, hr)
```

Example 4

```
REGISTER EXTRACT sales DATABASE ADD CONTAINER (customers)
```

Example 5

```
REGISTER EXTRACT sales DATABASE DROP CONTAINER (finance)
```

Example 6

```
REGISTER EXTRACT sales DATABASE SCN 136589
```

The beginning SCN of the dictionary build is 136589.

Example 7

```
REGISTER EXTRACT sales DATABASE SCN 67000 SHARE ext2
```

The valid start SCN, 67000 in this case; it is not necessarily the current SCN.

Example 8

```
REGISTER EXTRACT sales DATABASE CONTAINER (sales, finance, hr) SCN 136589
```

1.15 SEND EXTRACT

Use `SEND EXTRACT` to communicate with a running Extract process. The request is processed as soon as Extract is ready to accept commands from users.

Syntax

```
SEND EXTRACT group_name, {
BR {BRINTERVAL interval |
   BRSTART |
   BRSTOP |
   BRCHECKPOINT {IMMEDIATE | IN n{M|H} | AT yyyy-mm-dd hh:mm[:ss]]}} |
BR BRFSOPTION { MS_SYNC | MS_ASYNC }
CACHEMGR {CACHESTATS | CACHEQUEUES | CACHEPOOL n} |
CACHEMGR CACHEFSOPTION { MS_SYNC | MS_ASYNC } |
FORCESTOP |
FORCETRANS transaction_ID [THREAD n] [FORCE] |
GETLAG |
GETPARAMINFO [parameter_name] [FILE output_file] |
GETTCPSTATS |
LOGEND |
LOGSTATS |
REPORT |
RESUME |
ROLLOVER |
SHOWTRANS [transaction_ID] [THREAD n] [COUNT n]
    [DURATION duration unit] [TABULAR]
    [FILE file_name [DETAIL]] |
SKIPTRANS transaction_ID [THREAD n] [FORCE] |
STATUS |
STOP |
TRACE[2] file_name |
TRACE[2] OFF |
TRACE OFF file_name |
TRACEINIT |
TRANSLOGOPTIONS INTEGRATEDPARAMS(parameter_specification) |
TRANLOGOPTIONS {PREPAREFORUPGRADETOIE | NOPREPAREFORUPGRADETOIE} |TRANLOGOPTIONS
{PURGEORPHANEDTRANSACTIONS | NOPURGEORPHANEDTRANSACTIONS} |
TRANLOGOPTIONS TRANSCLEANUPFREQUENCY minutes |
VAMMESSAGE 'Teradata_command' |
VAMMESSAGE {'ARSTATS' | 'INCLUDELIST [filter]' | 'FILELIST [filter]'| 'EXCLUDELIST
[filter]'} |
VAMMESSAGE 'OPENTRANS'
}
```

group_name
The name of the Extract group or a wildcard (*) to specify multiple groups. For example, T* sends the command to all Extract processes whose group names start with T. If an Extract is not running, an error is returned.

BR {BRINTERVAL *interval* | BRSTART | BRSTOP |
BRCHECKPOINT {IMMEDIATE | IN *n* {H|M} | AT yyyy-mm-dd[hh:mm[:ss]]}}
Sends commands that affect the Bounded Recovery mode of Extract.

> **BRINTERVAL *interval***
> Sets the time between Bounded Recovery checkpoints. Valid values are from 20 minutes to 96 hours specified as `M` for minutes or `H` for hours, for example `20M` or `2H`. The default interval is 4 hours.
>
> **BRSTART**
> Starts Bounded Recovery. This command should only be used under direction of Oracle Support.

`BRSTOP`
Stops Bounded Recovery for the run and for recovery. Consult Oracle Support before using this option. In most circumstances, when there is a problem with Bounded Recovery, it turns itself off.

`BRCHECKPOINT {IMMEDIATE | IN` *`n`*`{H|M} | AT` *`yyyy-mm-dd[ hh:mm`*`[:`*`ss`*`]]}}`
Sets the point at which a bounded recovery checkpoint is made. `IMMEDIATE` issues the checkpoint immediately when `SEND EXTRACT` is issued. `IN` issues the checkpoint in the specified number of hours or minutes from when `SEND EXTRACT` is issued. `AT` issues the checkpoint at exactly the specified time.

`BR BRFSOPTION {MS_SYNC | MS_ASYNC}`
Performs synchronous/asynchronous writes of the mapped data in Bounded Recovery.

`MS_SYNC`
Bounded Recovery writes of mapped data are synchronized for I/O data integrity completion.

`MS_ASYNC`
Bounded Recovery writes of mapped data are initiated or queued for servicing.

`CACHEMGR {CACHESTATS | CACHEQUEUES | CACHEPOOL` *`n`*`}`
Returns statistics about the Oracle GoldenGate memory cache manager. `CACHESTATS` should only be used as explicitly directed by Oracle Support.

`CACHESTATS`
Returns statistics for virtual memory usage and file caching.

`CACHEQUEUES`
Returns statistics for the free queues only.

`CACHEPOOL` *`n`*
Returns statistics for the specified object pool only.

`CACHEMGR CACHEFSOPTION {MS_SYNC | MS_ASYNC}`
Performs synchronous or asynchronous writes of the mapped data in the Oracle GoldenGate memory cache manager.

`FORCESTOP`
Forces Extract to stop, bypassing any notifications. This command will stop the process immediately.

`FORCETRANS` *`transaction_ID`* `[THREAD` *`n`*`] [FORCE]`
Valid for MySQL, Oracle, SQL/MX, SQL Server, Sybase.
Forces Extract to write a transaction specified by its transaction ID number to the trail as a committed transaction. `FORCETRANS` does not commit the transaction to the source database. It only forces the existing data to the trail so that it is processed (with an implicit commit) by Replicat. You can repeat `FORCETRANS` for other transactions in order of their age. Note that forcing a transaction to commit to the trail (and therefore the target database) may cause data discrepancies if the transaction is rolled back by the source user applications.
After using `FORCETRANS`, wait at least five minutes if you intend to issue `SEND EXTRACT` with `FORCESTOP`. Otherwise, the transaction will still be present.
If `FORCETRANS` is used immediately after Extract starts, you might receive an error message that asks you to wait and then try the command again. This means that no

other transactions have been processed yet by Extract. Once another transaction is processed, you will be able to force the transaction to trail.

transaction_ID
The ID of the transaction. Get the transaction ID number with `SHOWTRANS` or from an Extract runtime message. Extract ignores any data added to the transaction after this command is issued. A confirmation prompt must be answered unless `FORCE` is used. To use `FORCETRANS`, the specified transaction must be the oldest one in the list of transactions shown with `SHOWTRANS` with the exception of SQL/MX. For SQL/MX, the transaction does not have to be the oldest outstanding.

`THREAD` ***n***
Valid only for Oracle.
Use `THREAD` *n* to specify which thread generated the transaction in an Oracle RAC environment if there are duplicate transaction IDs across threads.

`FORCE`
Valid for Oracle, SQL/MX, SQL Server, Sybase. Not valid for MySQL.
Use `FORCE` to bypass the confirmation prompt.

`GETLAG`
Determines a true lag time between Extract and the data source. Returns the same results as `LAG EXTRACT (see` "LAG EXTRACT").

GETPARAMINFO [*parameter_name*] [FILE *output_file*]
Use `GETPARAMINFO` to query runtime parameter values of a running instance, including Extract, Replicat, and Manager. You can query for a single parameter or all parameters and send the output to the console or a text file

parameter_name
The default behavior is to display all parameters in use, meaning those parameters that have ever been queried by the application, parameters, and their current values. If you specify a particular parameter, then the output is filtered by that name.

`FILE` ***output_file***
The name of the text file that your output is redirected to.

`GETTCPSTATS`
Displays statistics about network activity between Extract and the target system. The statistics include:

- Local and remote IP addresses.
- Inbound and outbound messages, in bytes and bytes per second.
- Number of receives (inbound) and sends (outbound). There will be at least two receives per inbound message: one for the length and one or more for the data.
- Average bytes per send and receive.
- Send and receive wait time: Send wait time is how long it takes for the write to TCP to complete. The lower the send wait time, the better the performance over the network. Receive wait time is how long it takes for a read to complete. Together, the send and receive wait times provide a rough estimate of network round trip time. These are expressed in microseconds.

- Status of data compression (enabled or not).
- Uncompressed bytes and compressed bytes: When compared (uncompressed to compressed), these comprise the compression ratio, meaning how many bytes there were before and after compression. You can compare the compression ratio with the bytes that are being compressed per second to determine if the compression rate is worth the cost in terms of resource and network consumption.

The `TCPBUFSIZE` option of `RMTHOST` and `RMTHOSTOPTIONS` controls the size of the TCP buffer for uncompressed data. What actually enters the network will be less than this size if compression is enabled. `GETTCPSTATS` shows post-compression throughput.

`LOGEND`
Confirms whether or not Extract has processed all of the records in the data source.

`LOGSTATS`
Valid only for Oracle.
Instructs Extract to issue a report about the statistics that are related to the processing of data from the Oracle redo log files. Extract uses an asynchronous log reader that reads ahead of the current record that Extract is processing, so that the data is available without additional I/O on the log files. The processing is done through a series of read/write queues. Data is parsed by a producer thread at the same time that additional data is being read from the log file by a reader thread. Thus, the reason for the term "read-ahead" in the statistics.
The statistics are:

- `AsyncReader.Buffers`*`n`*: There is a field like this for each buffer queue that contains captured redo data. It shows the size, the number of records in it, and how long the wait time is before the data is processed. These statistics are given for write operations and read operations on the queue.
- `REDO read ahead buffers`: The number of buffers that are being used to read ahead asynchronously.
- `REDO read ahead buffer size`: The size of each buffer.
- `REDO bytes read ahead for current redo`: Whether read-ahead mode is on or off for the current redo log file (value of `ON` or `OFF`).
- `REDO bytes read`: The number of bytes read from all redo log files that are associated with this instance of Extract.
- `REDO bytes read ahead`: The number of bytes that were processed by the read-ahead mechanism.
- `REDO bytes unused`: The number of read-ahead bytes that were subsequently dropped as the result of Extract position changes or stale reads.
- `REDO bytes parsed`: The number of bytes that were processed as valid log data.
- `REDO bytes output`: The number of bytes that were written to the trail file (not including internal Oracle GoldenGate overhead).

`REPORT`
Generates an interim statistical report to the Extract report file. The statistics that are displayed depend upon the configuration of the `STATOPTIONS` parameter when used with the `RESETREPORTSTATS` | `NORESETREPORTSTATS` option.

`RESUME`
Resumes (makes active) a process that was suspended by an `EVENTACTIONS SUSPEND` event. The process resumes normal processing from the point at which it was suspended.

`ROLLOVER`
Causes Extract to increment to the next file in the trail when restarting. For example, if the current file is `ET000002`, the current file will be `ET000003` after the command executes. A trail can be incremented from `000001` through `999999`, and then the sequence numbering starts over at `000000`.

`SHOWTRANS [`*`transaction_ID`*`] [THREAD `*`n`*`] [COUNT `*`n`*`]`
`[DURATION `*`duration unit`*`] [TABULAR] | [FILE `*`file_name`*` [DETAIL]]`
Valid for MySQL, Oracle, SQL/MX, SQL Server, Sybase.
Displays information about open transactions. `SHOWTRANS` shows any of the following, depending on the database type:

- Process checkpoint (indicating the oldest log needed to continue processing the transaction in case of an Extract restart). See *Administering Oracle GoldenGate for Windows and UNIX* for more information about checkpoints.
- Transaction ID
- Extract group name
- Redo thread number
- Timestamp of the first operation that Oracle GoldenGate extracts from a transaction (not the actual start time of the transaction)
- System change number (SCN)
- Redo log number and RBA
- Status (`Pending COMMIT` or `Running`). `Pending COMMIT` is displayed while a transaction is being written after a `FORCETRANS` was issued.

Without options, `SHOWTRANS` displays all open transactions that will fit into the available buffer. However, it doesn't display the output user name sometimes for an open active transaction because the user name is not provided in the begin record from transaction log.
See the examples for sample output of `SHOWTRANS`. To further control output, see the following options.

`transaction_ID`
Limits the command output to a specific transaction.

`THREAD `*`n`*
Valid only for Oracle.
Constrains the output to open transactions against a specific Oracle RAC thread. For *`n`*, use a RAC thread number that is recognized by Extract.

`COUNT `*`n`*
Constrains the output to the specified number of open transactions, starting with the oldest one. Valid values are `1` to `1000`.

`DURATION `*`duration unit`*
Restricts the output to transactions that have been open longer than the specified time, where:

`duration` is the length of time expressed as a whole number.
`unit` is one of the following to express `seconds`, `minutes`, `hours`, or `days`:

```
S|SEC|SECS|SECOND|SECONDS
M|MIN|MINS|MINUTE|MINUTES
H|HOUR|HOURS
D|DAY|DAYS
```

For Sybase, which does not put a timestamp on each record, the duration is not always precise and depends on the time information that is stored in the transaction log for the `BEGIN` and `COMMIT` records.

`TABULAR`
Valid only for Oracle.
Generates output in tabular format similar to the default table printout from SQL*Plus. The default is field-per-row.

`FILE` ***`file_name`*** **`[DETAIL]`**
Valid only for Oracle and SQL Server. Not valid for MySQL, SQL/MX, Sybase.
Forces Extract to write the transaction information to the specified file. There is no output to the console.
For Oracle, you can write a hex and plain-character dump of the data by using `FILE` with `DETAIL`. This dumps the entire transaction from memory to the file. Viewing the data may help you decide whether to skip the transaction or force it to the trail.

Note:

Basic detail information is automatically written to the report file at intervals specified by the `WARNLONGTRANS CHECKINTERVAL` parameter.

`SKIPTRANS` ***`transaction_ID`*** **`[THREAD`** ***`n`*** **`] [FORCE]`**
Valid for MySQL, Oracle, SQL/MX, SQL Server, Sybase.
Forces Extract to skip the specified transaction, thereby removing any current data from memory and ignoring any subsequent data. A confirmation prompt must be answered unless `FORCE` is used. After using `SKIPTRANS`, wait at least five minutes if you intend to issue `SEND EXTRACT` with `FORCESTOP`. Otherwise, the transaction will still be present. Note that skipping a transaction may cause data loss in the target database.

Note:

To use `SKIPTRANS`, the specified transaction must be the oldest one in the list of transactions shown with `SHOWTRANS` with the exception of SQL/MX. For SQL/MX, the transaction does not have to be the oldest outstanding. You can repeat the command for other transactions in order of their age.

`transaction_ID`
The transaction ID number. Get the ID number with `SHOWTRANS` or from an Extract runtime message.

THREAD *n*
Valid only for Oracle.
Use `THREAD` *n* to specify which thread generated the transaction in an Oracle RAC environment if there are duplicate transaction IDs. `SKIPTRANS` specifies the checkpoint index number, not the actual thread number. To specify the correct thread, issue the `INFO EXTRACT` *group_name* `SHOWCH` command, and then specify the `READ` checkpoint index number that corresponds to the thread number that you want to skip. See the examples for details. See *Administering Oracle GoldenGate for Windows and UNIX* for more information about checkpoints.

FORCE
Valid for Oracle, SQL/MX, SQL Server, Sybase. Not valid for MySQL
Use `FORCE` to bypass the prompt that confirms your intent to skip the transaction.

STATUS
Returns a detailed status of the processing state, including current position and activity. Possible processing status messages on the `Current status` line are:

- `Delaying` – waiting for more data
- `Suspended` – waiting to be resumed
- `Processing data` – processing data
- `Starting initial load` – starting an initial load task
- `Processing source tables` – processing data for initial load task
- `Reading from data source` – reading from the data source, such as a source table or transaction log
- `Adding record to transaction list` – adding a record to the file memory transaction list
- `At EOF (end of file)` – no more records to process

In addition to the preceding statuses, the following status notations appear during an Extract recovery after an abend event. You can follow the progress as Extract continually changes its log read position over the course of the recovery.

- `In recovery[1]` – Extract is recovering to its checkpoint in the transaction log.
- `In recovery[2]` – Extract is recovering from its checkpoint to the end of the trail.
- `Recovery complete` – The recovery is finished, and normal processing will resume.

STOP
Stops Extract. If there are any long-running transactions (based on the `WARNLONGTRANS` parameter), the following message will be displayed:

```
Sending STOP request to EXTRACT JC108XT...
There are open, long-running transactions. Before you stop Extract, make the
archives containing data for those transactions available for when Extract
restarts. To force Extract to stop, use the SEND EXTRACT group, FORCESTOP command.
Oldest redo log file necessary to restart Extract is:
Redo Thread 1, Redo Log Sequence Number 150, SCN 31248005, RBA 2912272.
```

TRACE[2] {*file_name* | OFF}
Turns tracing on and off. Tracing captures information to the specified file to reveal processing bottlenecks. Contact Oracle Support for assistance if the trace reveals significant processing bottlenecks.

TRACE
Captures step-by-step processing information.

TRACE2
Identifies code segments rather than specific steps.

file_name
Specifies the name of the file to which the trace information is written. If a trace is already running when `SEND EXTRACT` is issued with `TRACE`, the existing trace file is closed and the trace is resumed to the new file specified with *`file_name`*.

OFF
Turns off tracing.

TRACE OFF *file_name*
Turns tracing off only for the specified trace file.

TRACEINIT
Resets tracing statistics back to 0 and then starts accumulating statistics again. Use this option to track the current behavior of processing, as opposed to historical.

INTEGRATEDPARAMS(*parameter_specification*)
(Oracle) Supports an integrated Extract. Sends a parameter specification to the database inbound server while Extract is running in integrated mode. Only one parameter specification can be sent at a time with this command. You can send multiple parameter changes, issue multiple `SEND EXTRACT` commands.
To preserve the continuity of processing, the parameter change is made at a transaction boundary. For a list of supported inbound server parameters, see *Installing and Configuring Oracle GoldenGate for Oracle Database*.

TRANLOGOPTIONS {PREPAREFORUPGRADETOIE | NOPREPAREFORUPGRADETOIE}
(Oracle) Valid when upgrading from Classic to Integrated Extract on Oracle RAC. When upgrading on Oracle RAC from Classic to Integrated Extract, you must set the `PREPAREFORUPGRADETOIE` option before stopping Classic Extract for the upgrade then wait for the information message in the report file that indicates that the parameter has taken effect before proceeding with the upgrade. For detailed upgrade instructions, see Upgrading Oracle GoldenGate for Windows and UNIX.

PREPAREFORUPGRADETOIE
Set `PREPAREFORUPGRADETOIE` in the Extract parameter file, which requires a restart of Extract, or you can set it dynamically for a running extract from GGSCI using this command:
`SEND EXTRACT` *`extract_name`* `TRANLOGOPTIONS PREPAREFORUPGRADETOIE`

NOPREPAREFORUPGRADETOIE
Dynamically turns off the `PREPAREFORUPGRADETOIE` option if necessary. The default is `NOPREPAREFORUPGRADETOIE`.

TRANLOGOPTIONS {PURGEORPHANEDTRANSACTIONS | NOPURGEORPHANEDTRANSACTIONS}
Valid for Oracle RAC. Enables or disables purging of orphaned transactions that occur when a node fails and Extract cannot capture the rollback.

`TRANLOGOPTIONS TRANSCLEANUPFREQUENCY` ***`minutes`***
Valid for Oracle RAC. Specifies the interval, in minutes, after which Oracle GoldenGate scans for orphaned transactions and then re-scans to confirm and delete them. Valid values are from 1 to 43200 minutes. Default is 10 minutes.

`VAMMESSAGE '`*`Teradata_command`*`'`
`VAMMESSAGE { 'ARSTATS' | 'INCLUDELIST [`*`filter`*`]' | 'EXCLUDELIST [`*`filter`*`]' }`
`VAMMESSAGE 'OPENTRANS'`
Sends a command to the capture API that is used by Extract.
A Teradata command can be any of the following:

> **`'control:terminate'`**
> Stops a replication group. Required before dropping or altering a replication group in Teradata.
>
> **`'control:suspend'`**
> Suspends a replication group. Can be used when upgrading Oracle GoldenGate.
>
> **`'control:resume'`**
> Resumes a replication group after it has been suspended.
>
> **`'control:copy`** ***`database.table`*****`'`**
> Copies a table from the source database to the target database.

A SQL/MX command can be any of the following. The module returns a response to GGSCI. The response can be either `ERROR` or `OK` along with a response message.

> **`'ARSTATS'`**
> Displays TMF audit reading statistics.
>
> **`'FILELIST [`*`filter`*`]'`**
> Displays the list of tables for which Extract has encountered data records in the audit trail that match the selection criteria in the `TABLE` parameters. The *`filter`* option allows use of a wildcard pattern to filter the list of tables returned. `GETFILELIST` can also be used in the same manner.
>
> **`'EXCLUDELIST [`*`filter`*`]'`**
> Displays the list of tables for which Extract has encountered data records in the audit trail that do not match the selection criteria in the `TABLE` parameters. The *`filter`* option allows use of a wildcard pattern to filter the list of tables returned. Certain system tables that are implicitly excluded will always be present in the list of excluded tables.

A SQL Server command can be the following:

> **`'OPENTRANS'`**
> Prints a list of open transactions with their transaction ID, start time, first LSN, and the number of operations they contain.

Examples

Example 1

```
SEND EXTRACT finance, ROLLOVER
```

Example 2

```
SEND EXTRACT finance, STOP
```

Example 3

```
SEND EXTRACT finance, VAMMESSAGE 'control:suspend'
```

Example 4

```
SEND EXTRACT finance, TRANLOGOPTIONS TRANSCLEANUPFREQUENCY 20
```

Example 5

This example explains `SKIPTRANS`. Start with the following `SHOWCH` output, which shows that thread 2 is at `Read Checkpoint #3`. See *Administering Oracle GoldenGate for Windows and UNIX* for more information about checkpoints.

```
INFO extract SHOWCH

Read Checkpoint #3
Oracle RAC Redo Log
Startup Checkpoint (starting position in the data source):
Thread #: 2
Sequence #: 17560
RBA: 65070096
Timestamp: 2011-07-30 20:04:47.000000
SCN: 1461.3499051750 (6278446271206)
Redo File: RAC4REDO/sss11g/onlinelog/group_4.292.716481937
```

Therefore, `SKIPTRANS` should be: `SKIPTRANS` *`xid`* `THREAD 3`.

Example 6

```
SEND EXTRACT finance, SHOWTRANS COUNT 2
```

Example 7

The following shows the default output of `SHOWTRANS`.

```
Oldest redo log file necessary to restart Extract is:
Redo Thread 1, Redo Log Sequence Number 148, SCN 30816254, RBA 17319664
------------------------------------------------------------
XID                  : 5.15.52582
Items                : 30000
Extract              : JC108XT
Redo Thread          : 1
Start Time           : 2011-01-18:12:51:27
SCN                  : 20634955
Redo Seq             : 103
Redo RBA             : 18616848
Status               : Running
------------------------------------------------------------
XID                  : 7.14.48657
Items                : 30000
Extract              : JC108XT
Redo Thread          : 1
Start Time           : 2011-01-18:12:52:14
SCN                  : 20635145
Redo Seq             : 103
Redo RBA             : 26499088
Status               : Running
```

Example 8

The following shows SHOWTRANS output with TABULAR in effect (view is truncated on right)

```
XID         Items  Extract   Redo Thread  Start Time
5.15.52582  30000  JC108XT       1            2011-01-18:12:52:14

Dumping transaction memory at 2011-01-21 13:36:54.
Record #1:
Header (140 bytes):
       0: 0000 0A4A 0000 FFFF 0000 0000 0057 6C10        ...J.........Wl.
      16: 02FF 3F50 FF38 7C40 0303 4141 414E 5A77        ..?P.8|@..AAANZw
      32: 4141 4641 4141 4B6F 4941 4144 0041 4141        AAFAAAKoIAAD.AAA
      48: 4E5A 7741 4146 4141 414B 6F49 4141 4400        NZwAAFAAAKoIAAD.
      64: 4141 414E 5A77 414A 2F41 4142 7A31 7741        AAANZwAJ/AABz1wA
      80: 4141 0041 4141 4141 4141 4141 4141 4141        AA.AAAAAAAAAAAAA
      96: 4141 4141 4100 0000 0140 FF08 0003 0000        AAAAA....@......
     112: 0000 0000 0000 70FF 0108 FFFF 0001 4A53        ......p.......JS
     128: 554E 2E54 4355 5354 4D45 5200                  UN.TCUSTMER.

Data (93 bytes):
       0: 2C00 0400 0400 0000 0100 0200 0300 0000        ,...............
      16: 0000 0000 0800 0000 1800 0000 2000 0400        ............ ...
      32: 1000 0600 0200 0000 284A 414E 456C 6C6F        ........(JANEllo
      48: 6352 4F43 4B59 2046 4C59 4552 2049 4E43        cROCKY FLYER INC
      64: 2E44 454E 5645 5220 6E43 4F20 7365 7400        .DENVER nCO set.
      80: 0000 0000 0000 0C00 0000 0000 00              .............
```

When analyzing the summary output of SHOWTRANS, understand that it shows all currently running transactions on the database (as many as will fit into a predefined buffer). Extract must track every open transaction, not just those that contain operations on tables configured for Oracle GoldenGate.

The Items field of the SHOWTRANS output shows the number of operations in the transaction that have been captured by Oracle GoldenGate so far, not the total number of operations in the transaction. If none of the operations are for configured tables, or if only some of them are, then Items could be 0 or any value less than the total number of operations.

The Start Time field shows the timestamp of the first operation that Oracle GoldenGate extracts from a transaction, not the actual start time of the transaction itself.

Note:

Command output may vary somewhat from the examples shown due ongoing enhancements of Oracle GoldenGate.

1.16 START EXTRACT

Use START EXTRACT to start the Extract process. To confirm that Extract has started, use the INFO EXTRACT or STATUS EXTRACT command. Extract can be started at its normal start point (from initial or current checkpoints) or from an alternate, user-specified position in the data source.

Normal Start Point

Without options, `START EXTRACT` directs a primary Extract and a data pump Extract to start processing at one of the following locations in the data source to maintain data integrity:

- After graceful or abnormal termination: At the first unprocessed transaction in the data source from the previous run, as represented by the current read checkpoint.
- First-time startup after the group was created: At the start point specified with the `ADD EXTRACT` command.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about checkpoints.

Extract also can be started from the command line of the operating system for certain synchronization configurations. For more information on the proper configuration and startup method to use for your purposes, see Administering Oracle GoldenGate for Windows and UNIX.

Alternate Start Point

The `ATCSN` and `AFTERCSN` options enable you to establish a logical starting point for a primary Extract or a data pump, after you establish an approximate physical starting point with the `ADD EXTRACT` or `ALTER EXTRACT` command. For example, in an initial-load scenario, after a backup is applied to the target, the serial identifier of the last transaction (such as an Oracle SCN) can be mapped to an Oracle GoldenGate CSN (*commit sequence number*) value, which can be used to start Extract with the `AFTERCSN` option. By starting with the first transaction after the specified CSN, Extract omits the transactions that were included in the backup, which would otherwise cause duplicate-record and missing-record errors.

Before starting Extract with `ATCSN` or `AFTERCSN`, you must establish a physical starting location with one of the following commands:

- `ADD EXTRACT` with the `BEGIN` option set to a timestamp that is earlier than the CSN value specified with `ATCSN` or `AFTERCSN`. The transaction log that contains the timestamp and every log thereafter must be available on the system before Extract is started.
- `ALTER EXTRACT` to the sequence number of the log that contains the CSN specified with `ATCSN` or `AFTERCSN`.

Note:

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about the values that comprise a CSN for a given database.

Syntax

```
START EXTRACT group_name [ATCSN csn | AFTERCSN csn]
```

`group_name`
The name of an Extract group or a wildcard (*) to specify multiple groups. For example, T* starts all Extract groups whose names begin with T.

`ATCSN` ***`csn`*** **`|`** **`AFTERCSN`** ***`csn`***
Specifies an alternate start point. (See "Alternate Start Point" for usage instructions.)

> **`ATCSN`**
> Directs Extract to position its start point at the first transaction that has the specified CSN. Any transactions in the data source that have CSN values less than the specified one are skipped.
>
> **`AFTERCSN`**
> Directs Extract to position its start point at the beginning of the first transaction after the one that has the specified CSN. Any transactions in the data source that have CSN values that are less than, or equal to, the specified one are skipped.
>
> ***`csn`***
> Specifies a CSN value. Enter the CSN value in the format that is valid for the database. See *Administering Oracle GoldenGate for Windows and UNIX* for CSN formats and descriptions. Extract abends if the format is invalid and writes a message to the report file. To determine the CSN to supply after an initial load is complete, use the serial identifier at which the load utility completed. Otherwise, follow the instructions in the initial load procedure for determining when to start Extract.

The following are additional guidelines to observe when using `ATCSN` and `AFTERCSN`:

- To support starting at, or after, a CSN, the trail must be of Oracle GoldenGate version 10.0.0 or later, because the CSN is stored in the file header so that it is available to downstream processes.
- When a record that is specified with a CSN is found, Extract issues a checkpoint. The checkpoint ensures that subsequent Extract startups begin from the requested location, and not from a point prior to the requested CSN.
- You must establish a physical start point in the transaction log or trail for Extract with `ADD EXTRACT` or `ALTER EXTRACT` before using `ATCSN` or `AFTERCSN`. These options are intended to be an additional filter after Extract is positioned to a physical location in the data source.

Examples

Example 1

```
START EXTRACT finance
```

Example 2

```
START EXTRACT finance ATCSN 684993
```

Example 3

```
START EXTRACT finance AFTERCSN 684993
```

1.17 STATS EXTRACT

Use `STATS EXTRACT` to display statistics for one or more Extract groups. The output includes DML and DDL operations that are included in the Oracle GoldenGate configuration.

To get the most accurate number of operations per second that are being processed, do the following.

1. Issue the `STATS EXTRACT` command with the `RESET` option.
2. Issue the `STATS EXTRACT REPORTRATE` command. The `LATEST STATISTICS` field shows the operations per second.

Note:

The actual number of DML operations executed on a DB2 database might not match the number of extracted DML operations reported by Oracle GoldenGate. DB2 does not log update statements if they do not physically change a row, so Oracle GoldenGate cannot detect them or include them in statistics.

To get accurate statistics on a Teradata source system where Oracle GoldenGate is configured in maximum protection mode, issue `STATS EXTRACT` to the VAM-sort Extract, not the primary Extract. The primary Extract may contain statistics for uncommitted transactions that could be rolled back; whereas the VAM-sort Extract reports statistics only for committed transactions.

Syntax

```
STATS EXTRACT group_name
[, statistic]
[, TABLE [container. | catalog.]schema.table]
[, TOTALSONLY [container. | catalog.]schema.table]
[, REPORTCHARCONV]
[, REPORTFETCH | NOREPORTFETCH]
[, REPORTRATE time_units]
[, ... ]
```

`group_name`
The name of an Extract group or a wildcard (*) to specify multiple groups. For example, T* returns statistics for all Extract groups whose names start with T.

`statistic`
The statistic to be displayed. More than one statistic can be specified by separating each with a comma, for example `STATS EXTRACT finance, TOTAL, DAILY`.
Valid values:

> **`TOTAL`**
> Displays totals since process startup.
>
> **`DAILY`**
> Displays totals since the start of the current day.

`HOURLY`
Displays totals since the start of the current hour.

`LATEST`
Displays totals since the last `RESET` command.

`RESET`
Resets the counters in the `LATEST` statistical field.

`TABLE [`*`container`*`. | `*`catalog`*`.]`*`schema`*`.`*`table`*
Displays statistics only for the specified table or a group of tables specified with a wildcard (*). The table name or wildcard specification must be fully qualified with the two-part or three-part name, for example `hr.emp` or `*.*.*`.

`TOTALSONLY [`*`container`*`. | `*`catalog`*`.]`*`schema`*`.`*`table`*
Summarizes the statistics for the specified table or a group of tables specified with a wildcard (*). The table name or wildcard specification must be fully qualified with the two-part or three-part name, for example `hr.emp` or `*.*.*`.

`REPORTCHARCONV`
Use only when `TABLE` parameters have a `TARGET` clause and character-set conversion is performed. The following statistics are added to the `STATS` output:
`Total column character set conversion failure`: the number of validation or conversion failures in the current Extract run.
`Total column data truncation`: the number of times that column data was truncated in the current Extract run as the result of character set conversion

`REPORTFETCH | NOREPORTFETCH`
Controls whether or not statistics about fetch operations are included in the output. The default is `NOREPORTFETCH`. See "STATOPTIONS" for defaults that control fetching and options for altering fetch behavior. The output of `REPORTFETCH` is as follows:

- `row fetch attempts`: The number of times Extract attempted to fetch a column value from the database when it could not obtain the value from the transaction log.
- `fetch failed`: The number of `row fetch attempts` that failed.
- row fetch by key: Valid for Oracle. The number of row fetch attempts that were made by using the primary key. The default is to fetch by row ID.

`REPORTRATE` ***`time_units`***
Displays statistics in terms of processing rate rather than absolute values.
Valid values:

```
HR
MIN
SEC
```

Example

Example 1

The following example displays total and hourly statistics per minute for a specific table, and it also resets the latest statistics and outputs fetch statistics.

```
STATS EXTRACT finance, TOTAL, HOURLY, TABLE hr.acct,
REPORTRATE MIN, RESET, REPORTFETCH
```

Example 2
The following is sample output using the `LATEST` and `REPORTFETCH` options

```
STATS EXTRACT ext, LATEST, REPORTFETCH
Sending STATS request to EXTRACT GGSEXT...
Start of Statistics at 2011-01-08 11:45:05.
DDL replication statistics (for all trails):
*** Total statistics since extract started     ***
    Operations                                   3.00
    Mapped operations                            3.00
    Unmapped operations                          0.00
    Default operations                           0.00
    Excluded operations                          0.00
Output to ./dirdat/aa:
Extracting from HR.EMPLOYEES to HR.EMPLOYEES:
*** Latest statistics since 2011-01-08 11:36:55 ***
    Total inserts                              176.00
    Total updates                                0.00
    Total deletes                               40.00
    Total discards                               0.00
    Total operations                           216.00
Extracting from HR.DEPARTMENTS to HR.DEPARTMENTS:
*** Latest statistics since 2011-01-08 11:36:55 ***
No database operations have been performed.
End of Statistics.
```

1.18 STATUS EXTRACT

Use `STATUS EXTRACT` to determine whether or not Extract is running. A status of `RUNNING` can mean one of the following:

- Active: Running and processing (or able to process) data. This is the normal state of a process after it is started.
- Suspended: The process is running, but suspended due to an `EVENTACTIONS SUSPEND` action. In a suspended state, the process is not active, and no data can be processed, but the state of the current run is preserved and can be continued by issuing the `RESUME` command in GGSCI. The RBA in the `INFO` command reflects the last checkpointed position before the suspend action. To determine whether the state is active or suspended, issue the `SEND EXTRACT` command with the `STATUS` option.

Syntax

```
STATUS EXTRACT group_name [, TASKS | ALLPROCESSES] [UPGRADE | DOWNGRADE]
```

`group_name`
The name of an Extract group or a wildcard (*) to specify multiple groups. For example, T* returns status for all Extract groups whose names begin with T.

`TASKS`
Displays status only for Extract tasks. By default, tasks are not displayed unless you specify a single Extract group (without wildcards).

`ALLPROCESSES`
Displays status for all Extract groups, including tasks.

`UPGRADE | DOWNGRADE`
Valid for an Oracle database only. If Extract cannot be upgraded or downgraded, the reason why is displayed. A wildcarded Extract name is not allowed with this option. Before using this command, issue the `DBLOGIN` command.

> **`UPGRADE`**
> Displays whether the Extract can be upgraded from classic capture mode to integrated capture mode.
>
> **`DOWNGRADE`**
> Displays whether the Extract can be downgraded from integrated capture mode to classic capture mode.

Examples

Example 1

```
STATUS EXTRACT finance
```

Example 2

```
STATUS EXTRACT fin*
```

1.19 STOP EXTRACT

Use `STOP EXTRACT` to stop Extract gracefully. The command preserves the state of synchronization for the next time Extract starts, and it ensures that Manager does not automatically start Extract.

If there are open, long-running transactions when you issue `STOP EXTRACT`, you might be advised of the oldest transaction log file that will be needed for that transaction when Extract is restarted. You can use the `SEND EXTRACT` option of `SHOWTRANS` to view details and data of those transactions and then, if desired, use the `SKIPTRANS` or `FORCETRANS` options to skip the transaction or force it to be written as a committed transaction to the trail. See "SEND EXTRACT".

Syntax

```
STOP EXTRACT group_name
```

`group_name`
The name of an Extract group or a wildcard (*) to specify multiple groups. For example, T* stops all Extract processes for groups whose names begin with T.

```
STOP EXTRACT finance
```

1.20 UNREGISTER EXTRACT

Use `UNREGISTER EXTRACT` to remove the registration of an Extract group from an Oracle database. `UNREGISTER EXTRACT` is valid only for a primary Extract group. Do not use it for a data pump Extract.

To register an Extract group with the database, use the `REGISTER EXTRACT` command.

To upgrade an Extract from classic capture mode to integrated capture mode, use the `ALTER EXTRACT` command.

See Installing and Configuring Oracle GoldenGate for Oracle Database for more information about configuring and registering Oracle GoldenGate for an Oracle database.

Syntax

```
UNREGISTER EXTRACT group_name
{DATABASE  | LOGRETENTION}
```

`group_name`
The name of the Extract group that is to be unregistered from the database. Do not use a wildcard. This group must currently be registered with the database.

`DATABASE`
Disables integrated capture mode for the Extract group.
This command removes the database capture (mining) server that has the same name as the Extract group. For additional information about support for, and configuration of, the Extract capture modes, see Installing and Configuring Oracle GoldenGate for Oracle Database.
Before using `UNREGISTER EXTRACT` with `DATABASE`, do the following:

1. Stop Extract with the `STOP EXTRACT` command.
2. Log in to the mining database with the `DBLOGIN` or `MININGDBLOGIN` command with the privileges granted in the `dbms_goldengate_auth.grant_admin_privilege` procedure. For local capture, `DBLOGIN` is required. For downstream capture, `DBLOGIN` and `MININGDBLOGIN` are both required.
3. Delete the Extract group with `DELETE EXTRACT`.

`LOGRETENTION`
Disables log retention for the specified Extract group and removes the underlying Oracle Streams capture process. Use `UNREGISTER EXTRACT` with `LOGRETENTION` only if you no longer want to capture changes with this Extract group. The log-retention feature is controlled with the `LOGRETENTION` option of the `TRANLOGOPTIONS` parameter.
Before using `UNREGISTER EXTRACT` with `LOGRETENTION`, stop Extract with the `STOP EXTRACT` command. Next, issue the `DBLOGIN` command with the privileges shown in 1–2.

Examples

Example 1

```
UNREGISTER EXTRACT sales LOGRETENTION
```

Example 2

```
UNREGISTER EXTRACT sales DATABASE
```

1.21 ADD REPLICAT

Use `ADD REPLICAT` to create a Replicat group. Unless `SPECIALRUN` is specified, `ADD REPLICAT` creates an online process group that creates checkpoints so that processing continuity is maintained from run to run.

This command cannot exceed 500 bytes in size for all keywords and input, including any text that you enter for the `DESC` option.

Oracle GoldenGate supports up to 5,000 concurrent Extract and Replicat groups per instance of Oracle GoldenGate Manager. At the supported level, all groups can be controlled and viewed in full with GGSCI commands such as the `INFO` and `STATUS` commands. Oracle GoldenGate recommends keeping the number of Extract and Replicat groups (combined) at the default level of 300 or below in order to manage your environment effectively.

(Oracle) Unless the `INTEGRATED` option is used, this command creates a Replicat group in non-integrated mode. For more information about Replicat modes, see "Deciding Which Apply Method to Use" in *Installing and Configuring Oracle GoldenGate for Oracle Database* and "BATCHSQL".

Syntax

```
ADD REPLICAT group_name
[, INTEGRATED | COORDINATED [MAXTHREADS number]]
{, SPECIALRUN |
    , EXTFILE file_name |
    , EXTTRAIL trail_name}
[, BEGIN {NOW | yyyy-mm-dd[ hh:mm[:ss[.cccccc]]]} |
    , EXTSEQNO sequence_number, EXTRBA rba]
{, CHECKPOINTTABLE owner.table | NODBCHECKPOINT}
[, PARAMS file_name]
[, REPORT file_name]
[, DESC 'description']
[, CPU number]
[, PRI number]
[, HOMETERM device_name]
[, PROCESSNAME process_name]
```

group_name
The name of the Replicat group. The name of a coordinated Replicat group can contain a maximum of five characters. The name of a regular Replicat group can contain up to eight characters. See *Administering Oracle GoldenGate for Windows and UNIX* for more information about naming conventions for process groups.

INTEGRATED
(Oracle) Creates the Replicat in integrated mode. Without this option, `ADD REPLICAT` creates the Replicat in non-integrated (classic) mode. In this mode, the Replicat process leverages the apply processing functionality that is available within the Oracle database. In this mode, Replicat operates as follows:

- Reads the Oracle GoldenGate trail.
- Performs data filtering, mapping, and conversion.
- Constructs logical change records (LCR) that represent source database DML or DDL transactions (in committed order).
- Attaches to a background process in the target database known as a database inbound server by means of a lightweight streaming interface.
- Transmits the LCRs to the inbound server, which applies the data to the target database.

Do not use `INTEGRATED` with the `SPECIALRUN` or `EXTFILE` options. `INTEGRATED` must be used for an online change-synchronization Replicat that reads from a local `EXTTRAIL`-specified trail.
Integrated Replicat does not require a checkpoint table (`ADD CHECKPOINTTABLE` command and `CHECKPOINTTABLE` parameter) or a trace table (`TRACETABLE` parameter). Integrated Replicat does not maintain either of these tables.
When in integrated mode, Replicat does not support the following parameters:

- `BULKLOAD` (Do not use integrated Replicat as an initial-load Replicat.)
- `SPECIALRUN`
- `GENLOADFILES`
- `SHOWSYNTAX`
- `MAXTRANSOPS` (is ignored)

See Installing and Configuring Oracle GoldenGate for Oracle Database for more information about configuring and using integrated Replicat.

`COORDINATED [MAXTHREADS *number*]`
Creates the Replicat in coordinated mode. A coordinated Replicat is multithreaded to enable parallel processing. This option adds the coordinator (identified by the group name itself) and the maximum number of processing threads that are specified by default or with `MAXTHREADS`. Dependencies are computed and coordinated by the coordinator, and the SQL processing is performed by the threads.
Do not use `COORDINATED` with the `SPECIALRUN` or `EXTFILE` options. `COORDINATED` must be used for an online change-synchronization Replicat that reads from a local `EXTTRAIL`-specified trail. For more information about coordinated Replicat, see *Administering Oracle GoldenGate for Windows and UNIX*.

> **Note:**
>
> Note that the group name of a coordinated Replicat can contain only five characters. See *Administering Oracle GoldenGate for Windows and UNIX* for more information about naming conventions for process groups.

`MAXTHREADS *number*`
Specifies the maximum number of processing threads that this Replicat group can spawn. These threads are all created on startup, but depending on what is specified in the `MAP` statements in the parameter file, some or all of these threads will process the workload at any given time. As a general rule, specify twice the number of threads that you specify in the `MAP` statements when you partition the workload. This allows you to add threads in the event that the workload increases, without having to drop and recreate the Replicat group.
See TABLE | MAPfor more information about how to partition the workload across threads.
The default number of threads is 25 if `MAXTHREADS` is omitted. The maximum number of threads is 500.
`MAXTHREADS` has a relationship to the `MAXGROUPS` parameter. `MAXGROUPS` controls the maximum number of process groups (Extract and Replicat) allowed per instance of Oracle GoldenGate. Each Replicat thread is considered a Replicat group in the context of `MAXGROUPS`. Therefore, the number of Extract and Replicat groups in the Oracle GoldenGate instance, plus the value of `MAXTHREADS`, cannot exceed the value of `MAXGROUPS`. For more information, see MAXGROUPS.

`SPECIALRUN`
Creates a Replicat special run as a task. Either `SPECIALRUN, EXTFILE`, or `EXTTRAIL` is required. When Extract is in `SPECIALRUN` mode, do not start Replicat with the `START REPLICAT` command in GGSCI. Do not use this option with the `INTEGRATED` or `COORDINATED` option.

`EXTFILE` ***`file_name`***
Specifies the relative or fully qualified name of an extract file that is specified with `RMTFILE` in the Extract parameter file. Do not use this option with the `INTEGRATED` option.

`EXTTRAIL` ***`trail_name`***
Specifies the relative or fully qualified name of a trail that was created with the `ADD RMTTRAIL` or `ADD EXTTRAIL` command.

`BEGIN {NOW |` ***`yyyy-mm-dd[ hh:mm[:ss[.cccccc]]]`*** **`}`**
Defines an initial checkpoint in the trail. See *Administering Oracle GoldenGate for Windows and UNIX* for more information about checkpoints.

> **`NOW`**
> Begins replicating changes from the time when the group is created.
>
> ***`yyyy-mm-dd[ hh:mm[:ss[.cccccc]]]`***
> Begins extracting changes from a specific time.

`EXTSEQNO` ***`sequence_number`***
Specifies the sequence number of the file in a trail in which to begin processing data. Specify the sequence number, but not any zeroes used for padding. For example, if the trail file is `c:\ggs\dirdat\aa000026`, you would specify `EXTSEQNO 26`.
By default, processing begins at the beginning of a trail unless this option is used. To use `EXTSEQNO`, you must also use `EXTRBA`. Contact Oracle Support before using this option.

`EXTRBA` ***`rba`***
Specifies the relative byte address within the trail file that is specified by `EXTSEQNO`. Contact Oracle Support before using this option.

`CHECKPOINTTABLE` ***`owner.table`***
Not valid for Oracle GoldenGate Applications Adapter or Oracle GoldenGate Big Data.
Specifies that this Replicat group will write checkpoints to the specified table in the database. Include the owner and table name, as in `hr.hr_checkpoint`. This argument overrides any default `CHECKPOINTTABLE` specification in the `GLOBALS` file. The table must first be added with the `ADD CHECKPOINTTABLE` command. Do not use this option with the `INTEGRATED` option. When `NODBCHECKPOINT` is specified, an additional checkpoint file for Java is not created.

`NODBCHECKPOINT`
Specifies that this Replicat group will not write checkpoints to a checkpoint table. This argument overrides any default `CHECKPOINTTABLE` specification in the `GLOBALS` file. This argument is required if you do not want to use a checkpoint table with the Replicat group that is being created. Do not use this option with the `INTEGRATED` option.

`PARAMS` ***`file_name`***
Specifies a parameter file in a location other than the default of `dirprm` within the Oracle GoldenGate directory. Specify the fully qualified path name.

`REPORT` ***`file_name`***
Specifies the full path name of a process report file in a location other than the default of `dirrpt` within the Oracle GoldenGate directory.

DESC '*description*'
Specifies a description of the group, such as `'Loads account_tab on Serv2'`. Enclose the description within quotes. You can use either the abbreviated keyword `DESC` or the full word `DESCRIPTION`.

CPU *number*
Valid for SQL/MX. Specifies the number of the CPU to be used for the process. Valid values are numbers `0` - `15` and `-1` is default, which is assigned 1 higher than the last Manager started.

PRI *number*
Valid for SQL/MX. Specifies the Extract process priority. Valid values are numbers are `1` - `199` and `-1` is the default, and is the same as the manager process priority.

HOMETERM *device_name*
Valid for SQL/MX. Specifies the name of the device to be used and must be a terminal or process. It can be entered in either Guardian `$` or OSS `/G/xxxxx` form. The default is `$zhome` or the current session `HOMETERM` when `$zhome` is not defined.

PROCESSNAME *process_name*
Valid for SQL/MX. Specifies the name of the process as alphanumeric string up to five characters and can be entered in either Guardian `$` or OSS `/G/xxxxx` form. The default is a system generated process name.

Examples

Example 1

```
ADD REPLICAT sales, EXTTRAIL dirdat/rt
```

Example 2

```
ADD REPLICAT sales, INTEGRATED, EXTTRAIL dirdat/rt
```

Example 3

This example creates Replicat in coordinated mode. It indicates that up to 100 threads can be employed in parallel at any given point in processing.

```
ADD REPLICAT sales, COORDINATED MAXTHREADS 100, EXTTRAIL dirdat/rt
```

Example 4

This example creates Replicat on a SQL/MX platform.

```
ADD REPLICAT reptcp, CPU 2, PRI 148, HOMETERM $ZTN0.#PTHBP32,  PROCESSNAME $rep1
```

1.22 ALTER REPLICAT

Use `ALTER REPLICAT` to change the attributes of a Replicat group that was created with the `ADD REPLICAT` command. Before using this command, stop Replicat by issuing the `STOP REPLICAT` command. If this is a coordinated Replicat group, the `ALTER` takes effect for all threads unless the *`threadID`* option is used.

Note:

`ALTER REPLICAT` does not support switching from regular Replicat mode to coordinated mode. You must stop processes, make certain all of the en route data is applied to the target, roll the trail to a new trail, drop and recreate the Replicat group in coordinated mode, and then start the processes again.

Syntax

```
ALTER REPLICAT group_name[threadID], {
   ADD REPLICAT option [, ...] |
   INTEGRATED | NONINTEGRATED, CHECKPOINTTABLE owner.table
}
[, CPU number]
[, PRI number]
[, HOMETERM device_name]
[, PROCESSNAME process_name]
```

`group_name[threadID]`
The name of the Replicat group or a thread of a coordinated Replicat that is to be altered. To specify a thread, use the full thread name, such as `ALTER REPLICAT fin003, EXTSEQNO 53`. If a thread ID is not specified, the `ALTER` takes effect for all threads of the Replicat group.

`ADD REPLICAT` ***`option`***
An `ADD REPLICAT` option. For a non-integrated Replicat, you can change the description or any service option that was configured using the `ADD REPLICAT` command, except for the `CHECKPOINTTABLE` and `NODBCHECKPOINT` options.

`INTEGRATED`
Switches Replicat from non-integrated mode to integrated mode. Transactions currently in process are applied before the switch is made. See *Administering Oracle GoldenGate for Windows and UNIX* for the full procedure for performing the transition from non-integrated to integrated Replicat.

`NONINTEGRATED, CHECKPOINTTABLE` ***`owner.table`***
(Oracle) Switches Replicat from integrated mode to non-integrated mode.
For `CHECKPOINTTABLE`, specify the owner and name of a checkpoint table. This table must be created with the `ADD CHECKPOINTTABLE` command before issuing `ALTER EXTRACT` with `NONINTEGRATED`.
See *Administering Oracle GoldenGate for Windows and UNIX* for the full procedure for performing the transition from integrated Replicat to non-integrated Replicat.
See Installing and Configuring Oracle GoldenGate for Oracle Database for more information about integrated Replicat.

`CPU` ***`number`***
Valid for SQL/MX. Specifies the number of the CPU to be used for the process. Valid values are numbers `0` - `15` and `-1` is default, which is assigned 1 higher than the last Manager started.

`PRI` ***`number`***
Valid for SQL/MX. Specifies the Extract process priority. Valid values are numbers are `1` - `199` and `-1` is the default, and is the same as the manager process priority.

`HOMETERM` ***`device_name`***
Valid for SQL/MX. Specifies the name of the device to be used and must be a terminal or process. It can be entered in either Guardian `$` or OSS `/G/`*`xxxxx`* form. The default is `$zhome` or the current session `HOMETERM` when `$zhome` is not defined.

`PROCESSNAME` ***`process_name`***
Valid for SQL/MX. Specifies the name of the process as alphanumeric string up to five characters and can be entered in either Guardian `$` or OSS `/G/`*`xxxxx`* form. The default is a system generated process name.

Examples

Example 1

```
ALTER REPLICAT finance, EXTSEQNO 53
```

Example 2

```
ALTER REPLICAT finance, EXTRBA 0
```

Example 3

```
ALTER REPLICAT finance, BEGIN 2011-01-07 08:00:00
```

Example 4

```
ALTER REPLICAT finance, INTEGRATED
```

Example 5

```
ALTER REPLICAT finance, NONINTEGRATED, CHECKPOINTTABLE ogg.checkpt
```

Example 6

```
ALTER REPLICAT fin001, EXTSEQNO 53
```

Example 7

The following alters a Replicat on a SQL/MX NonStop platform.

```
ALTER REPLICAT reptcp, CPU 3, PRI 150, HOMETERM /G/zhome,  PROCESSNAME default
```

1.23 CLEANUP REPLICAT

Use `CLEANUP REPLICAT` to delete run history for a specified Replicat group. The cleanup keeps the last run record intact so that Replicat can resume processing from where it left off.

Before using this command, stop Replicat by issuing the `STOP REPLICAT` command.

Syntax

```
CLEANUP REPLICAT group_name[threadID] [, SAVE count]
```

***`group_name`*`[`*`threadID`*`]`**
One of the following:

- *`group_name`*: The name of a Replicat group or a wildcard (*) to specify multiple groups. For example, T* cleans up all Replicat groups whose names begin with T. If the specified group (or groups) is a coordinated Replicat, the cleanup applies to all threads.
- *`group_namethreadID`*: A thread of a coordinated Replicat, identified by its full name (group name plus threadID), such as `finance003`.

`SAVE` *`count`*
Excludes the specified number of the most recent records from the cleanup.

Examples

Example 1
The following deletes all but the last record.

```
CLEANUP REPLICAT finance
```

Example 2
The following deletes all but the most recent five records.

```
CLEANUP REPLICAT *, SAVE 5
```

Example 3
The following deletes all but the most recent five records for thread 3 of coordinated Replicat group `fin`.

```
CLEANUP REPLICAT fin003, SAVE 5
```

1.24 DELETE REPLICAT

Use `DELETE REPLICAT` to delete a Replicat group. This command deletes the checkpoint file but leaves the parameter file intact. Then you can re-create the group or delete the parameter file as needed. This command frees up trail files for purging by Manager, because the checkpoints used by the deleted group are removed (assuming no other processes are reading the file).

Before using `DELETE REPLICAT`, stop Replicat with the `STOP REPLICAT` command.

If this is an integrated Replicat (Oracle only) or a non-integrated Replicat that uses a checkpoint table, do the following after you stop Replicat:

1. Log into the database by using the `DBLOGIN` command. `DBLOGIN` enables `DELETE REPLICAT` to delete the checkpoints from the checkpoint table of a non-integrated Replicat or to delete the inbound server that an integrated Replicat uses. For more information, see "DBLOGIN".
2. Issue `DELETE REPLICAT`.

Syntax

```
DELETE REPLICAT group_name [!]
```

`group_name`
The name of a Replicat group or a wildcard (*) to specify multiple groups. For example, T* deletes all Replicat groups whose names begin with T.

!
Use this option to force the Replicat group to be deleted if the `DBLOGIN` command is not issued before the `DELETE REPLICAT` command is issued. If the group is a nonintegrated Replicat, this option deletes the group's checkpoints from the checkpoint file on disk, but not from the checkpoint table in the database. If using this option to delete an integrated Replicat group, you must use the `UNREGISTER REPLICAT` command to delete the inbound server from the target database. This option can also be used to ignore the prompt that occurs when a wildcard specifies multiple groups.

> **Note:**
>
> The basic `DELETE REPLICAT` command commits an existing Replicat transaction, but the `!` option prevents the commit.

Example

```
DELETE REPLICAT finance
```

1.25 INFO REPLICAT

Use `INFO REPLICAT` to retrieve the processing history of a Replicat group. The output of this command includes:

- The status of Replicat (`STARTING`, `RUNNING`, `STOPPED` or `ABENDED`). `STARTING` means that the process has started but has not yet locked the checkpoint file for processing.
- (Oracle database) The Replicat mode: non-integrated or integrated.
- Whether or not Replicat is in coordinated mode and, if so, how many threads it currently uses.
- Approximate Replicat lag.
- The trail from which Replicat is reading.
- Replicat run history, including checkpoints in the trail.
- Information about the Replicat environment.

The basic command displays information only for online (continuous) Replicat groups. Tasks are excluded.

Replicat can be stopped or running when `INFO REPLICAT` is issued. In the case of a running process, the status of `RUNNING` can mean one of the following:

- `Active`: Running and processing (or able to process) data. This is the normal state of a process after it is started.
- `Suspended`: The process is running, but suspended due to an `EVENTACTIONS SUSPEND` action. In a suspended state, the process is not active, and no data can be processed, but the state of the current run is preserved and can be continued by issuing the `RESUME` command in GGSCI. The RBA in the `INFO` command reflects the last checkpointed position before the suspend action. To determine whether the state is active or suspended, issue the `SEND REPLICAT` command with the `STATUS` option.

About Lag

`Checkpoint Lag` is the lag, in seconds, at the time the last checkpoint was written to the trail. For example, consider the following example.

- Current time = 15:00:00
- Last checkpoint = 14:59:00
- Timestamp of the last record processed =14:58:00

Assuming these values, the lag is reported as 00:01:00 (one minute, the difference between 14:58 and 14:59).

A lag value of `UNKNOWN` indicates that Replicat could be running but has not yet processed records, or that the source system's clock is ahead of the target system's clock (due to clock imperfections, not time zone differences). For more precise lag information, use `LAG REPLICAT` (see "LAG REPLICAT").

Syntax

```
INFO REPLICAT group_name[threadID]
[, DETAIL]
[, SHOWCH [n]]
[, TASKS | ALLPROCESSES]
```

`group_name[threadID]`
The name of:

- A Replicat group or a wildcard (*) to specify multiple groups. For example, T* shows information for all Replicat groups whose names begin with T.
- A thread of a coordinated Replicat, identified by its full name. For example, `fin003` shows information only for thread 3 of the `fin` group.

`DETAIL`
Displays detail information. For an Oracle target, `DETAIL` displays the name of the inbound server when Replicat is in integrated mode.
To view `LOGBSN` information with the `DETAIL` output, issue the DBLOGIN command before you issue `INFO REPLICAT`. If the command is issued for a specific thread ID of a coordinated Replicat, only the `LOGBSN` for that thread is displayed. Otherwise, the `LOGBSN`s for all threads are displayed. For more information about recovering Extract by using the `LOGBSN`, see *Administering Oracle GoldenGate for Windows and UNIX*.
If Replicat is in coordinated mode, `DETAIL` will display only the active threads. For example, if a Replicat named `CR` was created with a maximum of 15 threads, but only threads 7-9 are running, `INFO REPLICAT` *`group_name`* with `DETAIL` will show only the coordinator thread (`CR`), `CR007`, `CR008`, and `CR009`. Checkpoints will exist for the other threads, but they will not be shown in the command output. See the examples for sample output.

`SHOWCH [`*`n`*`]`
Displays current checkpoint details, including those recorded to the checkpoint file and those recorded to the checkpoint table, if one is being used. The database checkpoint display includes the table name, the hash key (unique identifier), and the create timestamp.
Specify a value for *`n`* to include the specified number of previous checkpoints as well as the current one.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about checkpoints.

TASKS
Displays only Replicat tasks. Tasks that were specified by a wildcard argument are not displayed by `INFO REPLICAT`.

ALLPROCESSES
Displays all Replicat groups, including tasks.

Examples

Example 1

```
INFO REPLICAT *, DETAIL, ALLPROCESSES
```

Example 2

```
INFO REPLICAT *, TASKS
```

Example 3

```
INFO REPLICAT fin003, SHOWCH
```

Example 4

The following shows sample output of `INFO REPLICAT` with `DETAIL`.

```
REPLICAT   DELTPCC          Last Started 2011-01-21 11:40 Status RUNNING
Checkpoint Lag              00:00:00 (updated 232:39:41 ago)
Log Read Checkpoint File    C:\GGS\DIRDAT\RT000000
                            2011-01-21 18:54:33.000000 RBA 4735245

Extract Source             Begin                      End
C:\GGS\DIRDAT\RT000000     2011-01-21 18:54           2011-01-21 18:54
C:\GGS\DIRDAT\RT000000     * Initialized *            2011-01-21 18:54

Current directory          C:\GGS
Report file                C:\GGS\dirrpt\DELTPCC.rpt
Parameter file             dirprm\DELTPCC.prm
Checkpoint file            C:\GGS\dirchk\DELTPCC.cpr
Checkpoint table           GG.CHECKPT
Process file               C:\GGS\dirpcs\DELTPCC.pcr
Error log                  C:\GGS\ggserr.log
```

Example 5

The following shows `INFO EXTRACT` with `DETAIL` for a coordinated Replicat.

```
GGSCI (sysa) 3> info ra detail

REPLICAT   RA       Last Started 2013-05-01 14:15   Status RUNNING
COORDINATED          Coordinator                      MAXTHREADS 15
Checkpoint Lag       00:00:00 (updated 00:00:07 ago)
Process ID           11445
Log Read Checkpoint  File ./dirdat/withMaxTransOp/bg000001
                     2013-05-02 07:49:45.975662  RBA 44704

Lowest Log BSN value: (requires database login)

Active Threads:
 ID  Group Name PID   Status   Lag at Chkpt  Time Since Chkpt
```

```
1   RA001     11454 RUNNING  00:00:00      00:00:01
2   RA002     11455 RUNNING  00:00:00      00:00:04
3   RA003     11456 RUNNING  00:00:00      00:00:01
5   RA005     11457 RUNNING  00:00:00      00:00:02
6   RA006     11458 RUNNING  00:00:00      00:00:04
7   RA007     11459 RUNNING  00:00:00      00:00:04
Current directory    /scratch/vara/view_storage/vara_gg7/work/worklv/oggora1
Report file          /scratch/vara/view_storage/vara_gg7/work/worklv/oggora1/dirrpt/
RA.rpt
Parameter file       /net/slc03jgo/scratch/vara/view_storage/vara_gg7/work/worklv/
oggora1/dirprm/ra.prm
Checkpoint file      /scratch/vara/view_storage/vara_gg7/work/worklv/oggora1/dirchk/
RA.cpr
Checkpoint table     atstgt.checkPoint_ra
Process file         /scratch/vara/view_storage/vara_gg7/work/worklv/oggora1/dirpcs/
RA.pcr
Error log            /scratch/vara/view_storage/vara_gg7/work/worklv/oggora1/
ggserr.log
```

Example 6

The following shows `INFO EXTRACT` with `DETAIL` for a threadID of a coordinated Replicat.

```
GGSCI (sysa) 5> info ra002 detail

REPLICAT   RA002    Last Started 2013-05-01 14:15   Status RUNNING
COORDINATED          Replicat Thread                 Thread 2
Checkpoint Lag       00:00:00 (updated 00:00:02 ago)
Process ID           11455
Log Read Checkpoint  File ./dirdat/withMaxTransOp/bg000001
                     2013-05-01 14:13:37.000000  RBA 44704

Current Log BSN value: (requires database login)

  Extract Source                          Begin            End
             ./dirdat/withMaxTransOp/bg000001        2013-05-01 14:11  2013-05-01
14:13
  ./dirdat/withMaxTransOp/bg000001        2013-05-01 14:11  2013-05-01 14:11
  ./dirdat/withMaxTransOp/bg000001        * Initialized *   2013-05-01 14:11
  ./dirdat/withMaxTransOp/bg000000        * Initialized *   First Record
   Current directory    /scratch/vara/view_storage/vara_gg7/work/worklv/oggora1
Report file          /scratch/vara/view_storage/vara_gg7/work/worklv/oggora1/dirrpt/
RA002.rpt
Parameter file       /net/slc03jgo/scratch/vara/view_storage/vara_gg7/work/worklv/
oggora1/dirprm/ra.prm
Checkpoint file      /scratch/vara/view_storage/vara_gg7/work/worklv/oggora1/dirchk/
RA002.cpr
Checkpoint table     atstgt.checkPoint_ra
Process file         /scratch/vara/view_storage/vara_gg7/work/worklv/oggora1/dirpcs/
RA002.pcr
Error log            /scratch/vara/view_storage/vara_gg7/work/worklv/oggora1/
ggserr.log
```

1.26 KILL REPLICAT

Use `KILL REPLICAT` to kill a Replicat process. Killing a process leaves the most recent checkpoint in place, and the current transaction is rolled back by the database, guaranteeing that no data is lost when the process is restarted. The Manager process will not attempt to restart a killed Replicat process. Use this command only if Replicat cannot be stopped gracefully with the `STOP REPLICAT` command.

Syntax

```
KILL REPLICAT group_name
```

group_name
The name of a Replicat group or a wildcard (*) to specify multiple groups. For example, T* kills all Replicat processes whose group names begin with T.

Example

```
KILL REPLICAT finance
```

1.27 LAG REPLICAT

Use `LAG REPLICAT` to determine a true lag time between Replicat and the trail. `LAG REPLICAT` estimates the lag time more precisely than `INFO REPLICAT` because it communicates with Replicat directly rather than reading a checkpoint position.

For Replicat, lag is the difference, in seconds, between the time that the last record was processed by Replicat (based on the system clock) and the timestamp of the record in the trail.

If the heartbeat functionality is enable, you can view the associated lags. A `DBLOGIN` is required to view the heartbeat lag.

Syntax

```
LAG REPLICAT

[, group_name[threadID]name]
[, GLOBAL]
```

***group_name*[*threadID*]**
The name of:

- A Replicat group or a wildcard (*) to specify multiple groups. For example, T* shows lag for all Replicat groups whose names begin with T.
- A thread of a coordinated Replicat, identified by its full name. For example, `fin003` shows lag for thread 3 of coordinated Replicat `fin`.

GLOBAL
Displays the lags in the `GG_LAGS` view.

Examples

Example 1

```
LAG REPLICAT *
```

Example 2

```
LAG REPLICAT *fin*
```

1.28 REGISTER REPLICAT

Use the `REGISTER REPLICAT` command to register a Replicat group with a target Oracle database to support integrated Replicat mode. This command should not be necessary under normal Replicat conditions. The startup registers Replicat with the target database automatically. Use this command only if Oracle GoldenGate returns a message that an integrated Replicat is not registered with the database.

Before issuing this command, issue the `DBLOGIN` command as the Replicat database user with privileges granted through `dbms_goldengate_auth.grant_admin_privilege`.

For more information about integrated Replicat, see Installing and Configuring Oracle GoldenGate for Oracle Database.

Syntax

```
REGISTER REPLICAT group_name DATABASE
```

group_name
The name of a Replicat group or a wildcard (*) to specify multiple groups. For example, T* registers all Replicat groups whose names begin with T.

DATABASE
Required keyword to register with the target database. Creates a database inbound server and associates it with the specified Replicat group.

Example

```
REGISTER REPLICAT sales DATABASE
```

1.29 SEND REPLICAT

Use `SEND REPLICAT` to communicate with a starting or running Replicat process. The request is processed as soon as Replicat is ready to accept commands from users.

Syntax

```
SEND REPLICAT group_name[threadID],
{
CACHEMGR {CACHESTATS | CACHEQUEUES | CACHEPOOL n} |
FORCESTOP |
GETLAG |
GETPARAMINFO [parameter_name] [FILE output_file] |
HANDLECOLLISIONS | NOHANDLECOLLISIONS [table_spec] |
INTEGRATEDPARAMS(parameter_specification) |
REPORT [HANDLECOLLISIONS [table_spec]] |
RESUME |
STATUS |
STOP |
TRACE[2] [DDLINCLUDE | DDL[ONLY]] file_name |
TRACE[2] OFF |
TRACE OFF file_name |
TRACEINIT |
THREADS (threadID[, threadID][, ...][, thread_range[, thread_range][, ...])
}
```

***group_name*[*threadID*]**
The name of the Replicat group or the name of a specific thread of a coordinated Replicat, for example `fin003`. If the command is issued for a specific thread, then an option that is used applies only to that thread. As an alternative, you can issue `SEND REPLICAT` with the `THREADS` option instead of including *`threadID`* with the group name. If Replicat is not running, an error is returned.

CACHEMGR {CACHESTATS | CACHEQUEUES | CACHEPOOL *n*}
Returns statistics about the Oracle GoldenGate memory cache manager. CACHEMGR should only be used as explicitly directed by Oracle Support.

CACHESTATS
Returns statistics for virtual memory usage and file caching.

CACHEQUEUES
Returns statistics for the free queues only.

CACHEPOOL *n*
Returns statistics for the specified object pool only.

FORCESTOP
Forces Replicat to stop, bypassing any notifications. This command will roll back any active transaction and stop the process immediately. This command applies to Replicat as a whole and cannot be used for a specific Replicat thread.

GETLAG
Shows a true lag time between Replicat and the trail. Lag time is the difference, in seconds, between the time that the last record was processed by Replicat and the timestamp of the record in the trail. The results are the same as LAG REPLICAT.

GETPARAMINFO [*parameter_name*] [FILE *output_file*]
Use GETPARAMINFO to query runtime parameter values of a running instance, including Extract, Replicat, and Manager. You can query for a single parameter or all parameters and send the output to the console or a text file

parameter_name
The default behavior is to display all parameters in use, meaning those parameters that have ever been queried by the application, parameters, and their current values. If you specify a particular parameter, then the output is filtered by that name.

FILE *output_file*
The name of the text file that your output is redirected to.

HANDLECOLLISIONS | NOHANDLECOLLISIONS [*table_spec*]
Control HANDLECOLLISIONS behavior. Instead of using this option, you can specify the HANDLECOLLISIONS or NOHANDLECOLLISIONS parameter in the Replicat parameter file. See "HANDLECOLLISIONS | NOHANDLECOLLISIONS" for more information about HANDLECOLLISIONS. This command can be sent directly to an individual thread by means of SEND REPLICAT *group_name[threadID]* or you can use the THREADS option to send the command through the coordinator thread to affect multiple threads.

HANDLECOLLISIONS
Use HANDLECOLLISIONS to enable automatic error handling when performing initial data loads while the source database is active. Make certain to disable HANDLECOLLISIONS, either by issuing SEND REPLICAT with the NOHANDLECOLLISIONS option or by removing the parameter from the parameter file, after the initial load is complete and online data changes have been applied to the target tables.

Note:

The message returned by `SEND REPLICAT` with `HANDLECOLLISIONS`, when issued for a specific Replicat thread, shows that the command set `HANDLECOLLISIONS` for all `MAP` statements, not only the one handled by the specified thread. This is a known issue. The command actually affects only the `MAP` statement that includes the specified thread.

`NOHANDLECOLLISIONS`
Turns off the `HANDLECOLLISIONS` parameter but does not remove it from the parameter file. To avoid enabling `HANDLECOLLISIONS` the next time Replicat starts, remove it from the parameter file.

`table_spec`
`table_spec` restricts `HANDLECOLLISIONS` or `NOHANDLECOLLISIONS`to a specific target table or a group of target tables specified with a standard wildcard (*).

`INTEGRATEDPARAMS(`*`parameter_specification`*`)`
(Oracle) Supports an integrated Replicat. Sends a parameter specification to the database inbound server while Replicat is running in integrated mode. Only one parameter specification can be sent at a time with this command. To send multiple parameter changes, issue multiple `SEND REPLICAT` commands as in the following example.

```
SEND REPLICAT myrep INTEGRATEDPARAMS ( parallelism 4 )SEND REPLICAT myrep
INTEGRATEDPARAMS ( max_sga_size 250)
```

To preserve the continuity of processing, the parameter change is made at a transaction boundary. For a list of supported inbound server parameters, see *Installing and Configuring Oracle GoldenGate for Oracle Database*.

`REPORT [HANDLECOLLISIONS [`*`table_spec`*`]]`
Generates an interim statistical report to the Extract report file. The statistics that are displayed depend upon the configuration of the `STATOPTIONS` parameter when used with the `RESETREPORTSTATS` | `NORESETREPORTSTATS` option. See "STATOPTIONS".

`HANDLECOLLISIONS`
Shows tables for which `HANDLECOLLISIONS` has been enabled.

`table spec`
Restricts the output to a specific target table or a group of target tables specified with a standard wildcard (*).

`RESUME`
Resumes (makes active) a process that was suspended by an `EVENTACTIONS SUSPEND` event. The process resumes normal processing from the point at which it was suspended.

`STATUS`
Returns the current location within the trail and information regarding the current transaction. Fields output are:

- Processing status (per thread, if Replicat is coordinated)

- Position in the trail file (per thread, if Replicat is coordinated)
- Trail sequence number (per thread, if Replicat is coordinated)
- RBA in trail
- Trail name

Possible processing status messages are:

- `Delaying` – waiting for more data
- `Suspended` – waiting to be resumed
- `Waiting on deferred apply` – delaying processing based on the `DEFERAPPLYINTERVAL` parameter.
- `Processing data` – processing data
- `Skipping current transaction` – `START REPLICAT` with `SKIPTRANSACTION` was used.
- `Searching for START ATCSN` *`csn`* – `START REPLICAT` with `ATCSN` was used.
- `Searching for START AFTERCSN` *`csn`* – `START REPLICAT` with `AFTERCSN` was used.
- `Performing transaction timeout recovery` – Aborting current incomplete transaction and repositioning to start new one (see the TRANSACTIONTIMEOUT parameter).
- `Waiting for data at logical EOF after transaction timeout recovery` – Waiting to receive remainder of incomplete source transaction after a `TRANSACTIONTIMEOUT` termination.
- `At EOF (end of file)` – no more records to process

Possible thread status messages when `THREADS` is used or the command is issued for a specific thread are:

- `Waiting for consensus stop point`: This indicates that the threads are attempting to synchronize for a barrier transaction.
- `Waiting for Watermark`: Indicates that all threads are attempting to stop at the same transaction boundary in the trail, known as the global watermark.
- `Waiting on all threads to start up`: Indicates that the thread is waiting for all of the threads to start after a successful barrier transaction or a Replicat startup.

Possible coordinator thread status messages are:

- `Waiting for all threads to register`: Indicates that the `MAP` statements are all being parsed to determine the thread IDs that are specified in them.
- `Processing data`: Indicates that data is being processed normally.
- `Suspended, waiting to be resumed`: Indicates that a `SEND REPLICAT` command with a `SUSPEND` request was sent to Replicat.
- `At EOF`: Indicates that there is no more data in the trail to process.
- `Waiting to register MAP statistics`: Indicates that Replicat is collecting processing statistics to send to the report file.

`STOP`
Stops Replicat gracefully. This command applies to Replicat as a whole and cannot be used for a specific Replicat thread.

THREADS (*threadID*[, *threadID*][, ...][, *thread_range*[, *thread_range*][, ...])
Issues the command only for the specified thread or threads of a coordinated Replicat. You can use this option or you can use *groupname* with *threadID*. Without either of those options, the command applies to all active threads.

threadID[, threadID][, ...]
Specifies a thread ID or a comma-delimited list of threads in the format of `threadID, threadID, threadID`.

thread_range[, thread_range][, ...]
Specifies a range of threads in the form of `threadIDlow-threadIDhigh` or a comma-delimted list of ranges in the format of `threadIDlow-threadIDhigh`, `threadIDlow-threadIDhigh`.

A combination of these formats is permitted, such as threadID, threadID, `threadIDlow-threadIDhigh`.

TRACE[2] [DDLINCLUDE | DDL[ONLY]] *file_name*
Turns tracing on and off. Tracing captures information to the specified file to reveal processing bottlenecks. Tracing also can be enabled by means of the Replicat parameters `TRACE` and `TRACE2`.
If the Replicat is in coordinated mode and `TRACE` is used with a `THREADS` list or range, a trace file is created for each currently active thread. Each file name is appended with its associated thread ID. This method of identifying trace files by thread ID does not apply when `SEND REPLICAT` is issued by `groupname` with `threadID` (as in `SEND REPLICAT fin003 TRACE`...) or when only one thread is specified with `THREADS`.
Contact Oracle Support for assistance if the trace reveals significant processing bottlenecks.

TRACE
Captures step-by-step processing information.

TRACE2
Identifies code segments rather than specific steps.

DDLINCLUDE | DDLONLY
(Replicat only) Enables DDL tracing and specifies how DDL tracing is included in the trace report.

- `DDLINCLUDE` includes DDL tracing in addition to regular tracing of transactional data processing.
- `DDL[ONLY]` excludes the tracing of transactional data processing and only traces DDL. This option can be abbreviated to `DDL`.

file_name
file_name specifies the relative or fully qualified name of a file to which Oracle GoldenGate logs the trace information. If a trace is already in progress, the existing trace file is closed and the trace resumes to the file specified with *file_name*. For example:

```
SEND REPLICAT group_name TRACE file_name DDLINCLUDE
```

If no other options will follow the file name, the `FILE` keyword can be omitted, for example:

```
    SEND REPLICAT group_name TRACE DDLINCLUDE file_name
```

`TRACE[2] OFF`
Turns off tracing.

`TRACE OFF` *`file_name`*
Turns tracing off only for the specified trace file. This option supports the `EVENTACTIONS` feature, where there can be multiple trace files due to multiple `EVENTACTIONS` statements.

`TRACEINIT`
Resets tracing statistics back to 0 and then starts accumulating statistics again. Use this option to track the current behavior of processing, as opposed to historical.

Examples

Example 1

```
SEND REPLICAT finance, HANDLECOLLISIONS
```

Example 2

```
SEND REPLICAT finance, REPORT HANDLECOLLISIONS fin_*
```

Example 3

```
SEND REPLICAT finance, GETLAG
```

Example 4

```
SEND REPLICAT finance, INTEGRATEDPARAMS(parallelism 10)
```

Example 5

The following gets lag for thread 3 of a coordinated Replicat.

```
SEND REPLICAT fin003, GETLAG
```

Example 6

The following enables tracing for only thread 1 of a coordinated Replicat. In this case, because only one thread is being traced, the trace file will not have a *`threadID`* extension. The file name is `trace.trc`.

```
SEND REPLICAT fin, TRACE THREADS(1) FILE ./dirrpt/trace.trc
```

Example 7

The following enables tracing for threads 1,2, and 3 of a coordinated Replicat. Assuming all threads are active, the tracing produces files `trace001`, `trace002`, and `trace003`.

```
SEND REPLICAT fin TRACE THREADS(1-3) FILE ./dirrpt/trace.trc
```

Example 8

The following enables tracing only for thread 1 of a coordinated Replicat. Because the command was issued directly for thread 1 without the use of a `THREAD` clause, the trace file is named `trace` (without a thread ID suffix).

```
SEND REPLICAT fin001 TRACE FILE ./dirrpt/trace.trc
```

1.30 START REPLICAT

Use `START REPLICAT` to start Replicat. To confirm that Replicat has started, use the `INFO REPLICAT` or `STATUS REPLICAT` command.

When starting an integrated Replicat group for an Oracle target database, `START REPLICAT` automatically registers Replicat with the target database. See Installing and Configuring Oracle GoldenGate for Oracle Database for more information about integrated Replicat.

A coordinated Replicat can only be started as a whole. There is no option to start individual threads. If the prior shutdown of a coordinated Replicat was not clean, the threads may have stopped at different positions in the trail file. If this happens, `START REPLICAT` writes a warning if the parameter file was changed since the prior run and raises an error if the number of threads was changed. To resolve these problems and start Replicat again, see *Administering Oracle GoldenGate for Windows and UNIX*.

Normal Start Point

Replicat can be started at its normal start point (from initial or current checkpoints) or from an alternate, user-specified position in the trail.

`START REPLICAT`, without any options, causes Replicat to start processing at one of the following points to maintain data integrity:

- After graceful or abnormal termination: At the first unprocessed transaction in the trail from the previous run, as represented by the current read checkpoint.
- First-time startup after the group was created: From the beginning of the active trail file (`seqno 0`, `rba 0`).

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about checkpoints.

Alternate Start Point

The `SKIPTRANSACTION`, `ATCSN`, and `AFTERCSN` options of `START REPLICAT` cause Replicat as a whole, or specific threads of a coordinated Replicat, to begin processing at a transaction in the trail other than the normal start point. Use these options to:

- Specify a logical recovery position when an error prevents Replicat from moving forward in the trail. Replicat can be positioned to skip the offending transaction or transactions, with the understanding that the data will not be applied to the target.
- Skip replicated transactions that will cause duplicate-record and missing-record errors after a backup is applied to the target during an initial load. These options cause Replicat to discard transactions that occurred earlier than the most recent set of changes that were captured in the backup.You can map the value of the serial identifier that corresponds to the completion of the backup to a CSN value, and then start Replicat to begin applying transactions from the specified CSN onward.

Note:

Skipping a transaction, or starting at or after a CSN, might cause Replicat to start more slowly than normal, depending on how much data in the trail must be read before arriving at the appropriate transaction record. To view the startup progress, use the `SEND REPLICAT` command with the `STATUS` option. To omit the need for Replicat to read through transactions that ultimately will be skipped, you can use the `ATCSN` or `AFTERCSN` option when starting Extract and the data pumps, so that those transactions are omitted from the trail. See "START EXTRACT".

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about performing an initial load.

Syntax

```
START REPLICAT group_name
[SKIPTRANSACTION | {ATCSN csn | AFTERCSN csn}]
[FILTERDUPTRANSACTIONS | NOFILTERDUPTRANSACTIONS]
[THREADS (threadID[, threadID][, ...][, thread_range[, thread_range][, ...])
```

`group_name`
The name of a Replicat group or a wildcard (*) to specify multiple groups. For example, T* starts all Replicat groups whose names begin with T.

`SKIPTRANSACTION`
Causes Replicat to skip the first transaction after its expected startup position in the trail. All operations from that first transaction are excluded.
If the `MAXTRANSOPS` parameter is also being used for this Replicat, it is possible that the process will start to read the trail file from somewhere in the middle of a transaction. In that case, the remainder of the partial transaction is skipped, and Replicat resumes normal processing from the next begin-transaction record in the file. The skipped records are written to the discard file if the `DISCARDFILE` parameter is being used; otherwise, a message is written to the report file that is similar to:

```
User requested START SKIPTRANSACTION. The current transaction will be skipped.
Transaction ID txid, position Seqno seqno, RBA rba
```

`SKIPTRANSACTION` is valid only when the trail that Replicat is reading is part of an online change synchronization configuration (with checkpoints). Not valid for task-type initial loads (where `SPECIALRUN` is used with `ADD REPLICAT`).

`ATCSN` *`csn`* | `AFTERCSN` *`csn`*
Sets a user-defined start point at a specific CSN. When `ATCSN` or `AFTERCSN` is used, a message similar to one of the following is written to the report file:

```
User requested start at commit sequence number (CSN) csn-string
```

```
User requested start after commit sequence number (CSN) csn-string
```

General information about these options:

- Valid only when the trail that Replicat is reading is part of an online change synchronization configuration (with checkpoints). Not valid for task-type initial loads (where `SPECIALRUN` is used with `ADD REPLICAT`).
- To support starting at, or after, a CSN, the trail must be of Oracle GoldenGate version 10.0.0 or later, because the CSN is stored in the first trail record of each transaction. If Replicat is started with `AFTERCSN` against an earlier trail version, Replicat will abend and write an error to the report stating that the trail format is not supported.

`ATCSN`
Causes Replicat to start processing at the transaction that has the specified CSN. Any transactions in the trail that have CSN values that are less than the specified one are skipped.

`AFTERCSN`
Causes Replicat to start processing at the transaction that occurred after the one with the specified CSN. Any transactions in the trail that have CSN values that are less than, or equal to, the specified one are skipped.

`csn`
Specifies a CSN value. Enter the CSN value in the format that is valid for the database. See *Administering Oracle GoldenGate for Windows and UNIX* for CSN formats and descriptions. Replicat abends if the format is invalid and writes a message to the report file. To determine the CSN to supply after an initial load is complete, use the commit identifier at which the load utility completed the load. Otherwise, follow the instructions in the initial load procedure for determining when to start Replicat.

`FILTERDUPTRANSACTIONS | NOFILTERDUPTRANSACTIONS`
Causes Replicat to ignore transactions that it has already processed. Use when Extract was repositioned to a new start point (see the `ATCSN` or `AFTERCSN` option of "START EXTRACT") and you are confident that there are duplicate transactions in the trail that could cause Replicat to abend. This option requires the use of a checkpoint table. If the database is Oracle, this option is valid only for Replicat in nonintegrated mode. In case of Integrated mode and automatic target trail file regeneration, the Integrated mode handles the duplicate transactions transparently. The default is `FILTERDUPTRANSACTIONS`.

`THREADS (`*`threadID`*`[, `*`threadID`*`][, ...][, `*`thread_range`*`[, `*`thread_range`*`][, ...])`
Valid for `SKIPTRANSACTION`, `ATCSN`, and `AFTERCSN` when Replicat is in coordinated mode. Not valid for `START REPLICAT` without those options. Starts the specified Replicat thread or threads at the specified location.

***`threadID`*`[, `*`threadID`*`][, ...]`**
Specifies a thread ID or a comma-delimited list of threads in the format of `threadID, threadID, threadID`.

***`thread_range`*`[, `*`thread_range`*`][, ...]`**
Specifies a range of threads in the form of `threadIDlow-threadIDhigh` or a comma-delimted list of ranges in the format of `threadIDlow-threadIDhigh`, `threadIDlow-threadIDhigh`.

A combination of these formats is permitted, such as threadID, threadID, `threadIDlow-threadIDhigh`.

Examples

Example 1

```
START REPLICAT finance
```

Example 2
The following starts Replicat at an Oracle-specific CSN.

```
START REPLICAT finance, ATCSN 6488359
```

Example 3
The following starts Replicat at a SQL Server-specific CSN after the one with the specified CSN.

```
START REPLICAT finance, AFTERCSN 0X000004D2:0000162E:0009
```

Example 4
The following causes threads 4 and 5 of a coordinated Replicat to skip the first transaction after their last checkpoint when Replicat is started. If this were a 10-thread coordinated Replicat, threads 0-3 and 6-10 would all start at the normal start point, that of their last checkpoint.

```
START REPLICAT fin SKIPTRANSACTION THREADS(4-5)
```

Example 5
The following example causes threads 1-3 of a coordinated Replicat to start at CSN 6488359, threads 9-10 to start after CSN 6488360, and threads 7 and 8 to skip the first transaction after its last checkpoint.

```
START REPLICAT fin ATCSN 6488359 THREADS(1-3), AFTERCSN 6488360 THREADS(9-10),
SKIPTRANSACTION THREADS(7,8)
```

1.31 STATS REPLICAT

Use `STATS REPLICAT` to display statistics for one or more Replicat groups. Thread statistics for a coordinated Replicat group are provided as follows.

Thread Lag Gap
The difference between the maximum lag and the minimum lag among all threads.

Coordinated Total DDLs
The total number of coordinated DDL transactions.

Coordinated Total PK-Update Transactions
The total number of coordinated transactions that involved an update to a primary key.

Coordinated Total EMI Transactions
The total number of coordinated `EVENTACTIONS` events.

Total Transactions with User-requested Coordination
The total number of coordinations that were explicitly requested in the configuration by means of the `COORDINATED` option of the `MAP` parameter.

Average Coordination Time
The average time (in seconds) spent in coordination among all threads.

Syntax

```
STATS REPLICAT group_name
[, statistic]
[, TABLE [container. | catalog.]schema.table]
[, TOTALSONLY [container. | catalog.]schema.table]
[, REPORTCDR]
[, REPORTCHARCONV]
[, REPORTDETAIL | NOREPORTDETAIL]
[, REPORTRATE {HR | MIN | SEC}]
[, ... ]
```

group_name
The name of a Replicat group or a wildcard (*) to specify multiple groups. For example, T* shows statistics for all Replicat groups whose names begin with T.

statistic
The statistic to be displayed. More than one statistic can be specified by separating each with a comma, for example `STATS REPLICAT finance, TOTAL, DAILY`.
Valid values are:

> **TOTAL**
> Displays totals since process startup.
>
> **DAILY**
> Displays totals since the start of the current day.
>
> **HOURLY**
> Displays totals since the start of the current hour.
>
> **LATEST**
> Displays totals since the last `RESET` command.
>
> **RESET**
> Resets the counters in the `LATEST` statistical field.

TABLE [*container*. | *catalog*.]*schema*.*table*]
Displays statistics only for the specified table or a group of tables specified with a wildcard (*). The table name or wildcard specification must be fully qualified with the two-part or three-part name, for example `hr.emp` or `*.*.*`.

TOTALSONLY [*container*. | *catalog*.]*schema*.*table*]
Summarizes the statistics for the specified table or a group of tables specified with a wildcard (*). The table name or wildcard specification must be fully qualified with the two-part or three-part name, for example `hr.emp` or `*.*.*`.

REPORTCDR
Shows statistics for Conflict Detection and Resolution. Statistics include:

- Total CDR conflicts
- CDR resolutions succeeded
- CDR resolutions failed
- CDR `INSERTROWEXISTS` conflicts
- CDR `UPDATEROWEXISTS` conflicts

- CDR `UPDATEROWMISSING` conflicts
- CDR `DELETEROWEXISTS` conflicts
- CDR `DELETEROWMISSING` conflicts

`REPORTCHARCONV`
Reports statistics for character validation when character-set conversion is performed. The following statistics are added to the `STATS` output:
`Total column character set conversion failure`: the number of validation or conversion failures in the current Replicat run.
`Total column data truncation`: the number of times that column data was truncated in the current Replicat run as the result of character set conversion

`REPORTDETAIL | NOREPORTDETAIL`
Controls whether or not the output includes operations that were not replicated as the result of collision errors. These operations are reported in the regular statistics (inserts, updates, and deletes performed) plus as statistics in the detail display, if enabled. For example, if 10 records were insert operations and they were all ignored due to duplicate keys, the report would indicate that there were 10 inserts and also 10 discards due to collisions. The default is `REPORTDETAIL`. See also "STATOPTIONS".

`REPORTRATE {HR | MIN | SEC}`
Displays statistics in terms of processing rate rather than absolute values.

> **`HR`**
> Sets the processing rate in terms of hours.
>
> **`MIN`**
> Sets the processing rate in terms of minutes.
>
> **`SEC`**
> Sets the processing rate in terms of seconds.

Examples

Example 1
The following example displays total and hourly statistics per minute for a specific table, and it also resets the latest statistics. Statistics for discarded operations are not reported.

```
STATS REPLICAT finance, TOTAL, HOURLY, TABLE sales.acct,
REPORTRATE MIN, RESET, NOREPORTDETAIL
```

Example 2
The following example displays the same statistics as the previous example, but for thread 3 of a coordinated Replicat group.

```
STATS REPLICAT fin003, TOTAL, HOURLY, TABLE sales.acct,
REPORTRATE MIN, RESET, NOREPORTDETAIL
```

1.32 STATUS REPLICAT

Use `STATUS REPLICAT` to determine whether or not Replicat is running. There are the following four possible statuses:

Abended
The process abnormally ended.

Running
Means one of the following:

- **Active:** Running and processing (or able to process) data. This is the normal state of a process after it is started.
- **Suspended:** The process is running though suspended due to an `EVENTACTIONS SUSPEND` action. In a suspended state, the process is not active, and no data can be processed, but the state of the current run is preserved and can be continued by issuing the `RESUME` command in GGSCI. The RBA in the `INFO` command reflects the last checkpointed position before the suspend action. To determine whether the state is active or suspended, issue a `SEND EXTRACT|REPLICAT` *`group_name`* `STATUS` command. For more information, see SEND EXTRACT or SEND REPLICAT.

Starting
The process is starting.

Stopped
The process was stopped.

Syntax

```
STATUS REPLICAT group_name
[, TASKS]
[, ALLPROCESSES]
```

`group_name`
The name of a Replicat group or a wildcard (*) to specify multiple groups. For example, T* shows status for all Replicat groups whose names begin with T.

`TASKS`
Displays status only for Replicat tasks. By default, tasks are not displayed unless you specify a single Replicat group (without wildcards).

`ALLPROCESSES`
Displays status for all Replicat groups, including tasks.

Examples

Example 1

```
STATUS REPLICAT finance
```

Example 2

```
STATUS REPLICAT fin*
```

1.33 STOP REPLICAT

Use `STOP REPLICAT` to stop Replicat cleanly. This command preserves the state of synchronization for the next time Replicat starts, and it ensures that Manager does not automatically start Replicat.

In a clean shutdown of a coordinated Replicat, the coordinator thread attempts to stop all of the threads on the same transaction boundary. If the shutdown of a coordinated Replicat is not clean, the threads may stop at different positions in the trail file. If this happens, `START REPLICAT` writes a warning if the parameter file was changed since the prior run and raises an error if the number of threads was changed. To resolve these problems and start Replicat again, see *Administering Oracle GoldenGate for Windows and UNIX*.

Syntax

```
STOP REPLICAT group_name [!]
```

group_name
The name of a Replicat group or a wildcard (*) to specify multiple groups. For example, T* stops all Replicat groups whose names begin with T.

!
(Exclamation point) Stops Replicat immediately. The transaction is aborted and the process terminates.

Example

```
STOP REPLICAT finance
```

1.34 SYNCHRONIZE REPLICAT

Use `SYNCHRONIZE REPLICAT` to return all of the threads of a coordinated Replicat to the same position in the trail file after an unclean shutdown. This position is the maximum checkpoint position of all of the threads, in other words, the most recent trail record processed among all of the threads. When `SYNCHRONIZE REPLICAT` is issued, all threads are started and allowed to process transactions until they reach the maximum checkpoint position, and then Replicat stops.

For more information about how to use `SYNCHRONIZE REPLICAT` to recover a coordinated Replicat after an unclean shutdown, or to enable repartitioning of data among different threads, see *Administering Oracle GoldenGate for Windows and UNIX*.

Syntax

```
SYNCHRONIZE REPLICAT group_name
```

group_name
The name of a Replicat group or a wildcard (*) to specify multiple groups. For example, T* synchronizes the threads of all Replicat groups whose names begin with T. The threads synchronize to the same position within their group, not to the same position across all Replicat groups being synchronized with this command.

Example

```
SYNCHRONIZE REPLICAT repA
```

1.35 UNREGISTER REPLICAT

Use the `UNREGISTER REPLICAT` command to unregister a Replicat group from a target Oracle database to disable integrated Replicat mode. Use this command only if you forcibly deleted the Replicat group. `UNREGISTER REPLICAT` should not be used when deleting Replicat in the normal manner, where you first stop Replicat and then issue the `DELETE REPLICAT` command.

Before issuing this command, issue the `DBLOGIN` command as the Replicat database user with privileges granted through `dbms_goldengate_auth.grant_admin_privilege`.

For more information about integrated Replicat, see Installing and Configuring Oracle GoldenGate for Oracle Database.

Syntax

```
UNREGISTER REPLICAT group_name DATABASE
```

`group_name`
The name of a Replicat group or a wildcard (*) to specify multiple groups. For example, T* unregisters all Replicat groups whose names begin with T.

`DATABASE`
Required keyword to unregister from the target database. Removes the database inbound server that is associated with this Replicat.

Example

```
UNREGISTER REPLICAT sales DATABASE
```

1.36 ER

Use the ER commands to control multiple Extract and Replicat groups as a unit. Use them with wildcards to affect every Extract and Replicat group that satisfies the wildcard.

Syntax

```
COMMAND ER wildcard_specification
```

`COMMAND`
Can be any of the following:

```
INFO
KILL
LAG
SEND
START
STATS
STATUS
STOP
```

For descriptions and optional documentation. For a list of command categories, see "Summary of Oracle GoldenGate Commands".

`ER`
A required keyword indicating that the command affects both Extract (E) and Replicat (R).

`wildcard_specification`
The wildcard specification for the groups that you want to affect with the command. Oracle GoldenGate will automatically increase internal storage to track up to 100,000 wildcard entries.

Example

The following example starts and then stops the Extract and Replicat groups whose names contain the letter X.

```
START ER *X*
STOP ER *X*
```

1.37 CREATE WALLET

Use the `CREATE WALLET` command to create a *`master-key wallet`*. This wallet stores the master key that is used by Oracle GoldenGate processes to encrypt the encryption keys that secure data over the network and in trail files and other Oracle GoldenGate files that store sensitive data.

This command creates an empty wallet that remains open for the duration of the GGSCI session. The GGSCI console returns messages similar to the following, indicating that the wallet is present and open.

```
Created wallet at location './dirwlt'.
Opened wallet at location './dirwlt'.
```

The wallet is created as an *`autologin`* wallet (file extension `.sso`) to support automated restarts of Oracle GoldenGate processes without requiring human intervention to supply the necessary decryption passwords. The wallet file is created in the directory specified by the `GLOBALS` parameter `WALLETLOCATION`, if present, or otherwise in the default location of `dirwlt` in the Oracle GoldenGate installation directory.

The wallet is in a platform-independent format. It must either be stored on a shared file system that is accessible by all systems in the Oracle GoldenGate environment, or it must be copied to all of those systems initially and every time the master key changes.

The wallet is permanent within Oracle GoldenGate, but can be manually deleted with the appropriate command in the operating system, if that becomes necessary.

The use of a wallet and master key is not supported for the iSeries, z/OS, and NonStop platforms.

See "ADD MASTERKEY" to add a master key value to the wallet.

Syntax

```
CREATE WALLET
```

1.38 OPEN WALLET

Use the `OPEN WALLET` command to open a master-key wallet. Opening a wallet decrypts the contents and loads them into the GGSCI memory. This command must be used before using any of the commands that add, renew, or delete the master keys in the wallet.

The wallet remains open for the rest of the GGSCI session. The name of the wallet to be opened is taken from the `GLOBALS` parameter `WALLETLOCATION`, if present, or otherwise it is opened from the default location in the Oracle GoldenGate installation directory.

The use of a wallet and master key is not supported for the iSeries, z/OS, and NonStop platforms.

Syntax

```
OPEN WALLET
```

1.39 PURGE WALLET

Use the `PURGE WALLET` command to permanently remove master key versions from the master-key wallet. Only the versions that are marked for deletion by the `DELETE MASTERKEY` command are removed. The purge is not reversible.

Note:

For Oracle GoldenGate deployments using a shared wallet, the older versions of the master key should be retained after the master key is renewed until all processes are using the newest version. The time to wait depends on the topology, latency, and data load of the deployment. A minimum wait of 24 hours is a conservative estimate, but you may need to perform testing to determine how long it takes for all processes to start using a new key. To determine whether all of the processes are using the newest version, view the report file of each Extract immediately after renewing the master key to confirm the last SCN that was mined with the old key. Then, monitor the Replicat report files to verify that this SCN was applied by all Replicat groups. At this point, you can delete the older versions of the master key.

The `OPEN WALLET` command must be used before using this command or any of the commands that add, renew, or delete the master keys in the wallet.

After purging a wallet that is not maintained centrally on shared storage, the updated wallet can be copied to all of the other systems in the Oracle GoldenGate configuration that use this wallet, so that no purged keys remain in the configuration. Before doing so, Extract must be stopped and then all of the downstream Oracle GoldenGate processes must be allowed to finish processing their trails and then be stopped. After the wallet is copied into place, the processes can be started again. For detailed instructions, see *Administering Oracle GoldenGate for Windows and UNIX*.

The use of a wallet and master key is not supported for the iSeries, z/OS, and NonStop platforms.

Syntax

```
PURGE WALLET
```

1.40 ADD MASTERKEY

Use the `ADD MASTERKEY` command to add a master key to a master-key wallet. The master key is used by Extract and Replicat to encrypt the encryption keys that secure data being sent across the network and in the trail files, so that those keys can be sent to, and used, by downstream processes. The master key omits the need to use wallet storage for the keys that actually encrypt the data.

The master-key wallet must be open to add a key. Use the `CREATE WALLET` or `OPEN WALLET` command to open a wallet. The wallet remains open throughout the same GGSCI session in which the command was issued.

The master key is generated as a random sequence of bits. The length is 256 bits by default. The key name is `OGG_DEFAULT_MASTERKEY`.

The successful completion of this command returns a message similar to the following:

```
Masterkey 'OGG_DEFAULT_MASTERKEY' added to wallet at location './dirwlt'.
```

After adding a master key to a wallet that is not maintained centrally on shared storage, the updated wallet must be copied to all of the other systems in the Oracle GoldenGate configuration that use this wallet. Before doing so, Extract must be stopped and then all of the downstream Oracle GoldenGate processes must be allowed to finish processing their trails and then be stopped. After the wallet is copied into place, the processes can be started again. For detailed instructions, see *Administering Oracle GoldenGate for Windows and UNIX*.

The use of a wallet and master key is not supported for the iSeries, z/OS, and NonStop platforms.

Syntax

```
ADD MASTERKEY
```

Example

This example creates a new master key.

```
ADD MASTERKEY
```

1.41 INFO MASTERKEY

Use the `INFO MASTERKEY` command to view the contents of a currently open master-key wallet. The default output shows the version history of the master key, with the creation date of a version and the status of the version. The status can be one of the following:

- **Current**: Indicates this is the active version of the master key.
- **Available**: Indicates this version is not the current one but can be made active, if needed.
- **Deleted**: Indicates that this version is marked to be deleted when the `PURGE WALLET` command is issued.

The use of a wallet and master key is not supported for the iSeries, z/OS, and NonStop platforms.

Syntax

```
INFO MASTERKEY [VERSION version]
```

`VERSION` ***`version`***
Shows detailed information about a specific version of the master key. The output includes the original creation date, the latest renewal date, the status, and the hash of AES (Advanced Encryption Standard) Key.

Examples

Example 1
The following example shows the default input without any options.

```
INFO MASTERKEY

Masterkey Name:                OGG_DEFAULT_MASTERKEY
Creation Date:                 Mon Aug 27 10:00:40 2012
Version:        Creation Date:                 Status:
1               Mon Aug 27 10:00:40 2012       Deleted
2               Mon Aug 27 10:00:46 2012       Available
3               Mon Aug 27 10:02:58 2012       Deleted
4               Mon Aug 27 10:03:02 2012       Deleted5                Mon Aug 27
10:03:05 2012        Deleted
6               Mon Aug 27 10:03:09 2012       Available
7               Mon Aug 27 10:03:16 2012       Current
```

Example 2
The following example shows the results of `INFO MASTERKEY` with `VERSION`. The status of `Current` in the output shows that version 7 is the active version.

```
INFO MASTERKEY VERSION 7

Masterkey Name:                OGG_DEFAULT_MASTERKEY
Creation Date:                 Mon Aug 27 10:00:40 2012
Version:                       7
Renew Date:                    Mon Aug 27 10:03:16 2012
Status:                        Current
Key Hash (SHA1):               0xC65ADFA1CF42F9DB2CED3BC39A53F661CDED3304
```

1.42 RENEW MASTERKEY

Use the `RENEW MASTERKEY` command to create a new version of the master encryption key in the master-key wallet. The key name remains the same, but the bit ordering is different. All versions of a master key remain in the wallet until they are marked for deletion with the `DELETE MASTERKEY` command and then the wallet is purged with the `PURGE WALLET` command.

The `OPEN WALLET` command must be used before using this command or any of the commands that add or delete the master keys or purge the wallet.

A message similar to the following indicates that the command succeeded.

```
Masterkey 'OGG_DEFAULT_MASTERKEY' renewed to version 2 in wallet at location './
dirwlt'.
```

After renewing a master key in a wallet that is not maintained centrally on shared storage, the updated wallet must be copied to all of the other systems in the Oracle GoldenGate configuration that use this wallet. Before doing so, Extract must be stopped and then all of the downstream Oracle GoldenGate processes must be allowed to finish processing their trails and then be stopped. After the wallet is copied into place, the processes can be started again. For detailed instructions, see *Administering Oracle GoldenGate for Windows and UNIX*.

The use of a wallet and master key is not supported for the iSeries, z/OS, and NonStop platforms.

Syntax

```
RENEW MASTERKEY
```

Example

This example creates a new version of the master key.

```
RENEW MASTERKEY
```

1.43 DELETE MASTERKEY

Use the `DELETE MASTERKEY` command to mark a version of a master key for deletion. Routinely deleting older versions of a master key ensures that they cannot be used maliciously.

The `OPEN WALLET` command must be used before using this command or any of the commands that add or renew the master keys or purge the wallet.

To view the version of a master key, use the INFO MASTERKEY command.

This command marks a version for deletion but does not physically remove it from the wallet. See "PURGE WALLET" to remove the master key version permanently.

> **Note:**
>
> For Oracle GoldenGate deployments using a shared wallet, the older versions of the master key should be retained after the master key is renewed until all processes are using the newest version. The time to wait depends on the topology, latency, and data load of the deployment. A minimum wait of 24 hours is a conservative estimate, but you may need to perform testing to determine how long it takes for all processes to start using a new key. To determine whether all of the processes are using the newest version, view the report file of each Extract immediately after renewing the master key to confirm the last SCN that was mined with the old key. Then, monitor the Replicat report files to verify that this SCN was applied by all Replicat groups. At this point, you can delete the older versions of the master key.

See "UNDELETE MASTERKEY" to reverse a deletion made by `DELETE MASTERKEY`.

Once a version number is used, the wallet reserves it forever, and no other key of the same version can be generated. For example, you cannot mark version 2 of a key for deletion, then purge the wallet to remove it, and then issue `RENEW MASTERKEY` to add a version 2 again. Even though only version 1 of the key remains in the wallet after the purge, the renewal generates version 3, not version 2.

The use of a wallet and master key is not supported for the iSeries, z/OS, and NonStop platforms.

Syntax

```
DELETE MASTERKEY
{VERSION version | RANGE FROM begin_value TO end_value | ALL}
```

`VERSION` ***`version`***
Specifies a single version to be marked for deletion.

`RANGE FROM` ***`begin_value`*** **`TO`** ***`end_value`***
Specifies a range of versions to be marked for deletion. The versions must be contiguous. For example, specifying `RANGE FROM 3 TO 6` marks versions 3, 4, 5, and 6.

`ALL`
Marks all versions of the master key for deletion, including the currently active one. When this option is used, it should always be followed by a `RENEW MASTERKEY` command to create a new, current version of the master key.

Examples

Example 1

This command marks one version of the master key for deletion and returns a message similar to the one shown.

```
DELETE MASTERKEY VERSION 10
Version 10 of Masterkey 'OGG_DEFAULT_MASTERKEY' deleted from wallet at location './
dirwlt'.
```

Example 2

This command marks versions 3, 4, 5, and 6 for deletion and returns a message similar to the one shown.

```
DELETE MASTERKEY RANGE FROM 3 TO 6

Version 3 of Masterkey 'OGG_DEFAULT_MASTERKEY' deleted from wallet at location './
dirwlt'.
Version 4 of Masterkey 'OGG_DEFAULT_MASTERKEY' deleted from wallet at location './
dirwlt'.
Version 5 of Masterkey 'OGG_DEFAULT_MASTERKEY' deleted from wallet at location './
dirwlt'.
Version 6 of Masterkey 'OGG_DEFAULT_MASTERKEY' deleted from wallet at location './
dirwlt'.
```

1.44 UNDELETE MASTERKEY

Use the `UNDELETE MASTERKEY` command to remove the deletion mark from a master key version, thus retaining that version if the `PURGE WALLET` command is used. Only one version can be unmarked per `UNDELETE MASTERKEY` command. See "DELETE MASTERKEY" to mark a version of a master key for deletion.

The `OPEN WALLET` command must be used before using this command or any of the commands that add, renew, or delete the master keys in the wallet.

The use of a wallet and master key is not supported for the iSeries, z/OS, and NonStop platforms.

Syntax

```
UNDELETE MASTERKEY VERSION version
```

`VERSION` ***`version`***
The version that is to be unmarked for deletion.

Example

This command unmarks version 3 of the master key and returns a message similar to the one shown.

```
UNDELETE MASTERKEY VERSION 3
Version 3 of Masterkey 'OGG_DEFAULT_MASTERKEY' undeleted from wallet at location './
dirwlt'.
```

1.45 ADD CREDENTIALSTORE

Use the `ADD CREDENTIALSTORE` command to create a credential store. The credential store manages user IDs and their encrypted passwords (together known as *`credentials`*) that are used by Oracle GoldenGate processes to interact with the local database. The credential store eliminates the need to specify user names and clear-text passwords in the Oracle GoldenGate parameter files. An optional alias can be used in the parameter file instead of the user ID to map to a userid-password pair in the credential store.

The credential store is implemented as an autologin wallet within the Oracle Credential Store Framework (CSF). The use of an LDAP directory is not supported for the Oracle GoldenGate credential store. The autologin wallet supports automated restarts of Oracle GoldenGate processes without requiring human intervention to supply the necessary passwords.

`ADD CREDENTIALSTORE` creates an empty credentials store in the location that is specified with the `CREDENTIALSTORELOCATION` parameter in the `GLOBALS` file, if used, or otherwise in the default location of `dircrd` in the Oracle GoldenGate installation directory. A credential store can be shared by multiple instances (installations) of Oracle GoldenGate on the same or different systems. Store a shared credential store in a shared file system, and specify this location in each Oracle GoldenGate instance by using the `CREDENTIALSTORELOCATION` parameter in each `GLOBALS` parameter file.

Only one credential store can be used at a time by any given instance of Oracle GoldenGate. For example, you can have a credential store named `/home/ogg/credentials` and a credential store named `/test/ogg/credentials`, but only one can be used at runtime by a given instance of Oracle GoldenGate. You can stop the processes to switch to a different credential store, but make certain to update the `CREDENTIALSTORELOCATION` parameter in each `GLOBALS` parameter file, and change the `USERIDALIAS` parameters to specify different aliases if needed.

SeeALTER CREDENTIALSTORE to add credentials to the credentials store.

The use of a credential store is not supported for the iSeries, z/OS, and NonStop platforms.

For more information about Oracle GoldenGate security options, see *Administering Oracle GoldenGate for Windows and UNIX*.

Syntax

```
ADD CREDENTIALSTORE
```

1.46 ALTER CREDENTIALSTORE

Use the `ALTER CREDENTIALSTORE` command to manage user ID and password pairs in the credential store. This command enables you to add credentials to the credential store and to specify different aliases for a user. Upon successful completion, the command returns a message similar to the following:

```
Credential store altered.
```

The use of a credential store is not supported for the DBE for i, DB2 z/OS, and NonStop platforms.

For more information about Oracle GoldenGate security options, see *Administering Oracle GoldenGate for Windows and UNIX*.

Syntax

```
ALTER CREDENTIALSTORE {
  ADD USER userid |
  REPLACE USER userid |
  DELETE USER userid }
[PASSWORD password]
[ALIAS alias]
[DOMAIN domain]
```

`ADD USER` ***`userid`***
Adds the specified user and its alias to the credential store. If the `ALIAS` option is not used, the alias defaults to the user name. A credential can only be entered once unless the `ALIAS` option is used to specify a different alias for each one. Unless the `PASSWORD` option is used, the command prompts for the password of the specified user. The user can be an actual user name or a SQL*Net connect string.

`REPLACE USER` ***`userid`***
Changes the password of the specified user. If the `ALIAS` option is not used, the alias defaults to the user name. You cannot change the alias or domain of a user with this option, but you can use the `ADD USER` option to add a new entry for the user under the desired `ALIAS` or `DOMAIN`. Unless the `PASSWORD` option is used, the command prompts for the new password for the specified user.

`DELETE USER` ***`userid`***
Removes the credential for the specified user from the credential store. If the `ALIAS` option is not used, the alias defaults to the user name.

`PASSWORD` ***`password`***
The user's password. The password is echoed (not obfuscated) when this option is used. If this option is omitted, the command prompts for the password, which is obfuscated as it is typed (recommended as more secure).

```
ALTER CREDENTIALSTORE ADD USER scott
Password: ********
```

`ALIAS` ***`alias`***
Specifies an alias for the user name. Use this option if you do not want the user name to be in a parameter file or command. If `ALIAS` is not used, the alias defaults to the `USER` name, which then must be used in parameter files and commands where a login

is required. You can create multiple entries for a user, each with a different alias, by using the `ADD USER` option with `ALIAS`.

`DOMAIN domain`
Saves the credential user under the specified domain name. Enables the same alias to be used by multiple Oracle GoldenGate installations that use the same credential store. The default domain is `Oracle GoldenGate`. For example, the administrators of system 1 might not want system 2 to have access to the same credentials that are used on system 1. Those credentials can be stored as `ALIAS extract`, for example, under `DOMAIN system1`, while a different set of credentials can be stored for `ALIAS extract` under `DOMAIN system2`. See ADD CREDENTIALSTORE for information about how to use a shared credential store.

Examples

Example 1

This example adds a user named `scott` but omits the `PASSWORD` specification, so the command prompts for Scott's password.

```
ALTER CREDENTIALSTORE ADD USER scott
Password: ********
```

Example 2

This example adds the user `scott` with his password `tiger` and specifies an alias for `scott` that is named `scsm2`.

```
ALTER CREDENTIALSTORE ADD USER scott PASSWORD tiger ALIAS scsm2
```

Example 3

This example adds the user `scott` under the domain of `support`.

```
ALTER CREDENTIALSTORE ADD USER scott ALIAS scsm3 DOMAIN support
Password: ********
```

Example 4

This example issues two `ALTER CREDENTIALSTORE` commands, each of which adds a `scott` entry, but with a different alias.

```
ALTER CREDENTIALSTORE ADD USER scott ALIAS scsm2
Password: ********
ALTER CREDENTIALSTORE ADD USER scott ALIAS scsm3
Password: ********
```

Example 5

The following shows how the `DELETE USER` option works with and without the `ALIAS` option.
The following command deletes the `user1` entry for which the `ALIAS` is the same as the user name.

```
ALTER CREDENTIALSTORE DELETE USER user1
Alias: user1
Userid: user1
```

The following command deletes the entry for user `user1` that is associated with the alias `alias1`.

```
ALTER CREDENTIALSTORE DELETE USER user1 ALIAS alias1
Alias: alias1
Userid: user1
```

Example 6
This example uses a SQL*Net connect string as the user value. In this case, the `PASSWORD` option is omitted. The person issuing the command will be prompted for the password, which is obfuscated.

```
ALTER CREDENTIALSTORE ADD USER oggext1@ora1 ALIAS ora1
```

1.47 INFO CREDENTIALSTORE

Use the `INFO CREDENTIALSTORE` command to get information about an Oracle GoldenGate credential store. This information includes the aliases that a credential store contains and the user IDs that correspond to them. The encrypted passwords in the credential store are not returned.

The credential store location is identified by the `CREDENTIALSTORELOCATION` parameter in the `GLOBALS` file, if one exists, or otherwise by the default location of `dircrd` in the Oracle GoldenGate installation directory.

The use of a credential store is not supported for the iSeries, z/OS, and NonStop platforms.

For more information about Oracle GoldenGate security options, see *Administering Oracle GoldenGate for Windows and UNIX*.

Syntax

```
INFO CREDENTIALSTORE [DOMAIN domain]
```

`DOMAIN` ***`domain`***
Returns the aliases and user IDs for a specific domain. For security purposes, if the `DOMAIN` option is omitted, only the aliases and user IDs under the default domain of `OracleGoldenGate` are shown. It is not possible to see `DOMAIN` credentials unless the person issuing the `INFO CREDENTIALSTORE` command knows the name of the domain. See "ALTER CREDENTIALSTORE" for more information about domains.

Examples

Example 1
The following example shows the default output of `INFO CREDENTIALSTORE`.

```
INFO CREDENTIALSTORE
Domain: OracleGoldenGate
  Alias: support1
  Userid: scott
  Alias: sales1
  Userid: scott
```

Example 2
The following example shows the output when `DOMAIN` is used.

```
INFO CREDENTIALSTORE DOMAIN support
Domain: Support
  Alias: support1
  Userid: scott
```

1.48 DELETE CREDENTIALSTORE

Use the `DELETE CREDENTIALSTORE` command to remove a credential store from the system. The credential store wallet and its contents are permanently deleted.

The use of a credential store is not supported for the iSeries, z/OS, and NonStop platforms.

For more information about Oracle GoldenGate security options, see *Administering Oracle GoldenGate for Windows and UNIX*.

Syntax

```
DELETE CREDENTIALSTORE
```

1.49 ADD EXTTRAIL

Use `ADD EXTTRAIL` to create a trail for online processing on the local system and:

- Associate it with an Extract group.
- Assign a maximum file size.

Syntax

```
ADD EXTTRAIL trail_name, EXTRACT group_name
[, MEGABYTES n]
[SEQNO n]
```

`trail_name`
The relative or fully qualified path name of the trail. The trail name can contain only two characters. Oracle GoldenGate appends this name with a nine-digit sequence number whenever a new file is created. For example, a trail named `dirdat/tr` would have files named `dirdat/tr000000001`, `dirdat/tr000000002`, and so forth.

`group_name`
The name of the Extract group to which the trail is bound. Only one Extract process can write data to a trail.

`MEGABYTES` ***`n`***
The maximum size, in megabytes, of a file in the trail. The default is 500.

`SEQNO` ***`n`***
Specifies that the first file in the trail will start with the specified trail sequence number. Do not include any zero padding. For example, to start at sequence 3 of a trail named `tr`, specify `SEQNO 3`. The actual file would be named `/ggs/dirdat/tr000003`. This option can be used during troubleshooting when Replicat needs to be repositioned to a certain trail sequence number. It eliminates the need to alter Replicat to read the required sequence number.

Examples

Example 1

```
ADD EXTTRAIL dirdat\aa, EXTRACT finance, MEGABYTES 200
```

Example 2

```
ADD EXTTRAIL /ggs/dirdat/tr000000003
```

1.50 ADD RMTTRAIL

Use `ADD RMTTRAIL` to create a trail for online processing on a remote system and:

- Assign a maximum file size.
- Associate the trail with an Extract group.

In the parameter file, specify a `RMTHOST` entry before any `RMTTRAIL` entries to identify the remote system and TCP/IP port for the Manager process.

> **Note:**
>
> The `RMTTRAIL` size (Target Trail) must be greater than or equal to (<=) the `EXTTRAIL` size (Source Trail), due to trail encryption requirements.

Syntax

```
ADD RMTTRAIL trail_name, EXTRACT group_name
[, MEGABYTES n]
[, SEQNO n]
```

`trail_name`
The relative or fully qualified path name of the trail. The actual trail name can contain only two characters. Oracle GoldenGate appends this name with a nine-digit sequence number whenever a new file is created. For example, a trail named ./`dirdat/tr` would have files named ./`dirdat/tr000000001`, ./`dirdat/tr000000002`, and so forth.

`group_name`
The name of the Extract group to which the trail is bound. Only one primary Extract process can write data to a remote trail.

`MEGABYTES` ***`n`***
The maximum size, in megabytes, of a file in the trail. The default is 500.

`SEQNO` ***`n`***
Specifies that the first file in the trail will start with the specified trail sequence number. Do not include any zero padding. For example, to start at sequence 3 of a trail named `tr`, specify `SEQNO 3`. The actual file would be named `/ggs/dirdat/tr000000003`. This option can be used during troubleshooting when Replicat needs to be repositioned to a certain trail sequence number. It eliminates the need to alter Replicat to read the required sequence number.

Example

Example 1

```
ADD RMTTRAIL dirdat\aa, EXTRACT finance, MEGABYTES 200
```

Example 2

```
ADD RMTTRAIL /ggs/dirdat/tr000003
```

1.51 ALTER EXTTRAIL

Use `ALTER EXTTRAIL` to change the attributes of a trail that was created with the `ADD EXTTRAIL` command (a trail on the local system). The change takes effect the next time that Extract starts.

Before using this command, stop the Extract using the `STOP EXTRACT` *`group_name`* command.

Syntax

```
ALTER EXTTRAIL trail_name, EXTRACT group_name
[, MEGABYTES n]
```

`trail_name`
The relative or fully qualified path name of the trail. For example, `dirdat\aa`.

`group_name`
The name of the Extract group to which the trail is bound.

`MEGABYTES` ***`n`***
The maximum size of a file, in megabytes. The default is 500. After using this option, issue the `SEND EXTRACT` command with the `ROLLOVER` option to close the current trail file and open a new one.

Example

```
ALTER EXTTRAIL dirdat\aa, EXTRACT finance,  MEGABYTES 200
```

1.52 ALTER RMTTRAIL

Use `ALTER RMTTRAIL` to change the attributes of a trail that was created with the `ADD RMTTRAIL` command (a trail on a remote system). The change takes effect the next time that Extract starts.

Syntax

```
ALTER RMTTRAIL trail_name, EXTRACT group_name
[, MEGABYTES n]
```

`trail_name`
The relative or fully qualified path name of the trail. For example, `dirdat\aa.`

`group_name`
The name of the Extract group to which the trail is bound.

`MEGABYTES` ***`n`***
The maximum size of a file, in megabytes. The default is 500. After using this option, issue the `SEND EXTRACT` command with the `ROLLOVER` option to close the current trail file and open a new one.

Example

```
ALTER RMTTRAIL dirdat\aa, EXTRACT finance,  MEGABYTES 200
```

1.53 DELETE EXTTRAIL

Use `DELETE EXTTRAIL` to delete the record of checkpoints associated with a trail on a local system. Checkpoints are maintained in a file bearing the same name as the group in the `dirchk` sub-directory of the Oracle GoldenGate directory.

This command only deletes references to the specified trail from the checkpoint file. It does not delete the trail files themselves. To delete the trail files, use standard operating system commands for removing files.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about checkpoints.

Syntax

```
DELETE EXTTRAIL trail_name
```

`trail_name`
The relative or fully qualified path name of the trail, including the two-character trail prefix.

Example

```
DELETE EXTTRAIL dirdat/et
```

1.54 DELETE RMTTRAIL

Use `DELETE RMTTRAIL` to delete the record of checkpoints associated with a trail on a remote system. Checkpoints are maintained in a file bearing the same name as the group in the `dirchk` sub-directory of the Oracle GoldenGate directory.

This command only deletes references to the specified trail from the checkpoint file. It does not delete the trail files themselves. To delete the trail files, use standard operating system commands for removing files.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about checkpoints.

Syntax

```
DELETE RMTTRAIL trail_name[,EXTRACT group_name}
```

`trail_name`
The relative or fully qualified path name of the trail, including the two-character trail prefix.

`group_name`
The name of the Extract group to which the trail is bound. If not specified, `DELETE RMTTRAIL` deletes the trail reference from all Extract groups that write to the specified trail.

Example

```
DELETE RMTTRAIL dirdat/et
```

1.55 INFO EXTTRAIL

Use `INFO EXTTRAIL` to retrieve configuration information for a local trail. It shows the name of the trail, the Extract that writes to it, the position of the last data processed, and the assigned maximum file size.

Syntax

```
INFO EXTTRAIL trail_name
```

`trail_name`
The relative or fully qualified path name of the trail or a wildcard designating multiple trails.

Examples

Example 1

```
INFO EXTTRAIL dirdat\aa
```

Example 2

```
INFO EXTTRAIL *
```

Example 3
The following is sample output of `INFO EXTTRAIL`.

```
Extract Trail: c:\gg_81\dirdat\md
      Extract: GGSEXT8
        Seqno: 2
          RBA: 51080
    File Size: 100M
```

1.56 INFO RMTTRAIL

Use `INFO RMTTRAIL` to retrieve configuration information for a remote trail. It shows the name of the trail, the Extract that writes to it, the position of the last data processed, and the assigned maximum file size.

Syntax

```
INFO RMTTRAIL trail_name
```

`trail_name`
The relative or fully qualified path name of the trail or a wildcard designating multiple trails.

Examples

Example 1

```
INFO RMTTRAIL dirdat\aa
```

Example 2

```
INFO RMTTRAIL *
```

Example 3
The following is a sample of `INFO RMTTRAIL` output.

```
Extract Trail: /ogg/dirdat/aa
       Seqno Length: 9
  Flip Seqno Length: no
      Extract: OGGPMP
        Seqno: 4
          RBA: 78066
    File Size: 500M
```

1.57 VIEW PARAMS

Use `VIEW PARAMS` to view the contents of a parameter file.

> **Caution:**
>
> Do not use this command to view a parameter file that is in a character set other than that of the local operating system (such as one where the `CHARSET` option was used to specify a different character set). The contents may become corrupted. View the parameter file from outside GGSCI.

Syntax

```
VIEW PARAMS {MGR | group_name | file_name}
```

`MGR`
Shows the Manager parameter file.

`group_name`
Shows the parameter file for the specified Extract or Replicat group.

`file_name`
Shows the specified file. By default, the subdirectory `dirprm` is used if no path is specified. If the parameter file resides in a directory other than `dirprm`, specify the full path name.

Examples

Example 1

```
VIEW PARAMS finance
```

Example 2

```
VIEW PARAMS c:\lpparms\replp.prm
```

1.58 EDIT PARAMS

Use `EDIT PARAMS` to create or change a parameter file. By default, this command launches Notepad on Windows systems or the vi editor on UNIX systems. You can change the editor with the `SET EDITOR` command.

> **Caution:**
>
> Do not use this command to view or edit an existing parameter file that is in a character set other than that of the local operating system (such as one where the `CHARSET` option was used to specify a different character set). The contents may become corrupted. View the parameter file from outside GGSCI.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about how to work with parameter files.

Syntax

```
EDIT PARAMS {MGR | group_name | file_name}
```

`MGR`
Opens a parameter file for the Manager process.

`group_name`
Opens a parameter file for the specified Extract or Replicat group.

`file_name`
Opens the specified file. When you create a parameter file with `EDIT PARAMS` in GGSCI, it is saved to the `dirprm` sub-directory of the Oracle GoldenGate directory. You can create a parameter file in a directory other than `dirprm` by specifying the full path name, but you must also specify the full path name with the `PARAMS` option of the `ADD EXTRACT` or `ADD REPLICAT` command when you create the process group.

Examples

Example 1

```
EDIT PARAMS finance
```

Example 2

```
EDIT PARAMS c:\lpparms\replp.prm
```

1.59 SET EDITOR

Use `SET EDITOR` to change the default text editor for the current session of GGSCI. The default editors are Notepad for Windows and vi for UNIX. GGSCI input, including to create parameter files, takes the character set of the local operating system.

Syntax

```
SET EDITOR program_name
```

program_name
Any text editor.

Example

The following example changes the default editor to Wordpad.

```
SET EDITOR wordpad
```

1.60 INFO PARAM

Use `INFO PARAM` to retrieve the parameter definition information. If a name matches multiple records, they are all displayed. If the query parameter has child options, they are not displayed in the output though their names are listed in the Options tab. To display the full record of an option, the full name in the form of *`parameter.option`* should be queried separately.

This parameter infrastructure allows unlimited levels of options. Thus, a full name of a parameter or option might have numbers of segments, such as A.B.C.D.

Syntax

```
INFO PARAM name
```

name
The name of a parameter, an option, or a full name that is part of the several names concatenated together using dot ('.') as the delimiter. These sample names are valid:

- `STREAMING`
- `RMTHOST.STREAMING`
- `RMTHOST`
- `RMTHOSTOPTIONS.STREAMING`
- `TRANLOGOPTIONS.INTEGRATEDPARAM.EAGER_SIZE`

The matching with this set of sample names is that `STREAMING` matches as an option of both `RMTHOST` and `RMTHOSTOPTIONS`.

Example

```
INFO PARAM RMTHOST
```

1.61 GETPARAMINFO

Use `GETPARAMINFO` to query runtime parameter values of a running instance, including Extract, Replicat, and Manager. You can query for a single parameter or all parameters and send the output to the console or a text file.

Syntax

```
SEND MGR | group GETPARAMINFO [parameter_name] [FILE output_file]
```

group
The name of the Extract or Replicat instance or `MGR`.

`parameter_name`
The default behavior is to display all parameters in use, meaning those parameters that have ever been queried by the application, parameters, and their current values. If you specify a particular parameter, then the output is filtered by that name.

`FILE` ***`output_file`***
The name of the text file that your output is redirected to.

Examples

Example 1

This example displays one parameter.

```
SEND MGR GETPARAMINFO PORT
```

Example 2

This example displays all parameters loaded from parameter file into Replicat `rep1` and those parameters that the `rep1` has accessed.

```
SEND REPL GETPARAMINFO
```

Example 3

The following example redirects the output to a file.

```
SEND MGR GETPARAMINFO FILE mgrfile.out
```

1.62 DBLOGIN

Use `DBLOGIN` to establish a database connection through GGSCI in preparation to issue other Oracle GoldenGate commands that affect the database. The user who issues `DBLOGIN` should have the appropriate database privileges to perform the functions that are enacted by those commands. Any other special privileges that are required for a GGSCI command are listed with the reference documentation for that command.

Requirements When Configuring Extract or Replicat in Integrated Mode (Oracle)

If using `DBLOGIN` to issue `ADD EXTRACT`, `ALTER EXTRACT`, or `REGISTER EXTRACT` to initiate integrated capture or `ADD REPLICAT`, `ALTER REPLICAT`, or `REGISTER REPLICAT` to initiate integrated Replicat against an Oracle database, the user who issues `DBLOGIN` must:

- Have privileges granted through the Oracle `dbms_goldengate_auth.grant_admin_privilege` procedure.
- Not be changed while Extract or Replicat is in integrated mode.

Special Database Privileges to Use Log Retention in Classic Capture Mode

When in classic capture mode for an Oracle database, Extract supports the log-retention feature, whereby the database retains the logs that Extract needs. (See Installing and Configuring Oracle GoldenGate for Oracle Database for more information about classic capture.) To enable the log-retention feature, `DBLOGIN` must be issued with special privileges before using `REGISTER EXTRACT` with the `LOGRETENTION` option. For simplicity, you can log in as the Extract database user if the correct privileges were granted to that user when Oracle GoldenGate was installed. Otherwise, log in as a user with the privileges shown in Table 1-17.

Table 1-17 Oracle Privileges for Log Retention

Oracle EE version	How to Grant Privileges
11.1 and 11.2.0.1	1. Run package to grant Oracle GoldenGate admin privilege. `exec dbms_streams_auth.grant_admin_privilege('user')` 2. Grant the '`become user`' privilege. `grant become user to user;`
11.2.0.2 and later	Run package to grant Oracle GoldenGate admin privilege. `exec dbms_goldengate_auth.grant_admin_privilege('user')`

Syntax

```
DBLOGIN {
[SOURCEDB data_source] |
[, database@host:port] |
USERID {/ | userid}[, PASSWORD password]
   [algorithm ENCRYPTKEY {keyname | DEFAULT}] |
USERIDALIAS alias [DOMAIN domain] |
[SYSDBA | SQLID sqlid]
[SESSIONCHARSET character_set]
}
```

`SOURCEDB` ***`data_source`***
`SOURCEDB` specifies a data source name. This option is required to identify one of the following:

- The source or target login database for Sybase, MySQL, and databases that use ODBC
- The source or target SQL/MX catalog

`database@host:port`
(MySQL) Specifies a connection string that contains the database name, host name, and database port number. Can be used to specify a port other than the default that is specified in the database configuration.

`USERID`
Supplies a database login credential, if required. Can be used if an Oracle GoldenGate credential store is not in use. (See the `USERIDALIAS` option.) Input varies, depending on the database, as follows:

> ***`userid`***
> Specifies the name of a database user or a schema, depending on the database configuration. For Oracle, a SQL*Net connect string can be used. To log into a pluggable database in an Oracle multitenant container database, specify *`userid`* as a connect string, such as `OGGUSER@FINANCE`. To log into the root container, specify *`userid`* as a common user, including the C## prefix, such as `C##GGADMIN@FINANCE`.

`/`
(Oracle) Directs Oracle GoldenGate to use an operating-system login for Oracle, not a database user login. Use this argument only if the database allows authentication at the operating-system level. To use this option, the correct user name must exist in the database, in relation to the value of the Oracle `OS_AUTHENT_PREFIX` initialization parameter. For more information, see the USERID | NOUSERID parameter.

`PASSWORD` ***`password`***
Use when authentication is required to specify the password for the database user. If the password was encrypted by means of the `ENCRYPT PASSWORD` command, supply the encrypted password; otherwise, supply the clear-text password. If the password is case-sensitive, type it that way.
If the `PASSWORD` clause is omitted, you are prompted for a password, and the password is not echoed.

`algorithm`
If the password was encrypted with the `ENCRYPT PASSWORD` command, specify the encryption algorithm that was used:
`AES128`
`AES192`
`AES256`
`BLOWFISH`

`ENCRYPTKEY {`*`keyname`*` | DEFAULT}`
Specifies the encryption key that was specified with `the ENCRYPT PASSWORD command`. Use one of the following:

`ENCRYPTKEY` ***`keyname`***
Specifies the logical name of a user-created encryption key in the `ENCKEYS` lookup file. Use if `ENCRYPT PASSWORD` was used with the `KEYNAME` *`keyname`* option.

`ENCRYPTKEY DEFAULT`
Directs Oracle GoldenGate to generate a Blowfish key. Use if the `ENCRYPT PASSWORD` command was used with the `KEYNAME DEFAULT` option.

`USERIDALIAS` ***`alias`*** **`[DOMAIN`** ***`domain`*** **`]`**
Supplies a database login credential, if required. Can be used instead of the `USERID` option if there is a local Oracle GoldenGate credential store that contains a credential with the required privileges for this `DBLOGIN` command. For more information about using a credential store, see *Administering Oracle GoldenGate for Windows and UNIX*.

`alias`
Specifies the alias of a database user credential that is stored in the Oracle GoldenGate credential store. To log into a pluggable database in an Oracle multitenant container database, the user must be stored as a connect string, such as `OGGUSER@FINANCE`. To log into the root container, the user must be stored as a common user, including the C## prefix, such as `C##GGADMIN@FINANCE`. For more information about configuring Oracle GoldenGate for a CDB, see Installing and Configuring Oracle GoldenGate for Oracle Database.

`DOMAIN` ***`domain`***
Specifies the credential store domain for the specified alias. A valid domain entry must exist in the credential store for the specified alias.

SYSDBA
(Oracle) Specifies that the user logs in as `sysdba`. This option can be used for `USERID` and `USERIDALIAS`.

SQLID *sqlid*
(DB2 on z/OS) Issues the SQL command `SET CURRENT SQLID = 'sqlid'` after the `USERID` login (with `PASSWORD`, if applicable) is completed. If the `SET` command fails, the entire `DBLOGIN` command fails as a unit.

SESSIONCHARSET *character_set*
(Sybase, Teradata and MySQL) Sets a database session character set for the GGSCI connection to the database. All subsequent commands will use the specified session character set. This command option overrides any `SESSIONCHARSET` that is specified in the `GLOBALS` file.
(Sybase) To display the language information in the process report file when using this option for a Sybase database, make certain that `locale.dat` is set properly in the Sybase installation directory. If the character set is not found in the supported Sybase database character set, then it is validated against the Oracle GoldenGate supported character set list. The character-set information is displayed with the `LOCALE INFORMATION` entry in the report output. When issuing the `DBLOGIN` command, the Sybase environment variable is examined to see if the language (`LANG`) is set. If the language is not set, Oracle GoldenGate automatically sets it to US English.

Examples

Example 1 (Oracle)

```
DBLOGIN USERIDALIAS alias1
```

Example 2 (Oracle with non-default domain)

```
DBLOGIN USERIDALIAS alias1 DOMAIN domain1
```

Example 3 (Oracle with SYSDBA)

```
DBLOGIN USERID ogguser@pdb1 SYSDBA password
AACAAAAAAAAAAAJAUEUGODSCVGJEEIUGKJDJTFNDKEJFFFTC AES128, ENCRYPTKEY securekey1
```

Example 4 (MySQL)

```
DBLOGIN SOURCEDB mysqldb@host1:3305, USERIDALIAS alias1
```

Example 5 (MySQL, Sybase)

```
DBLOGIN SOURCEDB database USERIDALIAS alias1
```

Example 6 (Sybase with Remote DB)

```
DBLOGIN SOURCEDB USERID ogguser@remotedatabase PASSWORD password
```

Example 7 (SQL Server with Integrated Windows authentication)

```
DBLOGIN SOURCEDB systemdsn
```

Example 8 (Informix, SQL Server)

```
DBLOGIN SOURCEDB systemdsn USERIDALIAS alias1
```

1.63 ENCRYPT PASSWORD

Use `ENCRYPT PASSWORD` to encrypt a password that is used in an Oracle GoldenGate parameter file or command.

Syntax

```
ENCRYPT PASSWORD password
[AES128 | AES192 | AES256 | BLOWFISH]
ENCRYPTKEY {key_name | DEFAULT}
```

`password`
The login password. Do *not* enclose the password within quotes. If the password is case-sensitive, type it that way.

`AES128 | AES192 | AES256 | BLOWFISH`
Specifies the encryption algorithm to use.

- `AES128` uses the AES-128 cipher, which has a key size of 128 bits.
- `AES192` uses the AES-192 cipher, which has a key size of 192 bits.
- `AES256` uses the AES-256 cipher, which has a key size of 256 bits.
- `BLOWFISH` uses Blowfish encryption with a 64-bit block size and a variable-length key size from 32 bits to 128 bits. Use `BLOWFISH` only for backward compatibility with earlier Oracle GoldenGate versions.

If no algorithm is specified, AES128 is the default for all database types except DB2 on z/OS and NonStop SQL/MX, where `BLOWFISH` is the default. AES is not supported for those platforms.
All of the AES ciphers have a 128-bit block size.
To use AES encryption for any database other than Oracle, the path of the `lib` sub-directory of the Oracle GoldenGate installation directory must be specified as an environment variable before starting any processes:

- UNIX: Specify the path as an entry to the `LD_LIBRARY_PATH` or `SHLIB_PATH` variable. For example:

  ```
  setenv LD_LIBRARY_PATH ./lib:$LD_LIBRARY_PATH
  ```

- Windows: Add the path to the `PATH` variable.

You can use the `SETENV` parameter to set it as a session variable for the process.

`ENCRYPTKEY {`*`key_name`*` | DEFAULT}`
Specifies the encryption key.

> ***`key_name`***
> Specifies the logical name of a user-created encryption key in a local `ENCKEYS` lookup file. The key name is used to look up the actual key in the `ENCKEYS` file. A user-created key and an associated `ENCKEYS` file is required when using AES encryption; optional, but recommended, for Blowfish encryption. To use *`key_name`*, generate the key with `KEYGEN` or another utility, then store it in an `ENCKEYS` file on the source and target systems. For more information, see the security guidelines in the *Administering Oracle GoldenGate for Windows and UNIX*.

`DEFAULT`
Directs Oracle GoldenGate to generate a random key that is stored in the trail so that decryption can be performed by the downstream process. This type of key is insecure and should not be used in a production environment. Use this option only when `BLOWFISH` is specified. `ENCRYPT PASSWORD` returns an error if `DEFAULT` is used with any AES algorithm.

Examples

Example 1

```
ENCRYPT PASSWORD ny14072 BLOWFISH ENCRYPTKEY DEFAULT
```

Example 2

```
ENCRYPT PASSWORD ny14072 BLOWFISH ENCRYPTKEY superkey3
```

Example 3

```
ENCRYPT PASSWORD ny14072 AES192 ENCRYPTKEY superkey2
```

1.64 DUMPDDL

Use the `DUMPDDL` command to view the data in the Oracle GoldenGate DDL history table if the trigger-based DDL capture is in use. This information is the same information that is used by the Extract process. It is stored in proprietary format, but can be exported in human-readable form to the screen or to a series of SQL tables that can be queried by using regular SQL.

`DUMPDDL` always dumps all of the records in the DDL history table. Use SQL queries or search redirected standard output to view information about particular objects and the operations you are interested in. Because the history table contains large amounts of data, only the first 4000 bytes (approximately) of a DDL statement are displayed in order to maintain efficient performance. The format of the metadata is string based. It is fully escaped and supports table and column names in their native character set.

Because the information is historical data that is provided by the DDL *before* trigger, it reflects the state of an object before a DDL change. Consequently, there will not be any data for `CREATE` operations.

Note:

The default name of the before trigger is `GGS_DDL_TRIGGER_BEFORE`.

Before using `DUMPDDL`, log into the database as the owner of the history table by using the `DBLOGIN` command.

The basic `DUMPDDL` command outputs metadata to the following tables.

Table 1-18 DUMPDDL Tables

Table	Description
`GGS_DDL_OBJECTS`	Information about the objects for which DDL operations are being synchronized. `SEQNO` is the primary key. All of the other tables listed here contain a `SEQNO` column that is the foreign key to `GGS_DDL_OBJECTS`.
`GGS_DDL_COLUMNS`	Information about the columns of the objects involved in DDL synchronization.
`GGS_DDL_LOG_GROUPS`	Information about the supplemental log groups involved in DDL synchronization.
`GGS_DDL_PARTITIONS`	Information about the partitions for objects involved in DDL synchronization.
`GGS_DDL_PRIMARY_KEYS`	Information about the primary keys of the objects involved in DDL synchronization.

The `SEQNO` column is the DDL sequence number that is listed in the Extract and Replicat report files. It also can be obtained by querying the DDL history table (default name is `GGS_DDL_HIST`).

All of these tables are owned by the schema that was designated as the Oracle GoldenGate DDL schema during the installation of the DDL objects. To view the structure of these tables, use the `DESC` command in SQL*Plus.

Syntax

```
DUMPDDL [SHOW]
```

`SHOW`
Dumps the information contained in the history table to the screen in standard output format. No output tables are produced. All records in the DDL history table are shown.

1.65 FLUSH SEQUENCE

Use `FLUSH SEQUENCE` immediately after you start Extract for the first time during an initial synchronization or a re-synchronization. This command updates an Oracle sequence so that initial redo records are available at the time that Extract starts to capture transaction data. Normally, redo is not generated until the current cache is exhausted. The flush gives Replicat an initial start point with which to synchronize to the correct sequence value on the target system. From then on, Extract can use the redo that is associated with the usual cache reservation of sequence values.

To Use FLUSH SEQUENCE

1. The following Oracle procedures are used by `FLUSH SEQUENCE`:

Table 1-19 Procedures That Support FLUSH SEQUENCE

Database	Procedure	User and Privileges
Source	`updateSequence`	Grants `EXECUTE` to the owner of the Oracle GoldenGate DDL objects, or other selected user if not using DDL support.
Target	`replicateSequence`	Grants `EXECUTE` to the Oracle GoldenGate Replicat user.

The `sequence.sql` script installs these procedures. Normally, this script is run as part of the Oracle GoldenGate installation process, but make certain that was done before using `FLUSH SEQUENCE`. If `sequence.sql` was not run, the flush fails and an error message similar to the following is generated:

```
Cannot flush sequence {0}. Refer to the Oracle GoldenGate for Oracle
documentation for instructions on how to set up and run the sequence.sql
script. Error {1}.
```

2. The `GLOBALS` file must contain a `GGSCHEMA` parameter that specifies the schema in which the procedures are installed. This user must have `CONNECT`, `RESOURCE`, and `DBA` privileges.
3. Before using `FLUSH SEQUENCE`, issue the `DBLOGIN` command as the database user that has `EXECUTE` privilege on the `updateSequence` procedure. If logging into a multitenant container database, log into the pluggable database that contains the sequence that is to be flushed.

> **Note:**
>
> For full instructions on configuring Oracle GoldenGate to support sequences, see Installing and Configuring Oracle GoldenGate for Oracle Database.

Syntax

```
FLUSH SEQUENCE owner.sequence
```

`owner.sequence`
The owner and name of an Oracle sequence. The schema name cannot be null. You can use an asterisk (*) wildcard for the sequence name but not for the owner name.

Example

```
FLUSH SEQUENCE scott.seq*
```

1.66 LIST TABLES

Use `LIST TABLES` to list all tables in the database that match the specification provided with the command argument. Use the `DBLOGIN` command to establish a database connection before using this command. If logging into an Oracle multitenant container database, log in to the pluggable database that contains the tables that you want to list.

Syntax

```
LIST TABLES table
```

table
The name of a table or a group of tables specified with a wildcard (*).

Example

The following shows a `LIST TABLES` command and sample output.

```
list tables tcust*

TCUSTMER
TCUSTORD
```

1.67 MININGDBLOGIN

Use `MININGDBLOGIN` to establish a connection to a downstream Oracle database logmining server in preparation to issue other Oracle GoldenGate commands that affect this database, such as `REGISTER EXTRACT`. Use this command only if establishing Extract in integrated capture mode for an Oracle database.

To log into a source Oracle database that serves as the database logmining server, use the `DBLOGIN` command. `MININGDBLOGIN` is reserved for login to a downstream mining database.

The user who issues `MININGDBLOGIN` must:

- Have privileges granted through the Oracle `dbms_goldengate_auth.grant_admin_privilege` procedure.
- Be the user that is specified with the `TRANLOGOPTIONS MININGUSER` parameter for the Extract group that is associated with this `MININGDBLOGIN`.
- Not be changed while Extract is in integrated capture mode.

For support and configuration information for integrated capture, see Installing and Configuring Oracle GoldenGate for Oracle Database.

Syntax

```
MININGDBLOGIN {
USERID {/ | userid}[, PASSWORD password]
   [algorithm ENCRYPTKEY {keyname | DEFAULT}] |
USERIDALIAS alias [DOMAIN domain] |
[SYSDBA]
}
```

`USERID`
Supplies a database login credential. Can be used if an Oracle GoldenGate credential store is not in use. (See the `USERIDALIAS` option.) Input varies, depending on the database, as follows:

> ***userid***
> Specifies the name of a database user or a SQL*Net connect string. To log into a pluggable database in an Oracle multitenant container database, specify *userid*

as a connect string, such as `OGGUSER@FINANCE`. To log into the root container, specify *`userid`* as a common user, including the C## prefix, such as `C##GGADMIN@FINANCE`. For more information about configuring Oracle GoldenGate for a CDB, see Installing and Configuring Oracle GoldenGate for Oracle Database.

/
(Oracle) Directs Oracle GoldenGate to use an operating-system login for Oracle, not a database user login. Use this argument only if the database allows authentication at the operating-system level. To use this option, the correct user name must exist in the database, in relation to the value of the Oracle `OS_AUTHENT_PREFIX` initialization parameter. For more information, see the USERID | NOUSERID parameter.

`PASSWORD` ***`password`***
Use when authentication is required to specify the password for the database user. If the password was encrypted by means of the `ENCRYPT PASSWORD` command, supply the encrypted password; otherwise, supply the clear-text password. If the password is case-sensitive, type it that way.
If the `PASSWORD` clause is omitted, you are prompted for a password, and the password is not echoed.

`algorithm`
If the password was encrypted with the `ENCRYPT PASSWORD` command, specify the encryption algorithm that was used:
`AES128`
`AES192`
`AES256`
`BLOWFISH`

`ENCRYPTKEY {`*`keyname`*` | DEFAULT}`
Specifies the encryption key that was specified with `the ENCRYPT PASSWORD command`. Use one of the following:

> **`ENCRYPTKEY`** ***`keyname`***
> Specifies the logical name of a user-created encryption key in the `ENCKEYS` lookup file. Use if `ENCRYPT PASSWORD` was used with the `KEYNAME` *`keyname`* option.
>
> **`ENCRYPTKEY DEFAULT`**
> Directs Oracle GoldenGate to generate a Blowfish key. Use if the `ENCRYPT PASSWORD` command was used with the `KEYNAME DEFAULT` option.

`USERIDALIAS` ***`alias`*** **`[DOMAIN`** ***`domain`*****`]`**
Supplies the alias of a database login credential. Can be used instead of the `USERID` option if there is a local Oracle GoldenGate credential store that contains a credential with the required privileges for this `MININGDBLOGIN` command. For more information about using a credential store, see *Administering Oracle GoldenGate for Windows and UNIX*.
To log into a pluggable database in an Oracle multitenant container database, the user must be stored as a connect string, such as `OGGUSER@FINANCE`. To log into the root container, the user must be stored as a common user, including the C## prefix, such as `C##GGADMIN@FINANCE`. For more information about configuring Oracle GoldenGate for a CDB, see Installing and Configuring Oracle GoldenGate for Oracle Database.

`alias`
Specifies the alias of a database user credential that is stored in the Oracle GoldenGate credential store. The user that is specified with `USERIDALIAS` must be the common database user.

`DOMAIN` ***`domain`***
Specifies the credential store domain for the specified alias. A valid domain entry must exist in the credential store for the specified alias.

`SYSDBA`
(Oracle) Specifies that the user logs in as `sysdba`. This option can be used for `USERID` and `USERIDALIAS`.

Examples

Example 1

```
MININGDBLOGIN USERIDALIAS oggalias SESSIONCHARSET ISO-8859-11
```

Example 2

```
MININGDBLOGIN USERID ogg@ora1.ora, PASSWORD
AACAAAAAAAAAAAJAUEUGODSCVGJEEIUGKJDJTFNDKEJFFFTC AES128, ENCRYPTKEY securekey1
```

1.68 SET NAMECCSID

Use `NAMECCSID` to set the CCSID (coded character set identifier) of the GGSCI session when you need to issue commands for tables in a DB2 for i database. This command is required if the CCSID of the object names stored in the SQL catalog tables is different from the CCSID of the system. The SQL catalog tables are created with the CCSID of the system, but the actual database object names could be represented with a different CCSID. The catalog does not indicate this difference when queried, and therefore Oracle GoldenGate could retrieve the name incorrectly unless `NAMECCSID` is present to supply the correct CCSID value.

To set the CCSID for `GLOBALS`, Extract, Replicat, or DEFGEN, use the NAMECCSID parameter.

`SET NAMECCSID` is not valid if the `DBLOGIN` command was previously issued, because that command affects the GGSCI session. To issue `SET NAMECCSID` after a `DBLOGIN` command, restart GGSCI.

To view the current CCSID, use the SHOW command. If the CCSID is not set through the GGSCI session or through the parameter `NAMECCSID`, the `SHOW` value will be `DEFAULT`.

Syntax

```
SET NAMECCSID {CCSID | DEFAULT}
```

`CCSID`
A valid DB2 for i coded character set identifier that is to be used for the GGSCI session.

`DEFAULT`
Indicates that the system CCSID is to be used for the GGSCI session.

Example

```
SET NAMECCSID 1141
```

1.69 ADD SCHEMATRANDATA

Valid for Oracle. Use `ADD SCHEMATRANDATA` to enable schema-level supplemental logging for a table. `ADD SCHEMATRANDATA` acts on all of the current and future tables in a given schema to automatically log a superset of available keys that Oracle GoldenGate needs for row identification.

`ADD SCHEMATRANDATA` is valid for both integrated and classic capture and does the following:

- Enables Oracle supplemental logging for new tables created with a `CREATE TABLE`.
- Updates supplemental logging for tables affected by an `ALTER TABLE` to add or drop columns.
- Updates supplemental logging for tables that are renamed.
- Updates supplemental logging for tables for which unique or primary keys are added or dropped.

By default, `ADD SCHEMATRANDATA` logs the key columns of a table in the following order of priority:

1. Primary key
2. In the absence of a primary key, all of the unique keys of the table, including those that are disabled, unusable or invisible. Unique keys that contain ADT member columns are also logged. Only unique keys on virtual columns (function-based indexes) are not logged.
3. If none of the preceding exists, all scalar columns of the table are logged. (System-generated row-OIDs are always logged.)

`ADD SCHEMATRANDATA` also supports the conditional or unconditional logging requirements for using integrated Replicat.

Note:

Apply Oracle Patch 10423000 to the source database if the Oracle version is earlier than 11.2.0.2.

When to Use `ADD SCHEMATRANDATA`

`ADD SCHEMATRANDATA` must be used in the following cases:

- For all tables that are part of an Extract group that is to be configured for integrated capture. `ADD SCHEMATRANDATA` ensures that the correct key is logged by logging all of the keys.
- For all source tables that will be processed in an integrated Replicat group. Options are provided that enable the logging of the primary, unique, and foreign keys to support the computation of dependencies among relational tables being processed through different apply servers.

- When DDL replication is active and DML is concurrent with DDL that creates new tables or alters key columns. It best handles scenarios where DML can be applied to objects very shortly after DDL is issued on them. `ADD SCHEMATRANDATA` causes the appropriate key values to be logged in the redo log atomically with each DDL operation, thus ensuring metadata continuity for the DML when it is captured from the log, despite any lag in Extract processing.

Database-level Logging Requirements for Using `ADD SCHEMATRANDATA`

Oracle strongly encourages putting the source database into forced logging mode and enabling minimal supplemental logging at the database level when using Oracle GoldenGate. This adds row chaining information, if any exists, to the redo log for update operations. See *Installing and Configuring Oracle GoldenGate for Oracle Database* for more information about configuring logging to support Oracle GoldenGate.

Additional Considerations for Using `ADD SCHEMATRANDATA`

- Before using `ADD SCHEMATRANDATA`, issue the `DBLOGIN` command. The user who issues the command must be granted the Oracle Streams administrator privilege.

  ```
  SQL> exec dbms_streams_auth.grant_admin_privilege('user')
  ```

- `ADD SCHEMATRANDATA` can be used instead of the `ADD TRANDATA` command when DDL replication is not enabled. Note, however, that if a table has no primary key but has multiple unique keys, `ADD SCHEMATRANDATA` causes the database to log all of the unique keys. In such cases, `ADD SCHEMATRANDATA` causes the database to log more redo data than does `ADD TRANDATA`. To avoid the extra logging, designate one of the unique keys as a primary key, if possible.
- For tables with a primary key, with a single unique key, or without a key, `ADD SCHEMATRANDATA` adds no additional logging overhead, as compared to `ADD TRANDATA`. For more information, see ADD TRANDATA.
- If you must log additional, non-key columns of a specific table (or tables) for use by Oracle GoldenGate, such as those needed for `FILTER` statements and `KEYCOLS` clauses in the `TABLE` and `MAP` parameters, issue an `ADD TRANDATA` command for those columns. That command has a `COLS` option to issue table-level supplemental logging for the columns, and it can be used in conjunction with `ADD SCHEMATRANDATA`.

Syntax

```
ADD SCHEMATRANDATA schema {
[ALLOWNONVALIDATEDKEYS]
[NOSCHEDULINGCOLS | ALLCOLS]}
[NOVALIDATE]
[PREPARECSN  {WAIT | LOCK | NOWAIT | NONE}]
```

schema
The schema for which you want the supplementary key information to be logged. Do not use a wildcard. To issue `ADD SCHEMATRANDATA` for schemas in more than one pluggable database of a multitenant container database, log in to each pluggable database separately with `DBLOGIN` and then issue `ADD SCHEMATRANDATA`. See DBLOGIN for more information.

`ALLOWNONVALIDATEDKEYS`
This option is not valid for Oracle 11.2.0.3 or 12.1.0.1. It includes `NON VALIDATED` and `NOT VALID` primary keys in the supplemental logging. These keys override the normal

key selection criteria that is used by Oracle GoldenGate. If the `GLOBALS` parameter `ALLOWNONVALIDATEDKEYS` is being used, `ADD SCHEMATRANDATA` runs with `ALLOWNONVALIDATEDKEYS` whether or not it is specified. By default `NON VALIDATED` and `NOT VALID` primary keys are not logged. For more information, see the `GLOBALS` ALLOWNONVALIDATEDKEYS parameter.

`NOSCHEDULINGCOLS | ALLCOLS`
These options control supplemental logging for an Oracle target database. You can use these options together though the latter option is used. For example, with the `ADD SCHEMATRANDATA oggadm_ext ALLCOL NOSCHEDULINGCOLS` command the `NOSCHEDULINGCOLS` option would be used.

`NOSCHEDULINGCOLS`
Disables the logging of scheduling columns. By default, `ADD SCHEMATRANDATA` enables the unconditional logging of the primary key and the conditional supplemental logging of all unique key(s) and foreign key(s) of all current and future tables in the given schema. Unconditional logging forces the primary key values to the log whether or not the key was changed in the current operation. Conditional logging logs all of the column values of a foreign or unique key if at least one of them was changed in the current operation. The integrated Replicat primary key, unique keys, and foreign keys must all be available to the inbound server to compute dependencies. For more information about integrated Replicat, see *Installing and Configuring Oracle GoldenGate for Oracle Database*.

`ALLCOLS`
Enables the unconditional supplemental logging of all supported key and non-key columns for all current and future tables in the given schema. This option enables the logging of the keys required to compute dependencies, plus columns that are required for filtering, conflict resolution, or other purposes. Columns like LOB, LONG, and ADT are not included.

`NOVALIDATE`
Valid for all databases supported by `ADD SCHEMATRANDATA`.
Suppresses additional information about the table being handled being processed by `ADD SCHEMATRANDATA`. By default, this option is enabled. The additional information processing creates a lapse time on command response so this option can be used to increase response time.

`PREPARECSN {WAIT | LOCK | NOWAIT | NONE}`
Valid for Oracle for both DML and DDL. Automatically prepares the tables at the source so the Oracle data pump Export dump file will includes Instantiation CSNs. Replicat uses the per table instantiation CSN set by the Oracle data pump (on import) to filter out trail records. On the target, the data pump import populates the system tables and views with instantiation SCNs using the `DBOPTIONS ENABLE_INSTANTIATION_FILTERING` parameter to enable table-level instantiation filtering.

`WAIT`
Wait for any in-flight transactions and prepare table instantiation.

`LOCK`
Put a lock on the table (to prepare for table instantiation).

`NOWAIT`
Default behavior, preparing for instantiation is done immediately.

NONE
No instantiation preparation occurs.

Example

Example 1
The following enables supplemental logging for the schema `scott`.

```
ADD SCHEMATRANDATA scott
```

Example 2
The following example logs all supported key and non-key columns for all current and future tables in the schema named `scott`.

```
ADD SCHEMATRANDATA scott ALLCOLS
```

Example 3
The following example suppress additional table information processing.

```
ADD SCHEMATRANDATA acct.emp* NOVALIDATE
```

1.70 ADD TRANDATA

Use `ADD TRANDATA` to enable Oracle GoldenGate to acquire the transaction information that it needs from the transaction records.

Before using this command, use the DBLOGIN command to establish a database connection.

`ADD TRANDATA` is valid only for the databases that are listed here. For other supported databases, this functionality may exist already or must be configured through the database interface. See the Oracle GoldenGate installation guide for your database for any special requirements that apply to making transaction information available.

DB2 for i Databases

Use `ADD TRANDATA` to start the journaling of data. The `ADD TRANDATA` command calls `STRJRNPF` and is the recommended method to start journaling for tables, because it ensures that the required journal image attribute of `Record Images (IMAGES): *BOTH` is set on the `STRJRNPF` command.

DB2 LUW Database

Use `ADD TRANDATA` to enable `DATA CAPTURE CHANGES` on specified tables. By default, `ADD TRANDATA` issues the following command to the database:

```
ALTER TABLE name DATA CAPTURE CHANGES INCLUDE LONGVAR COLUMNS;
```

You can exclude the `LONGVAR` clause by using `ADD TRANDATA` with the `EXCLUDELONG` option.

DB2 z/OS Database

Use `ADD TRANDATA` to enable `DATA CAPTURE CHANGES` on specified tables. By default, `ADD TRANDATA` issues the following command to the database:

```
ALTER TABLE name DATA CAPTURE CHANGES;
```

Oracle Database

By default, `ADD TRANDATA` for Oracle enables the unconditional logging of the primary key and the conditional supplemental logging of all unique key(s) and foreign key(s) of the specified table. See *Installing and Configuring Oracle GoldenGate for Oracle Database* for more information about how Oracle GoldenGate handles supplemental logging for Oracle databases.

If possible, use the `ADD SCHEMATRANDATA` command rather than the `ADD TRANDATA` command. The `ADD SCHEMATRANDATA` command ensures replication continuity should DML occur on an object for which DDL has just been performed. You can exclude objects from the schema specification by using the exclusion parameters. See Summary of Wildcard Exclusion Parametersfor more information.

To use the Oracle GoldenGate DDL replication feature, you must use the `ADD SCHEMATRANDATA` command to log the required supplemental data.

When using `ADD SCHEMATRANDATA`, you can use `ADD TRANDATA` with the `COLS` option to log any non-key columns, such as those needed for `FILTER` statements and `KEYCOLS` clauses in the `TABLE` and `MAP` parameters.

Note:

It is possible to use `ADD TRANDATA` for Oracle when DDL support is enabled, but only if you can stop DML on all tables before DDL is performed on them or, if that is not possible, you can guarantee that no users or applications will issue DDL that adds new tables whose names satisfy an object specification in a `TABLE` or `MAP` statement. There must be no possibility that users or applications will issue DDL that changes the key definitions of any tables that are already in the Oracle GoldenGate configuration.

For more information, see ADD SCHEMATRANDATA.

Oracle strongly encourages putting the source database into forced logging mode and enabling minimal supplemental logging at the database level when using Oracle GoldenGate. This adds row chaining information, if any exists, to the redo log for update operations. See *Installing and Configuring Oracle GoldenGate for Oracle Database* for more information about configuring logging to support Oracle GoldenGate.

Take the following into account when using `ADD TRANDATA` for an Oracle database:

- If any of the logging details change after Oracle GoldenGate starts extracting data, you must stop and then start the Extract process that is reading from the affected table before any data is changed.
- When creating a supplemental log group with `ADD TRANDATA`, Oracle GoldenGate appends the object ID to a prefix of `GGS_`, for example `GGS_18342`.

SQL Server Database

Use `ADD TRANDATA` to provide the extended logging information that Oracle GoldenGate needs to reconstruct SQL operations. The SQL Server transaction log does not provide enough information by default.

Sybase Database

`ADD TRANDATA` marks a Sybase table for replication by executing the Sybase `sp_setreptable` and `sp_setrepcol` system procedures. `ADD TRANDATA` options employ database features to control how the database propagates `LOB` data for the specified table. See the `ADD TRANDATA` options list.

Syntax

```
ADD TRANDATA {[container.]owner.table | schema.table [JOURNAL
library/journal] |
   library/file [JOURNAL library/journal]}
[, NOSCHEDULINGCOLS | ALLCOLS]
[, COLS (columns)]
[, INCLUDELONG | EXCLUDELONG]
[, LOBSNEVER | LOBSALWAYS | LOBSIFCHANGED | LOBSALWAYSNOINDEX]
[, NOKEY]
[, PREPARECSN  {WAIT | LOCK | NOWAIT | NONE}]
```

`[`*`container`*`.]`*`owner`*`.`*`table`*
Valid for DB2 LUW, DB2 for z/OS, Oracle, SQL Server, and Sybase.
The two-part or three-part name specification. Use a two-part name of *`owner.table`* for all supported databases except an Oracle multitenant container database. Use a three-part name of *`container.owner.table`* for an Oracle multitenant container database. A wildcard can be used for any component. Used with a wildcard, `ADD TRANDATA` filters out names that match the names of system objects. To use `ADD TRANDATA` for objects that are not system objects but have names that match those of system objects in a wildcard pattern, issue `ADD TRANDATA` for those objects without using a wildcard.

***`schema.table`* `[JOURNAL` *`library/journal`*`] |`**
***`library/file`* `[JOURNAL` *`library/journal`*`]`**
Valid for DB2 for i.
Specifies the SQL schema and name of a table or the native library and file name. If a default journal is set with the `DEFAULTJOURNAL` command, you can omit the `JOURNAL` option; otherwise it is required.

`NOSCHEDULINGCOLS | ALLCOLS`
Valid for Oracle
These options satisfy the logging requirements of an integrated Replicat that will be processing the tables that you are specifying with `ADD TRANDATA`.

> **`NOSCHEDULINGCOLS`**
> Disables the logging of scheduling columns. By default, `ADD TRANDATA` enables the unconditional logging of the primary key and the conditional supplemental logging of all unique key(s) and foreign key(s) of the specified table. Unconditional logging forces the primary key values to the log whether or not the key was changed in the current operation. Conditional logging logs all of the column values of a foreign or unique key if at least one of them was changed in the current operation. The primary key, unique keys, and foreign keys must all be available to the inbound server to compute dependencies. For more information about integrated Replicat, see *Installing and Configuring Oracle GoldenGate for Oracle Database*.

`ALLCOLS`
Enables the unconditional supplemental logging of all of the key and non-key columns of the table. This option enables the logging of the keys required to compute dependencies, plus all other columns for use in filtering, conflict resolution, or other purposes.

`COLS (`*`columns`*`)`
Valid for all databases supported by `ADD TRANDATA`.
Use the `COLS` option to log specific non-key columns. Can be used to log columns specified in a `KEYCOLS` clause and to log columns that will be needed for filtering or manipulation purposes, which might be more efficient than fetching those values with a `FETCHCOLS` clause in a `TABLE` statement. Separate multiple columns with commas, for example `NAME`, `ID`, `DOB`.

`INCLUDELONG | EXCLUDELONG`
Valid for DB2 LUW.
Controls whether or not the `ALTER TABLE` issued by `ADD TRANDATA` includes the `INCLUDE LONGVAR COLUMNS` attribute. `INCLUDELONG` is the default. When `ADD TRANDATA` is issued with this option, Oracle GoldenGate issues the following statement:

```
ALTER TABLE name DATA CAPTURE CHANGES INCLUDE LONGVAR COLUMNS;
```

When `EXCLUDELONG` is used, the following is the command:

```
ALTER TABLE name DATA CAPTURE CHANGES;
```

When `EXCLUDELONG` is used, Oracle GoldenGate does not support functionality that requires before images of tables that include `LONGVAR` columns. Examples of this functionality are the `GETUPDATEBEFORES`, `NOCOMPRESSUPDATES`, and `NOCOMPRESSDELETES` parameters. To support this functionality, changes to `LONGVAR` columns in the transaction logs must include both the before and after images of the column value.

`LOBSNEVER | LOBSALWAYS | LOBSIFCHANGED | LOBSALWAYSNOINDEX`
Valid for Sybase.
Controls how the database propagates `LOB` data for the specified table.

Note:

The `ADD TRANDATA` command will overwrite the LOB setting that is currently set for the table. To change the setting afterwards, you must use the `sp_setrepcol` script.

`LOBSNEVER`
Prevents `LOB` data from being propagated. Note this exception: If the LOB column is inserted with a `NULL` value, or if it is skipped in an `INSERT` operation, then Extract will write that column to the trail with `NULL` data.

`LOBSALWAYS`
Does two things: it uses `sp_setrepcol` to set `LOB` replication to `ALWAYS_REPLICATE` (always replicate `LOB` data whether or not it has changed in a transaction), and it marks the table to use an index on replication (by means of the `USE_INDEX` option of `sp_setreptable).` Because a `LOB` is marked for replication in a single transaction, this can take a long time, and `USE_INDEX` reduces that time by creating

a global nonclustered index for every LOB. A shared-table lock is held while the global nonclustered index is created.

LOBSIFCHANGED
Replicates LOB data only if it was changed during a transaction. This reduces replication overhead but does not protect against inconsistencies that could occur on the target outside the replication environment. This is the default.

LOBSALWAYSNOINDEX
Sets LOB replication to ALWAYS_REPLICATE (always replicate LOB data whether or not it has changed in a transaction). This adds overhead, but protects against inconsistencies that could occur on the target outside the replication environment. LOBSALWAYSNOINDEX does not mark the table to use an index on replication. The benefit is that no lock is held while ADD TRANDATA is being executed. LOBSALWAYSNOINDEX is the default for Sybase databases earlier than version 15.

Note:

When using the ALWAYS_REPLICATE option, if a LOB column contains a NULL value, and then another column in the table gets updated (but not the LOB), that LOB will not be captured even though ALWAYS_REPLICATE is enabled.

You can check the LOB settings of a table with the INFO TRANDATA command, after ADD TRANDATA has been used for that table. It shows the LOB settings for all of the LOB columns. You can use the Sybase system procedures to change the LOB settings for any given column as needed.

NOKEY
Valid for all databases supported by ADD TRANDATA.
Suppresses the supplemental logging of primary key columns. If using NOKEY, use the COLS option to log alternate columns that can serve as keys, and designate those columns as substitute keys by using the KEYCOLS option of the TABLE or MAP parameter.

PREPARECSN {WAIT | LOCK | NOWAIT | NONE}
Valid for Oracle for both DML and DDL. Automatically prepares the tables at the source so the Oracle Datapump Export dump file will includes Instantiation CSNs. Replicat uses the per table instantiation CSN set by the Oracle Datapump (on import) to filter out trail records. On the target, the data pump import populates the system tables and views with instantiation SCNs using the DBOPTIONS ENABLE_INSTANTIATION_FILTERING parameter to enable table-level instantiation filtering.

WAIT
Wait for any in-flight transactions and prepare table instantiation.

LOCK
Put a lock on the table (to prepare for table instantiation).

NOWAIT
Default behavior, preparing for instantiation is done immediately.

NONE
No instantiation preparation occurs.

Examples

Example 1
The following example causes one of the following: the primary key to be logged for an Oracle table; supplemental data to be logged for a SQL Server table; or a Sybase table to be marked for replication.

```
ADD TRANDATA finance.acct
```

Example 2
The following example enables the unconditional supplemental logging of all of the key and non-key columns for the table named `acct`.

```
ADD TRANDATA acct ALLCOLS
```

Example 3
The following Oracle example causes the primary key to be logged plus the non-key columns name and address.

```
ADD TRANDATA finance.acct, COLS (name, address)
```

Example 4
The following Oracle example prevents the primary key from being logged, but logs the non-key columns `name` and `pid` instead.

```
ADD TRANDATA finance.acct, NOKEY, COLS (name, pid)
```

Example 5
The following Sybase example marks the `acct` table for replication and specifies to log `LOB` data only if it was changed during a transaction.

```
ADD TRANDATA finance.acct, LOBSIFCHANGED
```

Example 6
The following example adds logging though does not prepare the table for instantiation.

```
ADD TRANDATA acct PREPARECSN NONE
```

1.71 DELETE SCHEMATRANDATA

Use `DELETE SCHEMATRANDATA` to remove the Oracle schema-level supplemental logging that was added with the `ADD SCHEMATRANDATA` command. Use the `DBLOGIN` command to establish a database connection before using this command. The user that is specified with this command must have the privilege to remove supplemental log groups.

By default, this command attempts to remove the supplemental logging of the key columns that are used by Oracle GoldenGate (can be the primary key, a unique key, `KEYCOLS` columns, or all columns) and also the scheduling columns. The scheduling columns are the primary key, all of the unique keys, and all of the foreign keys. To delete the logging of the Oracle GoldenGate key columns, but not the scheduling columns, include the `NOSCHEDULINGCOLS` option with `DELETE SCHEMATRANDATA`. If `ADD SCHEMATRANDATA` was issued with the `ALLCOLS` option, use `DELETE SCHEMATRANDATA` with the `ALLCOLS` option to remove the supplemental logging of all of the columns, including the Oracle GoldenGate key columns.

Syntax

```
DELETE SCHEMATRANDATA schema [NOSCHEDULINGCOLS | ALLCOLS]
```

`schema`
The schema for which you want supplemental logging to be removed. Do not use a wildcard. If the source is an Oracle multitenant container database, make certain to log into the pluggable database that contains the schema for which you want to remove the logging. See DBLOGIN for more information.

`NOSCHEDULINGCOLS`
Prevents the command from removing the supplemental logging of the scheduling columns of the tables in the specified schema. The scheduling columns are the primary key, all of the unique keys, and all of the foreign keys of a table.

`ALLCOLS`
Removes the supplemental logging of all of the columns of the tables in the specified schema.

Examples

Example 1

```
DELETE SCHEMATRANDATA scott
```

Example 2

```
DELETE SCHEMATRANDATA scott ALLCOLS
```

1.72 DELETE TRANDATA

Use `DELETE TRANDATA` to do one of the following:

- DB2 LUW and DB2 on z/OS: Alters the table to `DATA CAPTURE NONE`.
- Oracle: Disable supplemental logging.
- Sybase: Disable replication.
- SQL Server: Stops extended logging for a table.

By default, this command attempts to remove the supplemental logging of the key columns that are used by Oracle GoldenGate (can be the primary key, a unique key, `KEYCOLS` columns, or all columns) and also the scheduling columns. The scheduling columns are the primary key, all of the unique keys, and all of the foreign keys. To delete the logging of the Oracle GoldenGate key columns, but not the scheduling columns, include the `NOSCHEDULINGCOLS` option with `DELETE TRANDATA`. If `ADD TRANDATA` was issued with the `ALLCOLS` option, use `DELETE TRANDATA` with the `ALLCOLS` option to remove the supplemental logging of all of the columns, including the Oracle GoldenGate key columns.

Use the `DBLOGIN` command to establish a database connection before using this command. The user specified with this command must have the same privileges that are required for `ADD TRANDATA`.

Syntax

```
DELETE TRANDATA [container.]owner.table [NOSCHEDULINGCOLS | ALLCOLS]
```

[container.]owner.table
The pluggable database (if this is an Oracle multitenant container database), owner and name of the table or file. A wildcard can be used for any name component.

NOSCHEDULINGCOLS
Prevents the command from removing the supplemental logging of the scheduling columns of the specified table. The scheduling columns are the primary key, all of the unique keys, and all of the foreign keys of a table.

ALLCOLS
Removes the supplemental logging of all of the columns of the specified table.

Examples

Example 1

```
DELETE TRANDATA finance.acct
```

Example 2

```
DELETE TRANDATA finance.ac*
```

Example 3

```
DELETE TRANDATA finance.acct ALLCOLS
```

1.73 INFO SCHEMATRANDATA

Use `INFO SCHEMATRANDATA` to determine whether Oracle schema-level supplemental logging is enabled for the specified schema or if any instantiation information is available. Use the `DBLOGIN` command to establish a database connection before using this command.

Syntax

```
INFO SCHEMATRANDATA schema
```

schema
The schema for which you want to confirm supplemental logging. Do not use a wildcard. To get information on the appropriate schema in an Oracle multitenant container database, make certain to log into the correct pluggable database with `DBLOGIN`.

Example

```
INFO SCHEMATRANDATA scott
```

1.74 INFO TRANDATA

Use `INFO TRANDATA` to get the following information:

- DB2 LUW and DB2 on z/OS: Determine whether `DATA CAPTURE` is enabled or not.
- Oracle: Determine whether supplemental logging is enabled, and to show the names of columns that are being logged supplementally. If all columns are being logged, the notation `ALL` is displayed instead of individual column names.

  Displays any SCN instantiation information.

- Sybase: Determine whether replication is enabled or not, and whether all LOB columns have identical logging settings (as specified with the `ADD TRANDATA` LOB options.
- SQL Server: Determine whether or not extended logging is enabled for a table.

Use the `DBLOGIN` command to establish a database connection before using this command.

Syntax

```
INFO TRANDATA [container.]owner.table
```

`[container.]owner.table`
The pluggable database (if this is an Oracle multitenant container database), owner and name of the table or file for which you want to view trandata information. The owner is not required if it is the same as the login name that was specified by the `DBLOGIN` command. A wildcard can be used for the table name but not the owner name.

Examples

Example 1

```
INFO TRANDATA finance.acct
```

Example 2

```
INFO TRANDATA finance.ac*
```

1.75 SET_INSTANTIATION_CSN

Use `SET_INSTANTIATION_CSN` on your target database to set the instantiation CSN manually. This command requires `DBLOGIN`. It enables a Replicat with the `DBOPTIONS ENABLE_INSTANTIATION_FILTERING` option to filter out records below the specified CSN for any object without Oracle Datapump import instantiation information. It is an alternative to specifying `@FILTER(@GETENV('TRANSACTION','CSN')`.

To enable instantiation SCN filtering, you must do the following:

1. Your Replicat parameter file must contain `DBOPTIONS ENABLE_INSTANTIATION_FILTERING`.
2. The instantiation SCNs must be set at the target database for each table.

   You can do this using one of the following two methods:

   Automatically set the source SCN by the Oracle Datapump upon import if the tables were prepared at the source database using `ADD TRANDATA PREPARECSN` or `ADD SCHEMATRANDATA PREPARECSN` prior to the Oracle Datapump export.

   or

   Manually set the instantiation source SCN at the target database using this command.

Syntax

```
SET_INSTANTIATION_CSN csn FOR [schema.]table FROM source_database_name
```

csn
The CSN number that instantiation will begin.

[schema.]table
The name of the table to set the instantiation CSN on. If no schema is provided, the `DBLOGIN` user will be used.

source_database_name
The global name of the source database for which this is a target.

Example

```
SET_INSTANTIATION_CSN 12345678 FOR hr.employees FROM DBS1.US.COMPANY.COM
```

1.76 CLEAR_INSTANTIATION_CSN

Use `CLEAR_INSTANTIATION_CSN` on your target database to clear (reverse) the instantiation CSN manually. This command requires `DBLOGIN` where the user is the default Oracle GoldenGate schema.

Syntax

```
CLEAR_INSTANTIATION_CSN FOR [schema.]table FROM source_database_name
```

[schema.]table
The name of the table to clear the instantiation CSN on. If no schema is provided, the `DBLOGIN` user will be used.

source_database_name
The global name of the source database for which this is a target.

Example

```
CLEAR_INSTANTIATION_CSN FOR hr.employees FROM DBS1.US.COMPANY.COM
```

1.77 CLEANUP CHECKPOINTTABLE

Not valid for Replicat for Java, Oracle GoldenGate Applications Adapter, or Oracle GoldenGate Big Data.

Use `CLEANUP CHECKPOINTTABLE` to remove checkpoint records from the checkpoint table when there is no checkpoint file associated with it in the working Oracle GoldenGate directory (from which GGSCI was started). The purpose of this command is to remove checkpoint records that are not needed any more, either because groups were changed or files were moved.

Use the `DBLOGIN` command to establish a database connection before using this command.

Syntax

```
CLEANUP CHECKPOINTTABLE [[container. | catalog.]owner.table]
```

***container*. | *catalog*.**
The Oracle pluggable database or SQL/MX catalog, if applicable. If this option is omitted, the catalog or pluggable database defaults to the one that is associated with the `SOURCEDB`, `USERID`, or `USERIDALIAS` portion of the `DBLOGIN` command (depending on the database).

owner.table
The owner and name of the checkpoint table to be cleaned up. If an owner and name are not specified, the table that is affected is the one specified with the `CHECKPOINTTABLE` parameter in the `GLOBALS` parameter file.

Example

```
CLEANUP CHECKPOINTTABLE ggs.fin_check
```

1.78 DELETE CHECKPOINTTABLE

Not valid for Replicat for Java, Oracle GoldenGate Applications Adapter, or Oracle GoldenGate Big Data.

Use `DELETE CHECKPOINTTABLE` to drop a checkpoint table from the database. Use the `DBLOGIN` command to establish a database connection before using this command.

To stop using a checkpoint table while the associated Replicat group remains active, follow these steps:

1. Run GGSCI.
2. Stop Replicat.

   ```
   STOP REPLICAT group
   ```
3. Delete the Replicat group and then add it back with the following commands.

   ```
   DELETE REPLICAT group
   ADD REPLICAT group, EXTTRAIL trail, NODBCHECKPOINT
   ```
4. Exit GGSCI, then start it again.
5. Start Replicat again.

   ```
   START REPLICAT group
   ```
6. Log into the database with the `DBLOGIN` command, using the appropriate authentication options for the database. See "DBLOGIN".
7. Delete the checkpoint table with `DELETE CHECKPOINTTABLE`.

If the checkpoint table is deleted while Replicat is still running and transactions are occurring, Replicat will abend with an error that the checkpoint table could not be found. However, the checkpoints are still maintained on disk in the checkpoint file. To resume processing, add the checkpoint table back under the same name. Data in the trail resumes replicating. Then, you can delete the checkpoint table.

Syntax

```
DELETE CHECKPOINTTABLE [[container. | catalog.]owner.table] [!]
```

***container*. | *catalog*.**
The Oracle pluggable database or SQL/MX catalog, if applicable. If this option is omitted, the catalog or pluggable database defaults to the one that is associated with

the `SOURCEDB`, `USERID`, or `USERIDALIAS` portion (depending on the database) of the `DBLOGIN` command.

`owner.table`
The owner and name of the checkpoint table to be deleted. An owner and name are not required if they are the same as those specified with the `CHECKPOINTTABLE` parameter in the `GLOBALS` file.

!
Bypasses the prompt that confirms intent to delete the table.

Example

```
DELETE CHECKPOINTTABLE ggs.fin_check
```

1.79 INFO CHECKPOINTTABLE

Not valid for Replicat for Java, Oracle GoldenGate Applications Adapter, or Oracle GoldenGate Big Data.

Use `INFO CHECKPOINTTABLE` to confirm the existence of a checkpoint table and view the date and time that it was created. It returns a message similar to the following:

```
Checkpoint table HR.CHKPT_TBLE created 2011-01-06 11:51:53.
```

Use the `DBLOGIN` command to establish a database connection before using this command.

Syntax

```
INFO CHECKPOINTTABLE [[container. | catalog.]owner.table]
```

`container. | catalog.`
The Oracle pluggable database or SQL/MX catalog, if applicable. If this option is omitted, the catalog or pluggable database defaults to the one that is associated with the `SOURCEDB`, `USERID`, or `USERIDALIAS` portion of the `DBLOGIN` command (depending on the database).

`owner.table`
The owner and name of the checkpoint table. An owner and name are not required if they are the same as those specified with the `CHECKPOINTTABLE` parameter in the `GLOBALS` file.

Example

```
INFO CHECKPOINTTABLE ggs.fin_check
```

1.80 UPGRADE CHECKPOINTTABLE

Not valid for Replicat for Java, Oracle GoldenGate Applications Adapter, or Oracle GoldenGate Big Data.

Use the `UPGRADE CHECKPOINTTABLE` command to add a supplemental checkpoint table when upgrading Oracle GoldenGate from version 11.2.1.0.0 or earlier.

Syntax

```
UPGRADE CHECKPOINTTABLE [[container. | catalog.]owner.table]
```

container. | catalog.
The Oracle pluggable database or SQL/MX catalog, if applicable. If this option is omitted, the catalog or pluggable database defaults to the one that is associated with the `SOURCEDB`, `USERID`, or `USERIDALIAS` portion of the `DBLOGIN` command (depending on the database).

owner.table
The owner and name of the checkpoint table. An owner and name are not required if they are the same as those specified with the `CHECKPOINTTABLE` parameter in the `GLOBALS` file.

Example

```
UPGRADE CHECKPOINTTABLE ggs.fin_check
```

1.81 ADD TRACETABLE

Use `ADD TRACETABLE` to create a trace table in the Oracle database. The trace table must reside in the schema of the Oracle GoldenGate Extract user, as configured with the `USERID` or `USERIDALIAS` parameter. The trace table prevents Replicat transactions from being extracted again in a bidirectional synchronization configuration.

Use the `DBLOGIN` command to establish a database connection before using this command.

The trace table has the following description.

Table 1-20 Description of trace table

Name	Null?	Type	Description
`GROUP_ID`	`NOT NULL`	`VARCHAR2(8)`	The name of the Replicat group or special run process.
`DB_USER`		`VARCHAR2(30)`	The user ID of the Replicat group or special run process.
`LAST_UPDATE`		`DATE`	The timestamp of the transaction.

Syntax

```
ADD TRACETABLE [[container.]owner.table]
```

container
The pluggable database, if the database is a multitenant container database (CDB).

owner.table
Optional, use only to specify a trace table with a name that is different from the default of `GGS_TRACE`. The owner must be the same owner that is specified with the `USERID` or `USERIDALIAS` parameter in the Extract parameter file.
To use the default name, omit this argument. Whenever possible, use the default table name. When using a trace table name other than the default of `GGS_TRACE`,

specify it with the `TRACETABLE` parameter in the Extract and Replicat parameter files. Record the name, because you will need it for the parameter files and to view statistics or delete the table. For more information, see TRACETABLE | NOTRACETABLE.

Examples

Example 1
The following adds a trace table with the default name of `GGS_TRACE`.

```
ADD TRACETABLE
```

Example 2
The following adds a trace table with a user-defined name of `ora_trace`.

```
ADD TRACETABLE ora_trace
```

1.82 DELETE TRACETABLE

Use `DELETE TRACETABLE` to delete a trace table. Use the `DBLOGIN` command to establish a database connection before using this command.

Syntax

```
DELETE TRACETABLE [[container.]owner.table]
```

`container`
The pluggable database, if the database is a multitenant container database (CDB).

`owner.table`
The owner and name of the trace table to be deleted. An owner and name are not required if the owner is the same as that specified with the `USERID` or `USERIDALIAS` parameter and the trace table has the default name of `GGS_TRACE`.

Example

```
DELETE TRACETABLE ora_trace
```

1.83 INFO TRACETABLE

Use the `INFO TRACETABLE` command to verify the existence of the specified trace table in the local instance of the database. If the table exists, Oracle GoldenGate displays the name and the date and time that it was created; otherwise Oracle GoldenGate displays a message stating that the table does not exist. Use the `DBLOGIN` command to establish a database connection before using this command.

Syntax

```
INFO TRACETABLE [[container.]owner.table]
```

`container`
The pluggable database, if the database is a multitenant container database (CDB).

owner.table
The owner and name of the trace table to be verified. An owner and name are not required if the owner is the same as that specified with the `USERID` or `USERIDALIAS` parameter and the trace table has the default name of `GGS_TRACE`.

Example

```
INFO TRACETABLE ora_trace
```

1.84 ALTER DATASTORE

Use the `ALTER DATASTORE` command to change the memory model that is used for interprocess communication by the Oracle GoldenGate Monitor data store. Before using this command, stop all Oracle GoldenGate processes, including Manager. See Administering Oracle GoldenGate Monitor for more information about the data store.

Syntax

```
ALTER DATASTORE {MMAP | SHM [ID n]}
```

`MMAP`
Indicates that the data store should use memory mapped files for interprocess communications.

`SHM [ID` ***`n`*** **`]`**
Indicates that the data store should use System V shared memory for interprocess communications. This option is not available on Windows platforms. If `ID` is not specified, a suitable default ID is used.

Examples

Example 1

```
ALTER DATASTORE MMAP
```

Example 2

```
ALTER DATASTORE SHM
```

Example 3

```
ALTER DATASTORE SHM ID 1000
```

1.85 CREATE DATASTORE

Use the `CREATE DATASTORE` command to create an Oracle GoldenGate Monitor data store in the Oracle GoldenGate installation directory. For more information, see Administering Oracle GoldenGate Monitor.

Syntax

```
CREATE DATASTORE [ MMAP | SHM [ID n] ]
```

`MMAP`
Indicates that the data store should use memory mapped files for interprocess communications.

`SHM [ID n]`
Indicates that the data store should use System V shared memory for interprocess communications. This option is not available on Windows platforms. If `ID` is not specified, a suitable default ID is used. `SHM` is the default.

Examples

Example 1

```
CREATE DATASTORE MMAP
```

Example 2

```
CREATE DATASTORE SHM
```

Example 3

```
CREATE DATASTORE SHM ID 1000
```

1.86 DELETE DATASTORE

Use the `DELETE DATASTORE` command to remove the Oracle GoldenGate Monitor data store from the Oracle GoldenGate installation directory. Before using this command, stop all Oracle GoldenGate processes, including Manager. For more information, see Administering Oracle GoldenGate Monitor.

Syntax

```
DELETE DATASTORE [ ! ]
```

!
(Exclamation point character) Bypasses the prompt that confirms the intent to remove the data store.

Examples

Example 1

```
DELETE DATASTORE
```

Example 2

```
DELETE DATASTORE !
```

1.87 INFO DATASTORE

Use the `INFO DATASTORE` command to display information about the Oracle GoldenGate Monitor data store. For more information, see Administering Oracle GoldenGate Monitor.

Syntax

```
INFO DATASTORE
```

1.88 REPAIR DATASTORE

Use the `REPAIR DATASTORE` command to repair the Oracle GoldenGate Monitor data store if it is corrupt or after an upgrade.

Before using this command, stop all Oracle GoldenGate processes, including Manager. For more information, see Administering Oracle GoldenGate Monitor.

Syntax

```
REPAIR DATASTORE
```

1.89 INFO JAGENT

Use the `INFO JAGENT` command to determine whether or not the Oracle GoldenGate Monitor JAgent is running. This command is an alias for `STATUS JAGENT`. For more information, see Administering Oracle GoldenGate Monitor.

Syntax

```
INFO JAGENT
```

1.90 START JAGENT

Use the `START JAGENT` command to start the Oracle GoldenGate Monitor JAgent process in a non-clustered environment. In a Windows cluster, start JAgent from the Cluster Administrator. For more information, see Administering Oracle GoldenGate Monitor.

Syntax

```
START JAGENT
```

1.91 STATUS JAGENT

Use the `STATUS JAGENT` command to determine whether or not the Oracle GoldenGate Monitor JAgent is running. This command is an alias for `INFO JAGENT`. For more information, see Administering Oracle GoldenGate Monitor.

Syntax

```
STATUS JAGENT
```

1.92 STOP JAGENT

Use the `STOP JAGENT` command to stop the Oracle GoldenGate Monitor JAgent process in a non-clustered environment. In a Windows cluster, stop JAgent from the Cluster Administrator. For more information, see Administering Oracle GoldenGate Monitor.

Syntax

```
STOP JAGENT [ ! ]
```

!
(Exclamation point character) Bypasses the prompt that confirms the intent to stop the JAgent.

Examples

Example 1

```
STOP JAGENT
```

Example 2

```
STOP JAGENT !
```

1.93 ADD HEARTBEATTABLE

Use `ADD HEARTBEATTABLE` to create the objects necessary to use the automatic heartbeat functionality. This command:

- creates a heartbeat seed table, heartbeat table, and heartbeat history table,
- creates the `GG_LAG` and `GG_LAG_HISTORY` views,
- creates the `GG_UPDATE_HB_TAB` and `GG_PURGE_HB_TAB` procedures that are called by the scheduler jobs,
- creates the scheduler jobs that periodically update the heartbeat and seed table, and purge the history table,
- populates the seed table.

The default seed, heartbeat, and history table names are `GG_HEARTBEAT_SEED`, `GG_HEARTBEAT`, and `GG_HEARTBEAT_HISTORY` respectively. The tables, procedures and scheduler jobs are created in the `GGSCHEMA` mentioned in GLOBALS file. The default names can be overridden by specifying `HEARTBEATTABLE` *`hbschemaname.hbtablename`* in the GLOBALS file. In this case, the tables, procedures, and jobs are created in the schema, *`hbschemaname`*. The seed and history table are created by appending a `_SEED` and `_HISTORY` to the table, *`hbtablename`*.

This command requires a `DBLOGIN`. On a CDB database, a PDB login is required.

For Oracle, the `ADD HEARTBEATTABLE` has to be performed in every PDB that you want to generate heartbeats for in CDB mode.

For DB2 LUW, you must set the `DB2_ATS_ENABLE` property with the `db2set DB2_ATS_ENABLE=yes` command.

For SQL/MX, the `GGSCHEMA` schema is not used so you must use a two or three-part name only. Additionally, there are no stored procedures or scheduler jobs.

Syntax

```
ADD HEARTBEATTABLE
[, FREQUENCY number in seconds]
[, RETENTION_TIME number in days] |
[, PURGE_FREQUENCY number in days]
```

`FREQUENCY`
Specifies how often the heartbeat seed table and heartbeat table are updated. For example, how frequently heartbeat records are generated. The default is 60 seconds.

RETENTION_TIME
Specifies when heartbeat entries older than the retention time in the history table are purged. The default is 30 days.

PURGE_FREQUENCY
Specifies how often the purge scheduler is run to delete table entries that are older than the retention time from the heartbeat history . The default is 1 day.

Examples

Example 1
The following command creates default heartbeat tables, procedures and jobs.

```
ADD HEARTBEATTABLE
```

Example 2
The following command creates the heartbeat tables, procedures and jobs with custom frequency, retention time, and purge frequency.

```
ADD HEARTBEATTABLE, frequency 120, retention_time 10, purge_frequency 2
```

1.94 ALTER HEARTBEATTABLE

Use `ALTER HEARTBEATTABLE` to alter existing seed, heartbeat, and history table options that you set with `ADD HEARTBEATTABLE`.

This command requires a `DBLOGIN`. On a CDB database, a PDB login is required.

Syntax

```
ALTER HEARTBEATTABLE
[, FREQUENCY number in seconds]
[, RETENTION_TIME number in days] |
[, PURGE_FREQUENCY number in days]
```

FREQUENCY
Alter frequency to zero (0) is equivalent to pausing the heartbeat. Heartbeat records can be resumed by altering frequency to a value greater than 0.

RETENTION_TIME
Changes the heartbeat retention time specified, in days.

PURGE_FREQUENCY
Changes the repeat interval, in days, of the purge heartbeat table.

Examples

```
ALTER HEARTBEATTABLE FREQUENCY 60

ALTER HEARTBEATTABLE RETENTION_TIME 30

ALTER HEARTBEATTABLE PURGE_FREQUENCY 1
```

1.95 DELETE HEARTBEATTABLE

Use `DELETE HEARTBEATTABLE` to delete tables, procedures, schedulers, and views. This command requires a `DBLOGIN`. On a CDB database, a PDB login is required.

Syntax

```
DELETE HEARTBEATTABLE group_name
```

`group_name`
The name of the process to be cleaned.

1.96 DELETE HEARTBEATENTRY

Use `DELETE HEARTBEATENTRY` to delete the records in the heartbeat table with the specified process name either in the incoming or outgoing path columns. This command required a `DBLOGIN`. On a CDB database, a PDB login is required.

Syntax

```
DELETE HEARTBEATENTRY group_name
```

`group_name`
The name of the process to be cleaned.

1.97 INFO HEARTBEATTABLE

Use `INFO HEARTBEATTABLE` to display information about the heartbeat tables configured in the database.

This command requires a `DBLOGIN`. On a CDB database, a PDB login is required.

Syntax

```
INFO HEARTBEATTABLE
```

1.98 !

Use the ! command to execute a previous GGSCI command without modifications. To modify a command before executing it again, use the FCcommand (see "FC"). To display a list of previous commands, use the HISTORY command (see "HISTORY").

The ! command without arguments executes the most recent command. Options enable you to execute any previous command by specifying its line number or a text substring. Previous commands can be executed again only if they were issued during the current session of GGSCI, because command history is not maintained from session to session.

Syntax

```
! [n | -n | string]
```

n
Executes the command from the specified GGSCI line. Each GGSCI command line is sequenced, beginning with 1 at the start of the session.

-n
Executes the command issued n lines before the current line.

string
Executes the last command that starts with the specified text string.

Example 1-1 Examples

Example 1

```
! 9
```

Example 2

```
! -3
```

Example 3

```
! sta
```

1.99 ALLOWNESTED | NOALLOWNESTED

Use the `ALLOWNESTED` and `NOALLOWNESTED` commands to enable or disable the use of nested `OBEY` files. A nested `OBEY` file is one that contains another `OBEY` file.

When you exit your GGSCI session, the next GGSCI session will revert back to `NOALLOWNESTED`.

For more information, see OBEY.

Syntax

```
ALLOWNESTED | NOALLOWNESTED
```

ALLOWNESTED
Enables the use of nested `OBEY` files. The maximum number of nested levels is 16.

NOALLOWNESTED
This is the default. An attempt to run a nested `OBEY` file in the default mode of `NOALLOWNESTED` will cause an error that is similar to the following:

```
ERROR: Nested OBEY scripts not allowed. Use ALLOWNESTED to allow nested scripts.
```

1.100 CREATE SUBDIRS

Use `CREATE SUBDIRS` when installing Oracle GoldenGate. This command creates the default directories within the Oracle GoldenGate home directory. Use `CREATE SUBDIRS` before any other configuration tasks.

Note:

The `dirbdb` is not created with `CREATE SUBDIRS`; it is only created with `CREATE DATASTORE`.

Syntax

```
CREATE SUBDIRS
```

1.101 DEFAULTJOURNAL

Use the `DEFAULTJOURNAL` command to set a default journal for multiple tables or files for the `ADD TRANDATA` command when used with a DB2 for i database, instead of having to use the `JOURNAL` keyword. Issue this command before issuing `ADD TRANDATA`. Any `ADD TRANDATA` command used without a journal assumes the journal from `DEFAULTJOURNAL`. To remove the use of a default journal, use the `CLEAR` option. To display the current setting of `DEFAULTJOURNAL`, you can issue the command without arguments.

Syntax

```
DEFAULTJOURNAL [library/journal] [CLEAR]
```

library/journal
The native name of the journal that you want to use as the default journal for `ADD TRANDATA`.

CLEAR
Stops the use of a default journal for `ADD TRANDATA`.

1.102 FC

Use `FC` to display edit a previously issued GGSCI command and then execute it again. Previous commands are stored in the memory buffer and can be displayed by issuing the `HISTORY` command (see "HISTORY").

Displaying Previous Commands

Issuing `FC` without arguments displays the most recent command. Options enable you to execute any previous command by specifying its line number or a text substring. Previous commands can be edited only if they were issued during the current GGSCI session, because history is not maintained from one session to another.

Editing Commands

The `FC` command displays the specified command and then opens an editor with a prompt containing a blank line starting with two dots. To edit a command, use the space bar to position the cursor beneath the character in the displayed command where you want to begin editing, and then use one of the following arguments. Arguments are not case-sensitive and can be combined.

Table 1-21 FC Editor Commands

Argument	Description

`i` *`text`*	Inserts text. For example:
	`GGSCI (SysA) 24> fc 9`
	`GGSCI (SysA) 24> send mgr`
	`GGSCI (SysA) 24..        i childstatus`
	`GGSCI (SysA) 24> send mgr childstatus`

`r` *`text`*	Replaces text. For example:
	`GGSCI (SysA) 25> fc 9`
	`GGSCI (SysA) 25> info mgr`
	`GGSCI (SysA) 25..     rextract extjd`
	`GGSCI (SysA) 25> info extract extjd`

`d`	Deletes a character. To delete multiple characters, enter a `d` for each one. For example:
	`GGSCI (SysA) 26> fc 10`
	`GGSCI (SysA) 26> info extract extjd, detail`
	`GGSCI (SysA) 26..                 dddddddd`
	`GGSCI (SysA) 26> info extract extjd`

`replacement text`	Replaces the displayed command with the text that you enter on a one-for-one basis. For example:
	`GGSCI (SysA) 26> fc 10`
	`GGSCI (SysA) 26> info mgr`
	`GGSCI (SysA) 26..     extract extjd`
	`GGSCI (SysA) 26> info extract extjd`

To execute the command, press **Enter** twice, once to exit the editor and once to issue the command. To cancel an edit, type a forward slash (/) twice.

Syntax

```
FC [n | -n | string]
```

`n`
Displays the command from the specified line. Each GGSCI command line is sequenced, beginning with 1 at the start of the session.

`-n`
Displays the command that was issued *`n`* lines before the current line.

`string`
Displays the last command that starts with the specified text string.

Examples

Example 1

```
FC 9
```

Example 2

```
FC -3
```

Example 3

```
FC sta
```

1.103 HELP

Use `HELP` to obtain information about an Oracle GoldenGate command. The basic command returns a list of command categories and the associated commands. The *`command`* option restricts the output to that of a specific command.

Syntax

```
HELP [command]
```

`command`
The command for which you want help.

Example

```
HELP add replicat
```

1.104 HISTORY

Use `HISTORY` to view a list of the most recently issued GGSCI commands since the startup of the GGSCI session. You can use the `!` command ("!") or the `FC` command ("FC") to re-execute a command in the list.

Syntax

```
HISTORY [n]
```

`n`
Returns a specific number of recent commands, where *`n`* is any positive number.

Example

```
HISTORY 7
```

The result of this command would be similar to:

```
1: start manager
2: status manager
3: info manager
4: send manager childstatus
5: start extract extjd
6: info extract extjd
7: history
```

1.105 INFO ALL

Use `INFO ALL` to display the status and lag (where relevant) for all Manager, Extract, and Replicat processes on a system. When Oracle Grid Infrastructure Agents (XAG) Clusterware components are in use, the relevant information is also displayed. The basic command, without options, displays only online (continuous) processes. To display tasks, use either `INFO ALL TASKS` or `INFO ALL ALLPROCESSES`.

The `Status` and `Lag at Chkpt` (checkpoint) fields display the same process status and lag as the `INFO EXTRACT` and `INFO REPLICAT` commands.

If Replicat is in coordinated mode, `INFO ALL` shows only the coordinator thread. To view information about individual threads, use INFO REPLICAT.

Example 1-2 Sample INFO ALL Output

```
Program       Status      Group       Lag at Chkpt    Time Since Chkpt
MANAGER       RUNNING
EXTRACT       ABENDED     EXTCUST     00:00:00        96:56:14
EXTRACT       STOPPED     INITDL
EXTRACT       STOPPED     INITDBL
```

Syntax

```
INFO ALL [TASKS | ALLPROCESSES]
```

`TASKS`
Displays information only for tasks.

`ALLPROCESSES`
Displays information for online processes and tasks.

Examples

Example 1

```
INFO ALL TASKS
```

Example 2

```
INFO ALL ALLPROCESSES
```

1.106 INFO MARKER

Use `INFO MARKER` to review recently processed markers from a NonStop system. A record is displayed for each occasion on which GGSCI, Logger, Extract, or Replicat processed the marker.

Markers can only be added on a NonStop system, using Oracle GoldenGate for NonStop for HP NonStop software.

The following is an example of the output.

```
Processed           Added               Diff     Prog    Group     Node
2012-02-16:14:41:15 2012-02-16:14:41:08 00:00:07 Extract PQACMD   \QAMD
                    GROUPCMD REPLICAT RQACMD CLOSEFILES
2012-02-16:14:41:13 2012-02-16:14:41:08 00:00:05 Extract PQACMD   \QAMD
                    TACLCMD REPLICAT RQACMD FUP PURGEDATA $QA16.QAETAR
```

Where:

- `Processed` is the local time that a program processed the marker.
- `Added` is the local time at which the marker was inserted into the NonStop audit trails or log trails.

- `Diff` is the time difference between the `Processed` and `Added` values. `Diff` can serve as an indicator of the lag between the user application and Extract and Replicat activities.
- `Prog` shows which process processed the marker, such as GGSCI, Logger, Extract or Replicat.
- `Group` shows the Extract or Replicat group or Logger process that processed the marker. `N/A` is displayed if GGSCI processed the marker.
- Node shows the node where the marker was inserted into the audit trails.
- There might be an additional column if user-defined text was included in the `ADD MARKER` statement.

Syntax

```
INFO MARKER [COUNT number]
```

`COUNT` ***`number`***
Restricts the list to a specified number of the most recent markers.

1.107 OBEY

Use `OBEY` to process a file that contains a list of Oracle GoldenGate commands. `OBEY` is useful for executing commands that are frequently used in sequence.

You can call one `OBEY` file from another one. This is called a nested `OBEY` file. You can nest up to 16 `OBEY` files. To use nested `OBEY` files, you must enable the functionality by first issuing the `ALLOWNESTED` command. See "ALLOWNESTED | NOALLOWNESTED".

Syntax

```
OBEY file_name
```

`file_name`
The relative or fully qualified path name of the file that contains the list of commands.

Examples

Example 1

```
OBEY ./mycommands.txt
```

The preceding command executes a file that looks similar to the following example:

```
add extract fin, tranlog, begin now
add exttrail dirdat/aa, extract fin
add extract hr, tranlog, begin now
add exttrail dirdat/bb, extract hr
start extract *
info extract *, detail
```

Example 2

The following example illustrates a nested `OBEY` file. Assume an `OBEY` file named `addcmds.txt`. Inside this file, there is another `OBEY` command that calls the `OBEY` file named `startcmds.txt`, which executes another set of commands.

```
OBEY ./addcmds.txt
```

(This OBEY statement executes the following:)

```
add extract fin, tranlog, begin now
add exttrail ggs/dirdat/aa, extract fin
add extract hr, tranlog, begin now
add exttrail ggs/dirdat/bb, extract hr
add replicat fin2, exttrail ggs/dirdat/aa, begin now
add replicat hr2, exttrail ggs/dirdat/bb, begin now
obey ./startcmds.txt
```

(The nested startcmds.txt file executes the following:)

```
start extract *
info extract *, detail
start replicat *
info replicat *, detail
```

1.108 SHELL

Use SHELL to execute shell commands from within the GGSCI interface.

Syntax

```
SHELL command
```

command
The system command to execute.

Examples

Example 1

```
SHELL dir dirprm\*
```

Example 2

```
SHELL rm ./dat*
```

1.109 SHOW

Use SHOW to display the Oracle GoldenGate environment.

Syntax

```
SHOW
```

Example

The following is sample SHOW output. Additional entries may be displayed, depending on the database type.

```
Parameter settings:
SET DEBUG      OFF
Current directory: C:\GG_81
Using subdirectories for all process files
Editor:  notepad
Reports (.rpt)                C:\GG_81\dirrpt
Parameters (.prm)             C:\GG_81\dirprm
Replicat Checkpoints (.cpr)   C:\GG_81\dirchk
Extract Checkpoints (.cpe)    C:\GG_81\dirchk
```

```
Process Status (.pcs)          C:\GG_81\dirpcs
SQL Scripts (.sql)             C:\GG_81\dirsql
Database Definitions (.def)    C:\GG_81\dirdef
```

1.110 VERSIONS

Use `VERSIONS` to display operating system and database version information. For ODBC connections, the driver version is also displayed. To include database information in the output, issue a `DBLOGIN` command before issuing `VERSIONS` to establish a database connection.

Syntax

```
VERSIONS
```

1.111 VIEW GGSEVT

Use `VIEW GGSEVT` to view the Oracle GoldenGate error log (`ggserr.log` file). This file contains information about Oracle GoldenGate events, such as process startup, shutdown, and exception conditions. This information is recorded in the system error log, too, but viewing the Oracle GoldenGate error log sometimes is more convenient and may retain events further back in time.

The display can be lengthy. To exit the display before reaching the end, use the operating system's standard methods for terminating screen output.

Syntax

```
VIEW GGSEVT
```

Example

The following is sample `VIEW GGSEVT` output:

```
2011-01-08 11:20:56  GGS INFO     301  GoldenGate Manager for Oracle,
mgr.prm:  Command received from GUI (START GGSCI ).
2011-01-08 11:20:56  GGS INFO     302  GoldenGate Manager for Oracle,
mgr.prm:  Manager started GGSCI process on port 7840.
2011-01-08 11:21:31  GGS INFO     301  GoldenGate Manager for Oracle,
mgr.prm:  Command received from GUI (START GGSCI ).
```

1.112 VIEW REPORT

Use `VIEW REPORT` to view the process report or the discard filet hat is generated by Extract or Replicat. Each process generates a new report and discard file upon startup.

Reports and discard files are aged whenever a process starts. Old files are appended with a sequence number, for example `finance0.rpt`, `finance1.rpt`, and so forth, or `discard0.dsc`, `discard1.dsc`, and so forth.

Syntax

```
VIEW REPORT group_name[version]
```

`group_name`
The name of the Extract or Replicat group. The command assumes the report file named *`group`*`.rpt` or the discard file named *`group`*`.dsc` in the Oracle GoldenGate `dirrpt` sub-directory.

`version`
The relative file name if stored in the default location, or the full path name if not stored in the default location.

Examples

Example 1
View the most recent (active) report.

```
VIEW REPORT MYEXT
```

Example 2
View the second most recent report.

```
VIEW REPORT MYEXT0
```

Example 3
View the eleventh most recent report.

```
VIEW REPORT MYEXT9
```

Example 4
The following displays a specific discard file identified by its file name. Note that the file name has a non-default file extension.

```
VIEW REPORT dirrpt\orders.rpt
```

1.113 ADD CHECKPOINTTABLE

Not valid for Replicat for Java, Oracle GoldenGate Applications Adapter, or Oracle GoldenGate Big Data.

Use `ADD CHECKPOINTTABLE` to create a checkpoint table in the target database. Replicat uses the table to maintain a record of its read position in the trail for recovery purposes.

The use of a checkpoint table is strongly recommended, because it causes checkpoints to be part of the Replicat transaction. This allows Replicat to recover more easily in certain circumstances than when a checkpoint file alone is used. However, do not use a checkpoint table when configuring Replicat to operate in integrated mode against an Oracle target database. It is not required in that mode.

One table can serve as the default checkpoint table for all Replicat groups in an Oracle GoldenGate instance if you specify it with the `CHECKPOINTTABLE` parameter in a `GLOBALS` file. More than one instance of Oracle GoldenGate (multiple installations) can use the same checkpoint table. Oracle GoldenGate keeps track of the checkpoints even when the same Replicat group name exists in different instances.

Use the `DBLOGIN` command to establish a database connection before using this command. Do not change the names or attributes of the columns in this table. You may, however, change table storage attributes.

For more information about using a checkpoint table, see *Administering Oracle GoldenGate for Windows and UNIX*.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about checkpoints.

Syntax

```
ADD CHECKPOINTTABLE [[container. | catalog.]owner.table]
```

`container. | catalog.`
The Oracle pluggable database or SQL/MX catalog, if applicable. If this option is omitted, the catalog or pluggable database defaults to the one that is associated with the `SOURCEDB`, `USERID`, or `USERIDALIAS` portion of the `DBLOGIN` command (depending on the database) .

`owner.table`
The owner and name of the checkpoint table to be created. The name cannot contain any special characters, such as quotes, backslash, dollar sign, and percent symbol. The name of a MySQL checkpoint table can contain no more than 30 characters.
The owner and name can be omitted if you are using this table as the default checkpoint table and it is listed with `CHECKPOINTTABLE` in the `GLOBALS` file.
It is recommended, but not required, that the table be created in a schema dedicated to Oracle GoldenGate. If an owner and name are not specified, a default table is created based on the `CHECKPOINTTABLE` parameter in the `GLOBALS` parameter file.
Record the name of the table, because you will need it to view statistics or delete the table if needed.

Examples

Example 1
The following adds a checkpoint table with the default name specified in the `GLOBALS` file.

```
ADD CHECKPOINTTABLE
```

Example 2
The following adds a checkpoint table with a user-defined name.

```
ADD CHECKPOINTTABLE ggs.fin_check
```

2

Oracle GoldenGate Native Commands

This chapter contains reference information for commands that can be used to control Oracle GoldenGate from the native command line of the operating system (outside the GGSCI command interface). This enables you to include the commands in scripts to run programs non-interactively.

2.1 Summary of Oracle GoldenGate IBM i Native Commands

This section summarizes the commands that can be issued directly from the native command line of the Linux, UNIX, Windows, or IBM i platforms. For the purpose of this document, commands issued from the IBM i PASE environment are considered UNIX commands.

On the IBM i platform, these commands are stored in the Oracle GoldenGate installation library and can be used instead of issuing them from a PASE environment. With this support, it is possible to use the typical job submission tools such as SBMJOB to operate the Oracle GoldenGate product. If submitted to batch, the output is written to a spool file, and only job messages and any exceptions are written to the job log. In a typical installation, a batch submitted command should have both a `QPRINT` output spool file and a joblog spool file.

To use the native commands from the IBM CLI, you need only include the Oracle GoldenGate installation library in the library list, or reference it explicitly through a qualified name such as *`OGGLIB`*/GGSCI. During the execution of the command the current directory will be set to the Oracle GoldenGate installation directory, and all appropriate environment variables will be set to operate the Oracle GoldenGate commands. Therefore, the paths for any parameter that can take a path may be specified either as an absolute path name or as a relative path name based at the Oracle GoldenGate installation directory. The `OTHERS` parameter of the IBM i CLI commands is used to allow the specification of other parameters not explicitly exposed by the IBM i CLI commands. For example, if you want to specify `REPORTFILE` and `PROCESSID` for Extract, you would use the following syntax:

```
EXTRACT PARAMFILE('dirprm/myext.prm') OTHERS(REPORTFILE 'dirrpt/myext.rpt' PROCESSID
myext)
```

Note:

Normally, Extract and Replicat should be run from GGSCI, but some situations, such as certain initial load procedures, require running them from the command line of the operating system.

Table 2-1 Commands

Command	Description
checkprm	Assess the validity of the specified parameter file.
convchk	Converts the trail files from 9 digit to 6 digit checkpoint record for the named Extract group.
defgen	Runs the DEFGEN program. This program generates data definitions in a file that is transferred to a remote system to support the retrieval of object metadata.
extract	Runs the Extract program. This program captures either full data records or transactional data changes, depending on configuration parameters, and then sends the data to a trail for further processing by a downstream process, such as a data-pump Extract or the Replicat process.
ggsci	Runs the Oracle GoldenGate command line interface.
keygen	Runs the KEYGEN utility. This utility generates encryption keys to support Oracle GoldenGate security.
logdump	Runs the Logdump utility. This utility enables the contents of a trail file to be viewed for the purpose of troubleshooting. This command takes no arguments. For more information about Logdump, see Logdump Reference for Oracle GoldenGate.

Table 2-1 (Cont.) Commands

Command	Description
mgr	Runs the Manager program. Manager is the parent process of Oracle GoldenGate and is responsible for the management of its processes and files, resources, user interface, and the reporting of thresholds and errors.
replicat	Runs the Replicat program. This program reads a trail, performs mapping and manipulation as needed, and applies the data to a target database.

2.2 checkprm

Use the `checkprm` command to assess the validity of the specified parameter file, with a configurable application and running environment. It can provide either a simple `PASS/FAIL` or with optional details about how the values of each parameter are stored and interpreted.

When you use `checkprm` and do not use any of these arguments, then `checkprm` attempts to automatically detect Extract or Replicat and the platform and database of the Oracle GoldenGate installation.

For more information about using `checkprm`, see olink:GWUAD473*Administering Oracle GoldenGate for Windows and UNIX*.

Syntax

```
checkprm
[None]
[-v]
[? | help]
[parameter_file]
[-COMPONENT | -C) component_name]
[-MODE | -M) mode_name]
[-PLATFORM | -P) platform_name]
[-DATABASE | -D) database _ame]
[-VERBOSE | -V)]
```

None
Displays usage information.

-v
Displays banner. Cannot be combined with other options. Does not produce verbose (`-VERBOSE | -V`) output.

`? | help`
Displays detailed usage information, include all possible values of each option. Cannot be combine with other options.

`parameter_file`
Specifies the name of the parameter file, has to be the first argument if a validation is requested. You must specify the absolute path to the parameter file. For example, `CHECKPRM ./dirprm/myext.prm`.

`-COMPONENT | -C` ***`component_name`***
Specifies the running component (application) that this parameter file is validated for. This option can be omitted for Extract or Replicat because automatic detection is attempted. Valid values include:

```
CACHEFILEDUMP COBGEN CONVCHK CONVPRM DDLCOB DEFGEN EMSCLNT EXTRACT GGCMD GGSCI
KEYGEN LOGDUMP
MGR OGGERR REPLICAT RETRACE
REVERSE SERVER GLOBALS
```

There is no default for this option.

`-MODE | -M` ***`mode_name`***
Specifies the mode of the running application if applicable. This option is optional, only applicable to Extract or Replicat.
Valid input of this option includes:

- Classic Extract
- Integrated Extract
- Initial Load Extract
- Remote Task Extract
- Data Pump Extract
- Passive Extract
- Classic Replicat
- Coordinated Replicat
- Integrated Replicat
- Special Run Replicat
- Remote Task
- Replicat All

When key in the value for this option, the application name is optional, as long as it matches the value of component. For example, `"Â"Data Pump ExtractÂ"` is equivalent to `"Â"Data PumpÂ"` if the component is Extract. However, it is invalid if the component is Replicat.

`-PLATFORM | -P` ***`platform_name`***
Specifies the platform the application is supposed to run on. The default value is the platform that this `checkprm` executable is running on.
The possible values are:

```
AIX HP-OSS HPUX-IT HPUX-PA
Linux OS400 ZOS Solaris SPARC
Solaris x86 Windows x64 All
```

`-DATABASE | -D` *`database_name`*
Specifies the database the application is built against. The default value is the database for your Oracle GoldenGate installation.
The database options are:

```
Generic Oracle 8 Oracle 9i
Oracle 10g Oracle 11g Oracle 12c
Sybase DB2LUW 9.5 DB2LUW 9.7
DB2LUW 10.5 DB2LUW 10.1 DB2 Remote
Teradata Timesten Timesten 7
Timesten 11.2.1 MySQL Ctree8
Ctree9 DB2 for I DB2 for i Remote
MS SQL Informix Informix1150
Informix1170 Informix1210 Ingres
SQL/MX DB2 z/OS PostgreSQL
```

`-VERBOSE | -V`
Directs `checkprm` to display detailed parameter information, to demonstrate how the values are read and interpreted. It must be the last option specified in a validation and provides more information than the `-v` option.

2.3 convchk

Use the `convchk` command to convert trail files from 9 digit to 6 digit checkpoint record for the named extract group.

For more information about using `convchk`, see *Administering Oracle GoldenGate for Windows and UNIX*.

Syntax for Windows, UNIX, and Linux

```
convchk <checkpoint_group> <trail_name> (SEQLEN_9D | SEQLEN_6D) [-force]
```

`checkpoint_group`
The name of the Extract group writing the trail.

`trail_name`
The relative or fully qualified path name of the trail that was used with the `ADD EXTRAIL` command or `ADD RMTTRAIL` command.

`seqlen_9d`
Sets the sequence length to 9 digits. This is the default.

`seqlen_6d`
Sets the sequence length to 6 digits.

`-force`
Optional, not recommended. It can be used if the Extract was not stopped gracefully.

2.4 defgen

Use `defgen` to run the DEFGEN utility from the command line of the Linux, UNIX, Windows, or IBM i operating system. The `defgen` command is installed in the Oracle GoldenGate installation directory or library.

For more information about using DEFGEN, see *Administering Oracle GoldenGate for Windows and UNIX*.

Syntax for Windows, UNIX, and Linux

```
defgen paramfile parameter_file
[CHARSET character_set]
[COLCHARSET character_set]
[noextattr]
[pauseatend | nopauseatend]
[reportfile report_file]
```

The following syntax can also be used without any other options:

```
defgen defs_file updatecs charset
```

`defgen`
Used without options, the command runs the program interactively.

`paramfile` *`parameter_file`*
Required. Specifies the relative or absolute path name of the parameter file for the DEFGEN program that is being run.

`CHARSET` *`character_set`*
Any supported character set. See CHARSET for more information.

`COLCHARSET` *`character_set`*
Any supported character set. See COLCHARSET for more information.

`noextattr`
Can be used to support backward compatibility with Oracle GoldenGate versions that are older than Release 11.2.1 and do not support character sets other than ASCII, nor case-sensitivity or object names that are quoted with spaces. `NOEXTATTR` prevents DEFGEN from including the database locale and character set that support the globalization features that were introduced in Oracle GoldenGate Release 11.2.1. If the table or column name has multi-byte or special characters such as white spaces, DEFGEN does not include the table definition when `NOEXTATTR` is specified. If `APPEND` mode is used in the parameter file, `NOEXTATTR` is ignored, and the new table definition is appended in the existing file format, whether with the extra attributes or not.

`pauseatend | nopauseatend`
(Windows only) When the process stops, requires an Oracle GoldenGate user to look at the console output and then strike any key to clear it. Also indicates whether the process ended normally or abnormally.

`reportfile` *`report_file`*
Sends command output to the specified report file. Without the `reportfile` option, the command output is printed to the screen.

`defs_file`* `updatecs` *`charset`
Converts the character set of a definitions file to a different character set if the file is transferred to an operating system with an incompatible character set. This procedure takes the name of the definitions file and the targeted character set as input. For example: `defgen ./dirdef/source.def UPDATECS UTF-8`.
`updatecs` helps in situations such as when a Japanese table name on Japanese Windows is written in Windows CP932 to the data-definitions file, and then the definitions file is transferred to Japanese UNIX. The file cannot be used unless the UNIX is configured in PCK locale. Thus, you must use `updatecs` to convert the encoding of the definitions file to the correct format.

Syntax for IBM i CLI

```
DEFGEN PARAMFILE(input_file)
[OTHERS(other_options)]
```

`PARAMFILE(`*`input_file`*`)`
The input text file, known as an `OBEY` file, containing the commands that you want to issue, in the order they are to be issued, one command per line. The name can be anything supported by the operating system.

`OTHERS(`*`other_options`*`)`
Any options that are supported in the UNIX version of the command provided as a space separated list.

2.5 extract

Use `extract` to run the Extract program from the command line of the Linux, UNIX, Windows, or IBM i operating system. The `extract` command is installed in the Oracle GoldenGate installation directory or library.

Syntax for Windows, UNIX, and Linux

```
extract paramfile parameter_file
[atcsn CSN | aftercsn CSN]
[initialdataload]
[pauseatend | nopauseatend]
[processid PID]
[reportfile report_file]
[usesubdirs | nousesubdirs]
```

`extract`
Used without options, the command runs the program interactively.

`paramfile` ***`parameter_file`***
Required. Specifies the relative or absolute path name of the parameter file for the Extract program that is being run. The default location is the `dirprm` subdirectory of the Oracle GoldenGate installation directory.

`atcsn` ***`CSN`*** **`|`** **`aftercsn`** ***`CSN`***
Starts the process at or after the specified commit sequence number (CSN). For more information, see "START EXTRACT".

`initialdataload`
Runs Extract to extract all of the data records directly from the source database to support an initial load to the target.

`pauseatend | nopauseatend`
(Windows only) When the process stops, requires an Oracle GoldenGate user to look at the console output and then strike any key to clear it. Also indicates whether the process ended normally or abnormally.

`processid` ***`PID`***
A name for the process. This name must match the name that is specified for the `EXTRACT` parameter in the parameter file. Use one alphanumeric word. When used on

IBM i, this name (up to the first 10 characters) will be used as the job name in the IBM i job list.

`reportfile` ***`report_file`***
Sends command output to the specified report file. Without the `reportfile` option, the command output is printed to the screen. The default is the `dirrpt` subdirectory of the Oracle GoldenGate installation directory.

`usesubdirs | nousesubdirs`
Includes the Oracle GoldenGate subdirectories when the process searches for a file to open. `usesubdirs` is the default.

Syntax for IBM i CLI

```
EXTRACT PARAMFILE(input_file)
[OTHERS(other_options)]
```

`PARAMFILE(`*`input_file`*`)`
The input text file, known as an `OBEY` file, containing the commands that you want to issue, in the order they are to be issued, one command per line. The name can be anything supported by the operating system.

`OTHERS(`*`other_options`*`)`
Any options that are supported in the UNIX version of the command provided as a space separated list.

2.6 ggsci

Use the `ggsci` command to run the GGSCI command interface from the command line of the operating system. Optionally, you can provide input from an `OBEY` file. For more information about using an input file into GGSCI, see Storing and Calling Frequently Used Command Sequences in *Administering Oracle GoldenGate for Windows and UNIX*.

Syntax for Windows, UNIX, and Linux

```
ggsci[ < input_file]
[cd directory]
[log | nolog]
```

`<`
Pipes the input file into the GGSCI program.

`ggsci`
Used without options, the command runs the program interactively.

`cd` ***`directory`***
Changes the current working directory of the process. The process will use the specified directory for all of its operations, such as opening and writing files.

`input_file`
The input text file, known as an `OBEY` file, containing the commands that you want to issue, in the order they are to be issued, one command per line. The name can be anything supported by the operating system.

`log | nolog`
Enables or suppresses the logging of GGSCI commands to the report file. The default is `log`. The following commands are logged: `ADD`, `ALTER`, `CREATE`, `DELETE`, `INFO`, `START`, `STOP`, `CLEANUP`, `SEND`, `KILL`, `EDIT`, `REFRESH`.

Syntax for IBM i CLI

```
GGSCI [PARAMFILE (input_file)] [OTHERS(other_options)]
```

`PARAMFILE(`*`input_file`*`)`
The input text file, known as an `OBEY` file, containing the commands that you want to issue, in the order they are to be issued, one command per line. The name can be anything supported by the operating system.

`OTHERS(`*`other_options`*`)`
Any options that are supported in the UNIX version of the command provided as a space separated list.

2.7 keygen

Use `keygen` to generate one or more encryption keys to use with Oracle GoldenGate security features that use an `ENCKEYS` file. The key values are returned to your screen. You can copy and paste them into the `ENCKEYS` file. For more information, see *Administering Oracle GoldenGate for Windows and UNIX*.

Syntax

```
KEYGEN key_length n
```

`keygen`
Used without options, the command runs the program interactively.

`key_length`
The length of the encryption key, up to 256 bits (32 bytes).

`n`
The number of keys to generate.

Syntax for IBM i CLI

```
KEYGEN [KEYLEN(key_length)] [NUMKEYS(n)]
```

`KEYGEN(`*`key_length`*`)`
The length of the encryption key, up to 256 bits (32 bytes).

`NUMKEYS(`*`n`*`)`
The number of keys to generate.

2.8 logdump

Use logdump to run the Logdump utility. This command takes no arguments and runs interactively. For more information about the Logdump utility, see *Logdump Reference for Oracle GoldenGate*.

Syntax for Windows, UNIX, and Linux

```
logdump
```

Syntax for IBM i CLI

```
LOGDUMP
```

2.9 mgr

Use `mgr` to run the Manager program from the command line of the Linux, UNIX, Windows, or IBM i operating system. The `mgr` command is installed in the Oracle GoldenGate installation directory or library.

Syntax for Windows, UNIX, and Linux

```
mgr paramfile parameter_file
[cd directory]
[pauseatend | nopauseatend]
[port portnum]
[reportfile report_file]
[usesubdirs | nousesubdirs]
```

`mgr`
Used without options, the command runs the program interactively.

`paramfile` ***`parameter_file`***
Specifies the relative or absolute path name of the parameter file for the Manager program that is being run.

`cd` ***`directory`***
Changes the current working directory of the process. The process will use the specified directory for all of its operations, such as opening and writing files.

`pauseatend | nopauseatend`
(Windows only) When the process stops, requires an Oracle GoldenGate user to look at the console output and then strike any key to clear it. Also indicates whether the process ended normally or abnormally.

`port` ***`portnum`***
The number of the first port that Manager will check to start a connection. If this port number is not available, Manager increments the number by one and continues incrementing until it finds a port number that is available. However, if a port number is specified in the Manager parameter file, that number takes precedence as the start point for this search.

`reportfile` ***`report_file`***
Sends command output to the specified report file. Without the `reportfile` option, the command output is printed to the screen.

`usesubdirs | nousesubdirs`
Includes the Oracle GoldenGate subdirectories when the process searches for a file to open. `usesubdirs` is the default.

Syntax for IBM i CLI

```
MGR PARAMFILE(input_file)
[OTHERS(other_options)]
```

`PARAMFILE(`*`input_file`*`)`
The input text file, known as an `OBEY` file, containing the commands that you want to issue, in the order they are to be issued, one command per line. The name can be anything supported by the operating system.

`OTHERS(`*`other_options`*`)`
Any options that are supported in the UNIX version of the command provided as a space separated list.

2.10 replicat

Use `replicat` to run the Replicat program from the command line of the Linux, UNIX, Windows, or IBM i operating system. The `replicat` command is installed in the Oracle GoldenGate installation directory or library.

Syntax for Window, UNIX, and Linux

```
replicat paramfile parameter_file
[{atcsn CSN | aftercsn CSN} [threads(thread_list)]]
[filterduptransactions]
[initialdataload]
[pauseatend | nopauseatend]
[processid PID]
[reportfile report_file]
[skiptransaction [threads(thread_list)]]
[usesubdirs | nousesubdirs]
```

`replicat`
Used without options, the command runs the program interactively.

`paramfile` ***`parameter_file`***
Specifies the relative or absolute path name of the parameter file for the Replicat program that is being run. The default location is the `dirprm` subdirectory of the Oracle GoldenGate installation directory.

`atcsn` ***`CSN`*** **`|`** **`aftercsn`** ***`CSN`*** **`[threads(`*`thread_list`*`)]`**
Starts the process at or after the specified commit sequence number (CSN). For more information, see "START REPLICAT".

`filterduptransactions`
Causes Replicat to ignore transactions that it has already processed. For more information, see "START REPLICAT".

`initialdataload`
Runs Replicat to apply all of the data as an initial load to populate the target.

`pauseatend | nopauseatend`
(Windows only) When the process stops, requires an Oracle GoldenGate user to look at the console output and then strike any key to clear it. Also indicates whether the process ended normally or abnormally.

processid *PID*
A name for the process. This name must match the name that is specified for the `REPLICAT` parameter in the parameter file. Use one alphanumeric word. When used on IBM i, this name (up to the first 10 characters) will be used as the job name in the IBM i job list.

reportfile *report_file*
Sends command output to the specified report file. Without the `reportfile` option, the command output is printed to the screen. The default is the `dirrpt` subdirectory of the Oracle GoldenGate installation directory.

skiptransaction [threads(*thread_list*)]
Causes the process to skip the first transaction after its expected startup position in the trail. For more information, see "START REPLICAT".

usesubdirs | nousesubdirs
Includes the Oracle GoldenGate subdirectories when the process searches for a file to open. `usesubdirs` is the default.

Syntax for IBM i CLI

```
REPLICAT PARAMFILE(input_file)
[OTHERS(other_options)]
```

PARAMFILE(*input_file*)
The input text file, known as an `OBEY` file, containing the commands that you want to issue, in the order they are to be issued, one command per line. The name can be anything supported by the operating system.

OTHERS(*other_options*)
Any options that are supported in the UNIX version of the command provided as a space separated list.

3
Oracle GoldenGate Parameters

This chapter contains summaries of the Oracle GoldenGate parameters that control processing, followed by detailed descriptions of each parameter in alphabetical order. For instructions on creating, changing, and storing Oracle GoldenGate parameter files, see Administering Oracle GoldenGate for Windows and UNIX.

Topics:

3.1 Summary of Oracle GoldenGate Parameters

This section summarizes the Oracle GoldenGate parameters by module and purpose and includes the following topics:

- Summary of GLOBALS Parameters
- Summary of Manager Parameters
- Summary of Parameters Common to Extract and Replicat
- Summary of Extract Parameters
- Summary of Replicat Parameters
- Summary of Wildcard Exclusion Parameters
- Summary of DEFGEN Parameters
- Summary of DDL Parameters

3.1.1 Summary of GLOBALS Parameters

The `GLOBALS` file stores parameters that relate to the Oracle GoldenGate instance as a whole, as opposed to runtime parameters for a specific process.

Table 3-1 All GLOBALS Parameters

Parameter	Description
ALLOWOUTPUTDIR	Use to `ALLOWOUTPUTDIR` specify the allowed output trail directory (including its subdirectories) through `\u000b`.
CHARMAP	Specifies that the character mapping file overrides the character code point mapping.
CHARSET	Specifies a multibyte character set for the process to use instead of the operating system default when reading the parameter file.
CHECKPOINTTABLE	Specifies a default checkpoint table.
CREDENTIALSTORELOCATION	Specifies the location of the Oracle GoldenGate credential store that stores login credentials.
CRYPTOENGINE	Selects which cryptographic library will the OGG processes use to provide implementation of security primitives.

Table 3-1 (Cont.) All GLOBALS Parameters

Parameter	Description
DDLTABLE	Specifies a non-default name for the DDL history table that supports DDL synchronization for Oracle.
ENABLECATALOGNAMES	Enables support for three-part names for SQL/MX databases.
ENABLE_HEARTBEAT_TABLE | DISABLE_HEARTBEAT_TABLE	Enables the processing of heartbeat tables.
ENABLEMONITORING	Enables Oracle GoldenGate Monitor to view and monitor Oracle GoldenGate instances.
EXCLUDEWILDCARDOBJECTSONLY	Includes non-wildcarded source tables when a `TABLEEXCLUDE`, `SCHEMAEXCLUDE`, or `CATALOGEXCLUDE` parameter contains a wildcard.
GGSCHEMA	Specifies the name of the schema that contains the database objects that support heartbeat tables and DDL synchronization for Oracle.
HEARTBEATTABLE	Specifies the name of the heartbeat table.
MARKERTABLE	Specifies a non-default name for the DDL marker table that supports DDL synchronization for Oracle.
MAXGROUPS	Specifies the maximum number of process groups that can run in an instance of Oracle GoldenGate.
MGRSERVNAME	Specifies the name of the Manager process when it is installed as a Windows service.
NAMECCSID	Specifies a DB2 for i CCSID if the object names in the SQL catalog are of a different CCSID than the system.
NODUPMSGSUPPRESSION	Prevents the automatic suppression of duplicate informational and warning messages.
OUTPUTFILEUMASK	Specifies a umask that can be used by Oracle GoldenGate processes to create trail files and discard files.
USEANSISQLQUOTES | NOUSEANSISQLQUOTES	Enables SQL-92 rules for quoted object names and literals.
SYSLOG	Filters the types of Oracle GoldenGate messages that are written to the system logs.
TRAILBYTEORDER	Specifies the byte order (endianness) of a file created with the `EXTFILE`, `RMTFILE`, `EXTTRAIL`, or `RMTTRAIL` parameter.
TRAIL_SEQLEN_6D | TRAIL_SEQLEN_9D	Controls the sequence length for trail files.
UPREPORT	Specifies the frequency with which Manager reports Extract and Replicat processes that are running. Every time one of those processes starts or stops, events are generated.
USE_TRAILDEFS | NO_USE_TRAILDEFS	Controls where the data pump and Replicat processes obtain the table definitions when the trail files contain full table definitions.
USEIPV4	Forces Oracle GoldenGate to use IPv4 for TCP/IP connections.
USEIPV6	Forces Oracle GoldenGate to use IPv6 for TCP/IP connections.
WALLETLOCATION	Specifies the location of the master key wallet.

Table 3-1 (Cont.) All GLOBALS Parameters

Parameter	Description
XAGENABLE	Enables the Oracle GoldenGate Transparent Integration with Clusterware feature that allows you to continue using GGSCI to start and stop manager when GoldenGate instance is under the management of Oracle Grid Infrastructure Bundled Agents (XAG)).

3.1.2 Summary of Manager Parameters

Manager is the parent process of Oracle GoldenGate and is responsible for the management of its processes, resources, user interface, and the reporting of thresholds and errors. In most cases default settings for Manager suffice.

Table 3-2 Manager Parameters: General

Parameter	Description
ACCESSRULE	Adds security access rules for Manager.
CHARSET	Specifies a multibyte character set for the process to use instead of the operating system default when reading the parameter file.
COMMENT | --	Allows insertion of comments in a parameter file.
SOURCEDB	Specifies a data source name as part of the login information.
USERIDALIAS	Provides login information for Manager when it needs to access the database.

Table 3-3 Manager Parameters: Port Management

Parameter	Description
DYNAMICPORTLIST	Specifies the ports that Collector can dynamically allocate.
PORT	Establishes the TCP/IP port number on which Manager listens for requests.

Table 3-4 Manager Parameters: Process Management

Parameter	Description
AUTORESTART	Specifies processes to be restarted by Manager after a failure.
AUTOSTART	Specifies processes to be started when Manager starts.
BOOTDELAYMINUTES	Determines how long after system boot time Manager delays until performing main processing activities. This parameter supports Windows.
MONITORING_HEARTBEAT_TIMEOUT	Sets a process as non-responsive in a specified number of seconds.
UPREPORT	Determines how often process heartbeat messages are reported.

Table 3-5 Manager Parameters: Event Management

Parameter	Description
DOWNREPORT	Controls the frequency for reporting stopped processes.
LAGCRITICAL	Specifies a lag threshold that is considered critical and generates a warning to the error log.
LAGINFO	Specifies a lag threshold at which an informational message is reported to the error log.
LAGREPORT	Sets an interval for reporting lag time to the error log.

Table 3-6 Manager Parameters: Maintenance

Parameter	Description
CHECKMINUTES	Determines how often Manager cycles through maintenance activities.
PURGEDDLHISTORY | PURGEDDLHISTORYALT	Purges rows from the Oracle DDL history table when they are no longer needed.
PURGEMARKERHISTORY	Purges Oracle marker table rows that are no longer needed.
PURGEOLDEXTRACTS for Extract and Replicat	Purges trail data that is no longer needed.
PURGEOLDEXTRACTS for Manager	Purges trail files when processing has finished; Oracle recommends use of this parameter rather than the `PURGEOLDEXTRACTS` for Extract and Replicat parameter.
PURGEOLDTASKS	Purges Extract and Replicat tasks after a specified period of time.
STARTUPVALIDATIONDELAY[CSECS]	Sets a delay time after which Manager checks that processes are still running after startup.
VERIDATAREPORTAGE	Purges old Veridata report files when they have reached the specified age limit.

3.1.3 Summary of Parameters Common to Extract and Replicat

These parameters are available for both the Extract and Replicat processes.

Table 3-7 Parameters Common to Extract and Replicat: General

Parameter	Description
ALLOCFILES	Controls the incremental number of memory structures that are allocated after the initial memory allocation specified by the `NUMFILES` parameter is reached.
CHARSET	Specifies a multibyte character set for the process to use instead of the operating system default when reading the parameter file.
CHECKPARAMS	Verifies parameter file syntax.
COMMENT | --	Denotes comments in a parameter file.

Table 3-7 (Cont.) Parameters Common to Extract and Replicat: General

Parameter	Description
GETENV	Retrieves variables that were set with the `SETENV` parameter.
OBEY	Processes parameter statements contained in a different parameter file.
SETENV	Specifies a value for a UNIX environment variable from within the GGSCI interface.
TRACETABLE | NOTRACETABLE	Specifies a trace table to which Replicat adds a record whenever it updates the target database. Causes Extract to ignore database changes generated by Replicat. Supports Oracle bi-directional replication.
USERID | NOUSERID	Specifies database connection information.
USERIDALIAS	Specifies database connection information when a credential store is in use.

Table 3-8 Parameters Common to Extract and Replicat: Selection, Converting, and Mapping Data

Parameter	Description
ALLOWDUPTARGETMAP | NOALLOWDUPTARGETMAP	Allows the same source-target `MAP` statement to appear more than once in the parameter file.
ASCIITOEBCDIC	Converts ASCII text to EBCDIC for DB2 on z/OS systems running UNIX System Services.
CATALOGEXCLUDE	Excludes the specified source container or catalog from a wildcard specification.
COLMATCH	Establishes global column-mapping rules.
DDL	Enables and filters the capture of DDL operations.
DDLSUBST	Enables string substitution in DDL processing.
GETDELETES | IGNOREDELETES	Controls the extraction of delete operations.
GETINSERTS | IGNOREINSERTS	Controls the extraction of insert operations.
GETTRUNCATES | IGNORETRUNCATES	Controls the extraction of truncate statements.
GETUPDATEAFTERS | IGNOREUPDATEAFTERS	Controls the extraction of update after images.
GETUPDATEBEFORES | IGNOREUPDATEBEFORES	Controls the extraction of update before images.
GETUPDATES | IGNOREUPDATES	Controls the extraction of update operations.

Table 3-8 (Cont.) Parameters Common to Extract and Replicat: Selection, Converting, and Mapping Data

Parameter	Description
NAMECCSID	Specifies a DB2 for i CCSID if the object names in the SQL catalog are of a different CCSID than the system.
PROCEDURE	Specifies which feature groups of procedure calls are included or excluded during procedural replication.
REPLACEBADCHAR	Replaces invalid character values with another value.
SCHEMAEXCLUDE	Excludes the specified source schema from a wildcard specification.
SOURCEDEFS	Specifies a file that contains source data definitions created by the DEFGEN utility.
SOURCECATALOG	Specifies a default container or catalog for all following `TABLE` or `MAP` statements.
TRIMSPACES | NOTRIMSPACES	Controls whether trailing spaces are trimmed or not when mapping `CHAR` to `VARCHAR` columns.
VARWIDTHNCHAR | NOVARWIDTHNCHAR	Controls whether length information is written to the trail for `NCHAR` columns.

Table 3-9 Parameters Common to Extract and Replicat: Custom Processing

Parameter	Description
CUSEREXIT	Invokes a user exit routine during processing.
INCLUDE	Invokes a macro library.
MACRO	Defines an Oracle GoldenGate macro.
MACROCHAR	Defines a macro character other than the default of #.
SQLEXEC	Executes a stored procedure or query during Extract processing.
PTKCAPTUREPROCSTATS	Enables the capture of process and thread statistics for the PTK Monitoring.
PTKMONITORFREQUENCY	Sets the PTK Monitoring collection frequency interval.

Table 3-10 Parameters Common to Extract and Replicat: Reporting

Parameter	Description
CMDTRACE	Displays macro expansion steps in the report file.
LIST | NOLIST	Displays or suppresses the listing of macros in the report file.
REPORT	Schedules a statistical report.
STATOPTIONS	Specifies information to include in statistical displays.
REPORTCOUNT	Reports the number of records processed.
TRACE | TRACE2	Shows processing information to assist in revealing processing bottlenecks.

Table 3-11 Parameters common to Extract and Replicat: Tuning

Parameter	Description
ALLOCFILES	Controls the number of incremental memory structures allocated when the value of `NUMFILES` is reached.
CACHEMGR	Manages virtual memory resources.
CHECKPOINTSECS	Controls how often the process writes a checkpoint.
DBOPTIONS	Specifies database options.
DDLOPTIONS	Specifies DDL processing options.
EOFDELAY | EOFDELAYCSECS	Determines how long the process delays before searching for more data to process in its data source.
FUNCTIONSTACKSIZE	Controls the size of the memory stack that is used for processing Oracle GoldenGate functions.
NUMFILES	Controls the initial allocation of memory dedicated to storing information about tables to be processed by Oracle GoldenGate.

Table 3-12 Parameters Common to Extract and Replicat: Error Handling

Parameter	Description
DDLERROR	Controls error handling for DDL extraction.
DISCARDFILE | NODISCARDFILE	Contains records that could not be processed.

Table 3-13 Parameters Common to Extract and Replicat: Maintenance

Parameter	Description
DISCARDROLLOVER	Controls how often to create a new discard file.
PURGEOLDEXTRACTS for Extract and Replicat	Purges obsolete trail files.
REPORTROLLOVER	Specifies when to create new report files.

3.1.4 Summary of Extract Parameters

The Extract process captures either full data records or transactional data changes, depending on configuration parameters, and then sends the data to a target system to be applied to target tables or processed further by another process, such as a load utility.

Table 3-14 Extract Parameters: General

Parameter	Description
ABORTDISCARDRECS	Controls the number of discarded records after which Extract aborts.
RECOVERYOPTIONS	Controls the recovery mode of the Extract process.
SOURCEDB	Specifies the data source as part of the login information.
TCPSOURCETIMER | NOTCPSOURCETIMER	Adjusts timestamps of records transferred to other systems when those systems reflect different times.
UPDATERECORDFORMAT	Controls whether before and after images are stored in one trail record or two.

Table 3-15 Extract Parameters: Processing Method

Parameter	Description
DSOPTIONS	Specifies Extract processing options when a Teradata Access Module (TAM) is being used.
EXTRACT	Defines an Extract group as an online process.
GETAPPLOPS | IGNOREAPPLOPS	Controls whether or not operations from all processes except Replicat are written to a trail or file.
GETREPLICATES | IGNOREREPLICATES	Controls whether or not replicated operations are captured by an Extract on the same system.
RMTTASK	Creates a processing task on a remote system.

Table 3-15 (Cont.) Extract Parameters: Processing Method

Parameter	Description
SOURCEISTABLE	Extracts entire records from source tables.
VAM	Indicates that a Teradata Access Module (TAM) is being used to provide transactional data to the Extract process.

Table 3-16 Extract Parameters: Selecting, Converting, and Mapping Data

Parameter	Description
COMPRESSDELETES | NOCOMPRESSDELETES	Controls whether Oracle GoldenGate writes only the key or all columns to the trail for delete operations.
COMPRESSUPDATES | NOCOMPRESSUPDATES	Causes only primary key columns and changed columns to be logged for updates.
EXCLUDETAG	Specifies Replicat or data pump changes to be excluded from trail files.
FETCHOPTIONS	Controls certain aspects of the way that Oracle GoldenGate fetches data.
LOGALLSUPCOLS	Logs the columns that are required to support Conflict Detection and Resolution and Integrated Replicat.
SEQUENCE	Specifies sequences for synchronization.
TABLE | MAP	Specifies tables for extraction and controls column mapping and conversion.
TABLEEXCLUDE	Excludes source tables from the extraction process.
TARGETDEFS	Specifies a file containing target table definitions for target databases that reside on the NonStop platform.
TRAILCHARSETASCII	Specifies the ASCII character set for data captured from DB2 on z/OS, when both ASCII and EBCDIC tables are present.
TRAILCHARSETEBCDIC	Specifies the EBCDIC character set for data captured from DB2 on z/OS, when both ASCII and EBCDIC tables are present.

Table 3-17 Extract Parameters: Routing Data

Parameter	Description
EXTFILE	Specifies an extract file to which extracted data is written on the local system.

Table 3-17 (Cont.) Extract Parameters: Routing Data

Parameter	Description
EXTTRAIL	Specifies a trail to which extracted data is written on the local system.
RMTFILE	Specifies an extract file to which extracted data is written on a remote system.
RMTHOST	Specifies the target system and Manager port number.
RMTTRAIL	Specifies a trail to which extracted data is written on a remote system.

Table 3-18 Extract Parameters: Formatting Data

Parameter	Description
FORMATASCII	Formats extracted data in external ASCII format.
FORMATSQL	Formats extracted data into equivalent SQL statements.
FORMATXML	Formats extracted data into equivalent XML syntax.

Table 3-19 Extract Parameters: Tuning

Parameter	Description
BR	Controls the Bounded Recovery feature of Extract.
CACHEMGR	Controls the virtual memory cache manager.
FLUSHSECS | FLUSHCSECS	Determines the amount of time that record data remains buffered before being written to the trail.
LOBMEMORY	Controls the amount of memory and temporary disk space available for caching transactions that contain `LOB`s.
RMTHOSTOPTIONS	Specifies connection attributes other than host information for a TCP/IP connection used by a passive Extract group.
THREADOPTIONS	Controls aspects of the way that Extract operates in an Oracle Real Application Cluster environment.
TRANLOGOPTIONS	Supplies capture processing options.
TRANSMEMORY	Controls the amount of memory and temporary disk space available for caching uncommitted transaction data.
WARNLONGTRANS	Defines a long-running transaction and controls the frequency of checking for and reporting them.

Table 3-20 Extract Parameters: Maintenance

Parameter	Description
ROLLOVER	Specifies the way that trail files are aged.

Table 3-21 Extract Parameters: Security

Parameter	Description
DECRYPTTRAIL	Required to decrypt data when Extract is used as a data pump and must do work on the data.
ENCRYPTTRAIL | NOENCRYPTTRAIL	Controls encryption of data in a trail or extract file.

3.1.5 Summary of Replicat Parameters

The Replicat process reads data extracted by the Extract process and applies it to target tables or prepares it for use by another application, such as a load utility.

Table 3-22 Replicat Parameters: General

Parameter	Description
TARGETDB	Specifies the data source as part of the login information.
HAVEUDTWITHNCHAR	Causes Replicat to connect in UTF-8 to prevent data loss when the record being processed is a user-defined type that has an `NCHAR/NVARCHAR2` attribute.

Table 3-23 Replicat Parameters: Processing Method

Parameter	Description
BEGIN	Specifies a starting point for Replicat processing. Required when `SPECIALRUN` is specified.
BULKLOAD	Loads data directly into the interface of the Oracle SQL*Loader utility.
END	Specifies a stopping point for Replicat processing. Required when using `SPECIALRUN`.
GENLOADFILES	Generates run and control files that are compatible with a database load utility.
REPLICAT	Specifies a Replicat group for online change synchronization.
SPECIALRUN	Used for one-time processing that does not require checkpointing from run to run.

Table 3-24 Replicat Parameters: Selecting, Converting, and Mapping Data

Parameter	Description
ALLOWNOOPUPDATES | NOALLOWNOOPUPDATES	Controls how Replicat responds to a *no-op* operation. A no-op operation is one in which there is no effect on the target table.
APPLYNOOPUPDATES | NOAPPLYNOOPUPDATES	Force a no-op update to be applied using all columns in both the `SET` and `WHERE` clauses.
ASSUMETARGETDEFS	Assumes that source and target tables have the same column structure.
INSERTALLRECORDS	Inserts a new record into the target table for every change operation made to a record.
INSERTDELETES | NOINSERTDELETES	Converts deletes to inserts.
INSERTMISSINGUPDATES | NOINSERTMISSINGUPDATES	Converts an update to an insert when the target row does not exist.
INSERTUPDATES | NOINSERTUPDATES	Converts updates to inserts.
TABLE | MAP	Specifies a relationship between one or more source and target tables and controls column mapping and conversion.
MAPEXCLUDE	Excludes source tables from being processed by a wildcard specification supplied in `MAP` statements.
PRESERVETARGETTIMEZONE	Overrides the default Replicat session time zone.
REPLACEBADNUM	Specifies a global substitution value for invalid numeric data encountered when mapping number columns.
SOURCECHARSET	Controls whether the source character set it converted to the target character set.
SOURCETIMEZONE	Specifies the time zone of the source database for Replicat to use as the session time zone.
SPACESTONULL | NOSPACESTONULL	Controls whether or not a target column containing only spaces is converted to NULL.
TABLE for Replicat	Specifies a table or tables for which event actions are to take place when a row satisfies the given filter criteria.
TRAILCHARSET	Specifies the character set of the source data when the trail is of an older version that does not store the source character set, or to override the character set that is stored in the trail.
UPDATEINSERTS | NOUPDATEINSERTS	Converts insert operations to update operations for all `MAP` statements that are specified after it in the parameter file.
UPDATEDELETES | NOUPDATEDELETES	Converts deletes to updates.

Table 3-24 (Cont.) Replicat Parameters: Selecting, Converting, and Mapping Data

Parameter	Description
USEDEDICATEDCOORDINATIONTHREAD	Specifies a dedicated thread for barrier transactions when Replicat is in coordinated mode.

Table 3-25 Replicat Parameters: Routing Data

Paramete r	Description
EXTFILE	Defines the name of an extract file on the local system that contains data to be replicated. Used for one-time processing.
EXTTRAIL	Defines a trail containing data to be replicated. Used for one-time processing.

Table 3-26 Replicat Parameters: Error Handling and Reporting

Parameter	Description
HANDLECOLLISIONS | NOHANDLECOLLISIONS	Handles errors for duplicate and missing records.
HANDLETPKUPDATE	Prevents constraint errors associated with replicating transient primary key updates.
OVERRIDEDUPS | NOOVERRIDEDUPS	Overlays a replicated insert record onto an existing target record whenever a duplicate-record error occurs.
RESTARTCOLLISIONS | NORESTARTCOLLISIONS	Controls whether or not Replicat applies `HANDLECOLLISIONS` logic after Oracle GoldenGate has abended because of a conflict.
REPERROR	Determines how Replicat responds to database errors.
REPFETCHEDCOLOPTIONS	Determines how Replicat responds to operations for which a fetch from the source database was required.
SHOWSYNTAX	Causes Replicat to print its SQL statements to the report file.
SQLDUPERR	Specifies the database error number that indicates a duplicate record. Use with `OVERRIDEDUPS`.
WARNRATE	Determines how often database errors are reported.

Table 3-27 Replicat Parameters: Tuning

Parameter	Description
BATCHSQL	Increases the throughput of Replicat processing by arranging similar SQL statements into arrays and applying them at an accelerated rate.
COORDSTATINTERVAL	The interval at which the coordinator thread sends a request to the apply threads for statistics.
COORDTIMER	The amount of time that the coordinator thread waits for the apply threads to start.
DEFERAPPLYINTERVAL	Specifies a length of time for Replicat to wait before applying replicated operations to the target database.
GROUPTRANSOPS	Controls the number of records that are grouped into a Replicat transaction.
INSERTAPPEND | NOINSERTAPPEND	Controls whether or not Replicat uses an `APPEND` hint when applying `INSERT` operations to Oracle target tables.
MAXDISCARDRECS	Limits the number of discarded records reported to the discard file.
MAXSQLSTATEMENTS	Controls the number of prepared SQL statements that can be used by Replicat.
MAXTRANSOPS	Divides large source transactions into smaller ones on the target system.
NUMFILES	Controls the initial allocation of memory that is dedicated to storing information about tables to be processed by Oracle GoldenGate.
TRANSACTIONTIMEOUT	Specifies a time interval after which Replicat will commit its open target transaction and roll back any incomplete source transactions that it contains, saving them for when the entire source transaction is ready to be applied.

3.1.6 Summary of Wildcard Exclusion Parameters

Table 3-28 Wildcard Exclusion Parameters

Parameter	Description
EXCLUDEWILDCARDOBJECTSONLY	Forces the inclusion of non-wildcarded source objects specified in `TABLE` or `MAP` parameters when an exclusion parameter contains a wildcard that otherwise would exclude that object.
MAPEXCLUDE	Excludes a source object from a `MAP` statement.
TABLEEXCLUDE	Excludes a source object from a `TABLE` statement.
CATALOGEXCLUDE	Excludes source objects in the specified source container or catalog from the Oracle GoldenGate configuration when the container or catalog name is being specified with a wildcard in `TABLE` or `MAP` statements.

Table 3-28 (Cont.) Wildcard Exclusion Parameters

Parameter	Description
SCHEMAEXCLUDE	Excludes source objects that are owned by the specified source owner (such as a schema) from the Oracle GoldenGate configuration when wildcards are being used to specify the owners in `TABLE` or `MAP` statements.

3.1.7 Summary of DEFGEN Parameters

DEFGEN creates a file with data definitions for source or target tables. Data definitions are needed when the source and target tables have different definitions or the databases are of different types.

Table 3-29 All DEFGEN Parameters

Parameter	Description
CATALOGEXCLUDE	Excludes the specified source container or catalog from a wildcard specification.
CHARSET	Specifies a multibyte character set for the process to use instead of the operating system default when reading the parameter file.
DEFSFILE	Identifies the name of the file to which DEFGEN writes the definitions
NAMECCSID	Specifies a DB2 for i CCSID if the object names in the SQL catalog are of a different CCSID than the system.
NOCATALOG	Prevents the container or catalog name from being included in the metadata.
SCHEMAEXCLUDE	Excludes the specified source schema from a wildcard specification.
SOURCEDB	Specifies the data source as part of the login information.
TABLE for DEFGEN	Identifies a table for which you want to capture a definition.
USERIDALIAS	Specifies database connection information.

3.1.8 Summary of DDL Parameters

These parameters control Oracle GoldenGate DDL support. Other parameters may be required with DDL support, but the ones here deal specifically with the DDL feature.

Table 3-30 All DDL Parameters

Parameter	Description
DDL	Enables DDL support and filters DDL.

Table 3-30 (Cont.) All DDL Parameters

Parameter	Description
DDLERROR	Handles errors that occur during DDL replication.
DDLOPTIONS	Configures aspects of DDL replication other than filtering and string substitution.
DDLSUBST	Enables the substitution of strings in DDL operations.
DDLTABLE	Specifies an alternate name for the DDL history table.
GGSCHEMA	Specifies the name of the schema that contains the objects that support DDL replication.
PURGEDDLHISTORY | PURGEDDLHISTORYALT	Controls the size of the DDL history table.
PURGEMARKERHISTORY	Controls the size of the DDL marker table.

3.1.9 Summary of Oracle GoldenGate Data Store Commands

Use the data store commands to control the data store that Oracle GoldenGate uses to store monitoring information for use by Oracle GoldenGate Monitor.

Table 3-31 Oracle GoldenGate Veridata Data Store Commands

Command	Description
ALTER DATASTORE	Changes the memory model that is used for interprocess communication by the data store.
CREATE DATASTORE	Creates the data store.
DELETE DATASTORE	Removes the data store.
INFO DATASTORE	Returns information about the data store.
REPAIR DATASTORE	Repairs the data store after an upgrade or if it is corrupt.

3.2 ABORTDISCARDRECS

Valid For

Extract

Description

Use `ABORTDISCARDRECS` to abort Extracts configured with a `DISCARDFILE` after it has discarded *`N`* number of records.

Default

Zero (0) (Do not abort Extract and any number of discards.)

Syntax

```
ABORTDISCARDRECS
```

3.3 ACCESSRULE

Valid for Manager

Use `ACCESSRULE` to control connection access to the Manager process and the processes under its control. You can establish multiple rules by specifying multiple `ACCESSRULE` statements in the parameter file and control their priority. There is no limit to the number of rules that you can specify. To establish priority, you can either list the rules in order from most important to least important, or you can explicitly set the priority of each rule with the PRI option.

Default

None

Syntax

```
ACCESSRULE[, PROG program_name][, IPADDR address][, PRI rule][, login_ID]{, ALLOW |
DENY}
```

Argument	Description
`PROG` *`program_name`*	Specifies connection security for a specific Oracle GoldenGate program or multiple programs specified with a wildcard. If one of these options is not specified, the access rule applies to all programs that Manager starts, stops, or kills. Valid values: • `GGSCI`: Secures access to the GGSCI command-line interface. • `GUI`: Secures access to Oracle GoldenGate from the Activity Console. • `MGR | MANAGER`: Secures access to all inter-process commands controlled by Manager, such as `START`, `STOP`, and `KILL` • `REPLICAT`: Secures connection to the Replicat process. • `COLLECTOR | SERVER`: Secures the ability to dynamically create a Collector process. • `*` (asterisk): Wildcard. Use a wildcard to specify all of the preceding options.
`IPADDR` *`address`*	Permits access to Manager from the host with the specified IP address.
`PRI` *`rule`*	Specifies a priority for each `ACCESSRULE` statement. Valid values are from 1 through 99, with 1 being the highest priority and 99 being the lowest. Rules that have priorities assigned can appear in any order in the parameter file.

Argument	Description
login_ID	Permits access based on a user password. This option requires specifying USER and PASSWORD options with the RMTHOST parameter. The syntax for *login_ID* is: `USER user, PASSWORD password, [ENCRYPTKEY keyname]` Valid values: • *user* : The user specified with the USER option of the RMTHOST parameter. • *password*: The password specified with the PASSWORD option of the RMTHOST parameter. • *keyname*: Optional. Specifies an encryption key in the ENCKEYS file. When ENCRYPTKEY *keyname* is used as part of the login ID, Oracle GoldenGate looks up the key in the ENCKEYS file on the target system and uses it to decrypt the corresponding password. If the decrypted password matches the password supplied with the *password* portion of the login ID option, the rule passes.
ALLOW | DENY	Determines whether the rule specified with ACCESSRULE permits or denies access. Either ALLOW or DENY is required.

Example 1

The following access rules allow any nodes that begin with IP address 205 or the node 194.168.11.102 to access the requested services. All others are denied.

```
ACCESSRULE, PROG *, IPADDR 194.168.11.102, ALLOW ACCESSRULE, PROG *, IPADDR 205.*,
ALLOW ACCESSRULE, PROG *, IPADDR *, DENY
```

Example 2

The following access rules have been assigned explicit priority levels through the PRI option. These rules allow any user to access the Collector process (the SERVER program), and in addition, allow the IP address 122.11.12.13 to access GGSCI commands. Access to all other Oracle GoldenGate programs is denied.

```
ACCESSRULE, PROG *, DENY, PRI 99ACCESSRULE, PROG SERVER, ALLOW, PRI 1ACCESSRULE,
PROG GGSCI, IPADDR 122.11.12.13, PRI 1
```

Example 3

The following access rules are the same as Example 2, but they assign priority by means of their order in the parameter file, instead of the PRI option.

```
ACCESSRULE, PROG SERVER, ALLOWACCESSRULE, PROG GGSCI, IPADDR 122.11.12.13ACCESSRULE,
PROG *, DENY
```

Example 4

The following access rule grants access to all programs to the user JOHN.

```
ACCESSRULE, PROG *, USER JOHN, PASSWORD OCEAN1
```

Example 5

The following access rule grants access to all programs to the user JOHN and designates an encryption key to decrypt the password. If the password provided with `PASSWORD` matches the one in the `ENCKEYS` lookup file, connection is granted.

```
ACCESSRULE, PROG *, USER JOHN, PASSWORD OCEAN1, ENCRYPTKEY lookup1
```

3.4 ALLOCFILES

Valid For

Extract and Replicat

Description

Use the `ALLOCFILES` parameter to control the incremental number of memory structures that are allocated after the initial memory allocation specified by the `NUMFILES` parameter is reached. Together, these parameters control how process memory is allocated for storing information about the source and target tables being processed.

The default values should be sufficient for both `NUMFILES` and `ALLOCFILES`, because memory is allocated by the process as needed, system resources permitting.

`ALLOCFILES` must occur before any `TABLE` or `MAP` entries to have any effect. The valid range of minimum value is 1

See NUMFILESfor more information.

Default

500

Syntax

```
ALLOCFILES number
```

number
The additional number of memory structures to be allocated. Do not set `ALLOCFILES` to an arbitrarily high number, or memory will be consumed unnecessarily. The memory structures of Oracle GoldenGate support up to two million tables.

Example

```
ALLOCFILES 1000
```

3.5 ALLOWDUPTARGETMAP | NOALLOWDUPTARGETMAP

Valid For

Extract and Replicat

Description

Use the `ALLOWDUPTARGETMAP` and `NOALLOWDUPTARGETMAP` parameters to control whether or not the following are accepted in a parameter file:

- In an Extract parameter file: duplicate `TABLE` parameters for the same source object if the `COLMAP` option is used in any of them. By default, Extract abends on duplicate `TABLE` statements when `COLMAP` is used.
- In a Replicat parameter file: duplicate `MAP` statements for the same source and target objects. By default, duplicate `MAP` statements cause Replicat to abend.

If `ALLOWDUPTARGETMAP` is not specified and the same source and target tables are mapped more than once, only the first `MAP` statement is used and the others are ignored.

Default

`NOALLOWDUPTARGETMAP`

Syntax

```
ALLOWDUPTARGETMAP | NOALLOWDUPTARGETMAP
```

Examples

Example 1
The following Extract parameter file is permissible with `ALLOWDUPTARGETMAP` enabled.

```
EXTRACT extcust
USERIDALIAS tiger1
EXTTRAIL dirdat/aa
TABLE ogg.tcustmer;
EXTTRAIL dirdat/bb
TABLE ogg.tcustmer, TARGET ogg.tcustmer, COLMAP (USEDEFAULTS, col1=id, col2=name);
```

Example 2
The following Replicat parameter file is permissible with `ALLOWDUPTARGETMAP` enabled.

```
REPLICAT repcust
USERIDALIAS tiger1
SOURCEDEFS /ggs/dirdef/source.def
ALLOWDUPTARGETMAP
GETINSERTS
GETUPDATES
IGNOREDELETES
MAP ggs.tcustmer, TARGET ggs.tcustmer, COLMAP (USEDEFAULTS, deleted_row = 'N');
IGNOREINSERTS
IGNOREUPDATES
GETDELETES
UPDATEDELETES
MAP ggs.tcustmer, TARGET ggs.tcustmer, COLMAP (USEDEFAULTS, deleted_row = 'Y');
```

3.6 ALLOWINVISIBLEINDEXKEYS

Valid For

GLOBALS

Description

Use the `ALLOWINVISIBLEINDEXKEYS` parameter in the `GLOBALS` file to allow Extract and Replicat to use columns that are part of an Oracle invisible index as a unique row identifier.

Note:

To enable trigger-based DDL replication to use Oracle invisible indexes, set the following parameter to `TRUE` in the `params.sql script`:

```
define allow_invisible_index_keys = 'TRUE'
```

This functionality is automatically enabled for integrated capture and Replicat.

Default

None

Syntax

```
ALLOWINVISIBLEINDEXKEYS
```

3.7 ALLOWNONVALIDATEDKEYS

Valid For

GLOBALS

Description

Use `ALLOWNONVALIDATEDKEYS` to allow Extract, Replicat, and GGSCI commands to use a non-validated primary key or an invalid key as a unique identifier. This parameter overrides the key selection criteria that is used by Oracle GoldenGate. When it is enabled, Oracle GoldenGate will use `NON VALIDATED` and `NOT VALID` primary keys as a unique identifier.

A key can become invalid as the result of an object reorganization or a number of other actions, but if you know the keys are valid, `ALLOWNONVALIDATEDKEYS` saves the downtime of re-validating them, especially in a testing environment. However, when using `ALLOWNONVALIDATEDKEYS`, whether in testing or in production, you accept the risk that the target data may not be maintained accurately through replication. If a key proves to be non-valid and the table on which it is defined contains more than one record with the same key value, Oracle GoldenGate might choose the wrong target row to update.

To enable `ALLOWNONVALIDATEDKEYS` in a configuration where DDL replication is not active, stop all processes, add `ALLOWNONVALIDATEDKEYS` to the `GLOBALS` parameter file, and then restart the processes. To disable `ALLOWNONVALIDATEDKEYS` again, remove it from the `GLOBALS` file and then restart the processes.

To enable `ALLOWNONVALIDATEDKEYS` functionality in a configuration where DDL support is active, take the following steps.

1. Add the ALLOWNONVALIDATEDKEYS parameter to the GLOBALS parameter file.
2. Update the GGS_SETUP table in the DDL schema by using the following SQL.

   ```
   UPDATE owner.GGS_SETUP SET value='1' WHERE
   property='ALLOWNONVALIDATEDKEYS';
   COMMIT;
   ```

3. Restart all Oracle GoldenGate processes including Manager. From this point on, Oracle GoldenGate selects non-validated or non-valid primary keys as a unique identifier.

To disable ALLOWNONVALIDATEDKEYS functionality when DDL support is active, take the following steps.

1. Remove ALLOWNONVALIDATEDKEYS from the GLOBALS parameter file.
2. Update the record that you added to the GGS_SETUP table to 0.
3. Restart all of the Oracle GoldenGate processes.

Default

None (Disabled)

Syntax

```
ALLOWNONVALIDATEDKEYS
```

3.8 ALLOWNOOPUPDATES | NOALLOWNOOPUPDATES

Valid For

Replicat

Description

Use ALLOWNOOPUPDATES and NOALLOWNOOPUPDATES to control how Replicat responds to a *no-op* operation. A no-op operation is one in which there is no effect on the target table. The following are some examples of how this can occur.

- The source table has a column that does not exist in the target table, or it has a column that was excluded from replication (with a COLSEXCEPT clause). In either case, if that source column is updated, there will be no target column name to use in the SET clause within the Replicat SQL statement.
- An update is made that sets a column to the same value as the current one. The database does not log the new value, because it did not change. However, Oracle GoldenGate captures the operation as a change record because the primary key was logged, but there is no column value for the SET clause in the Replicat SQL statement.

By default (NOALLOWNOOPUPDATES), Replicat abends with an error because these types of operations do not update the database. With ALLOWNOOPUPDATES, Replicat ignores the operation instead of abending. The statistics reported by Replicat will show that an UPDATE was made, but the database does not get updated.

You can use the internal parameter APPLYNOOPUPDATES to force the UPDATE to be applied. APPLYNOOPUPDATES overrides ALLOWNOOPUPDATES. If both are specified, Replicat applies updates for which there are key columns for the source and target tables. By default, Oracle GoldenGate abends with the following message when there is a key on the source table but no key on the target table.

```
2011-01-25 02:28:42 GGS ERROR    160 Encountered an update for target table TELLER,
which has no unique key defined. KEYCOLS can be used to define a key. Use
ALLOWNOOPUPDATES to process the update without applying it to the target database.
Use APPLYNOOPUPDATES to force the update to be applied using all columns in both the
SET and WHERE clause.
```

If `ALLOWNOOPUPDATES` is specified when the `HANDLECOLLISIONS` or `INSERTMISSINGUPDATES` parameter is being used, and if Oracle GoldenGate has all of the target key values, Oracle GoldenGate applies an `UPDATE` by using all of the columns of the table in the `SET` clause and the `WHERE` clause (invoking `APPLYNOOPUPDATES` behavior). This is necessary so that Oracle GoldenGate can determine whether the row is present or missing. If it is missing, Oracle GoldenGate converts the `UPDATE` to an `INSERT`.

Default

`NOALLOWNOOPUPDATES` (only applies if the table does not have a key)

Syntax

```
ALLOWNOOPUPDATES | NOALLOWNOOPUPDATES
```

3.9 ALLOWOUTPUTDIR

Valid For

GLOBALS

Description

Use `ALLOWOUTPUTDIR` to specify the allowed output trail directory (including its subdirectories). The specified path must exist. Symbolic links are resolved before parsing and comparison.

Default

None (A directory must be specified.)

Syntax

```
ALLOWOUTPUTDIR [relative_dir_name | absolute_dir_name]
```

relative_dir_name* | *absolute_dir_name
Specify the output trail directory name with either the relative or absolute path.

3.10 APPLYNOOPUPDATES | NOAPPLYNOOPUPDATES

Valid For

Replicat

Description

Use `APPLYNOOPUPDATES` to force a no-op `UPDATE` operation to be applied by using all of the columns in the `SET` and `WHERE` clauses. See ALLOWNOOPUPDATES | NOALLOWNOOPUPDATES for a description of *no-op*.

`APPLYNOOPUPDATES` causes Replicat to use whatever data is in the trail. If there is a primary-key `UPDATE` record, Replicat uses the before columns from the source. If there is a regular (non-key) `UPDATE`, Replicat assumes that the after value is the same as the before value (otherwise it would be a primary-key update). The preceding assumes source and target keys are identical. If they are not, you must use a `KEYCOLS` clause in the `TABLE` statement on the source.

Default

`NOAPPLYNOOPUPDATES`

Syntax

```
APPLYNOOPUPDATES | NOAPPLYNOPUPDATES
```

3.11 ASCIITOEBCDIC

Valid For

Extract data pump and Replicat

Description

Use the `ASCIITOEBCDIC` parameter to control the conversion of data in the input trail file from ASCII to EBCDIC format. This parameter should only be used to support backward compatibility in cases where the input trail file was created by an Extract version prior to v10.0. It is ignored for all other cases, because ASCII to EBCDIC conversion is currently the default.

As of version 11.2.1, conversion is not allowed by a data pump.

Default

None

Syntax

```
ASCIITOEBCDIC
```

3.12 ASSUMETARGETDEFS

Valid For

Replicat (Not valid for SQL/MX) for trail file formats prior to 12c (12.2.0.1)

Description

Use the `ASSUMETARGETDEFS` parameter when the source and target objects specified in a `MAP` statement have identical column structure, such as when synchronizing a hot site. It directs Oracle GoldenGate to assume that the data definitions of the source and target objects are identical, and to refer to the target definitions when metadata is needed for the source data.

When source and target tables have dissimilar structures, do not use `ASSUMETARGETDEFS`. Create a data-definitions file for the source object, and specify the definitions file with the `SOURCEDEFS` parameter. See SOURCEDEFS for more information. Do not use `ASSUMETARGETDEFS` and `SOURCEDEFS` in the same parameter file.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about metadata and how it applies to Oracle GoldenGate.

Default

None

Syntax

```
ASSUMETARGETDEFS [OVERRIDE]
```

`OVERRIDE`
By default, the table definitions from the metadata records override the definitions from any `ASSUMETARGETDEFS` file.
Specify `OVERRIDE` to request Replicat to use the definitions from the target database as the definitions for the trail records.

3.13 AUTORESTART

Valid For

Manager

Description

Use the `AUTORESTART` parameter to start one or more Extract and Replicat processes automatically after they fail. `AUTORESTART` provides fault tolerance when something temporary interferes with a process, such as intermittent network outages or programs that interrupt access to transaction logs.

You can use multiple `AUTORESTART` statements in the same parameter file.

To apply this parameter to an Extract group that is created in `PASSIVE` mode, use it for the Manager that is on the target system where the associated alias Extract group resides. Oracle GoldenGate will send the start command to the source system. If `AUTORESTART` is used locally for a passive Extract group, it is ignored.

If Manager encounters an out-of-order transaction upon restart, it will not restart Extract. Instead, it will log a warning that notifies you to use the `ETROLLOVER` option of `SEND EXTRACT` to advance the trail to skip the transaction that caused the error.

Default

Do not auto-restart

Syntax

```
AUTORESTART {EXTRACT | REPLICAT | ER} group_name
[, RETRIES number]
[, WAITMINUTES minutes]
[, WAITSECONDS seconds]
[, RESETMINUTES minutes]
[, RESETSECONDS seconds]
```

`EXTRACT`
Restarts Extract automatically.

`REPLICAT`
Restarts Replicat automatically.

`ER`
Restarts Extract and Replicat automatically.

`group_name`
A group name or wildcard specification for multiple groups. When wildcarding is used, Oracle GoldenGate starts all groups of the specified process type on the local system that satisfy the wildcard, except those in `PASSIVE` mode.

`RETRIES` ***`number`***
The maximum number of times that Manager should try to restart a process before aborting retry efforts. The default number of tries is 2.

`WAITMINUTES | WAITSECONDS` ***`{minutes | seconds}`***
The amount of time, in minutes or seconds, to pause between discovering that a process has terminated abnormally and restarting the process. Use this option to delay restarting until a necessary resource becomes available or some other event occurs. The default delay is 2 minutes or 120 seconds.

`RESETMINUTES | RESETSECONDS` ***`{minutes | seconds}`***
The window of time, in minutes or seconds, during which retries are counted. The default is 120 minutes (2 hours) or 7200 seconds. After the time expires, the number of retries reverts to zero.

Example

In the following example, Manager tries to start all Extract processes three times after failure within a one hour time period, and it waits five minutes before each attempt.

```
AUTORESTART EXTRACT *, RETRIES 3, WAITMINUTES 5, RESETMINUTES 60
```

3.14 AUTOSTART

Valid For

Manager

Description

Use the `AUTOSTART` parameter to start one or more Extract and Replicat processes automatically when Manager starts. `AUTOSTART` ensures that no process groups are overlooked and that synchronization activities start immediately.

You can use multiple `AUTOSTART` statements in the same parameter file.

To apply this parameter to an Extract group that is created in `PASSIVE` mode, use it for the Manager that is on the target system where the associated alias Extract group resides. Oracle GoldenGate will send the start command to the source system. If `AUTOSTART` is used locally for a passive Extract group, it is ignored.

If Manager encounters an out-of-order transaction upon restart, it will not restart Extract. Instead, it will log a warning that notifies you to use the `ETROLLOVER` option of `SEND EXTRACT` to advance the trail to skip the transaction that caused the error.

Default

Do not autostart

Syntax

```
AUTOSTART {{EXTRACT | REPLICAT | ER} group_name | JAGENT}
```

`EXTRACT`
Starts Extract automatically.

`REPLICAT`
Starts Replicat automatically.

`ER`
Starts Extract and Replicat automatically.

`JAGENT`
Starts the Oracle GoldenGate Monitor JAgent automatically. For more information, see *Administering Oracle GoldenGate Monitor*.

`group_name`
Valid for `EXTRACT`, `REPLICAT`, `ER` only. `JAGENT` does not take a group name as input. Specifies a group name or wildcard specification for multiple groups. When wildcarding is used, Oracle GoldenGate starts all groups of the specified process type that satisfy the wildcard on the local system, except those in `PASSIVE` mode.

Example

```
AUTOSTART ER *
```

3.15 BATCHSQL

Valid For

Replicat

Description

Use the `BATCHSQL` parameter to increase the performance of Replicat. `BATCHSQL` causes Replicat to organize similar SQL statements into arrays and apply them at an accelerated rate. In its normal mode, Replicat applies one SQL statement at a time. BatchSQL is supported for Sybase ASE 15.7 SP110 onwards.

`BATCHSQL` is valid for:

- DB2 for i (except V5R4 or i6.1)
- DB2 LUW
- DB2 on z/OS
- Oracle
- NonStop SQL/MX

- PostgreSQL
- SQL Server
- Teradata
- TimesTen

How BATCHSQL Works

In `BATCHSQL` mode, Replicat organizes similar SQL statements into batches within a memory queue, and then it applies each batch in one database operation. A batch contains SQL statements that affect the same table, operation type (insert, update, or delete), and column list. For example, each of the following is a batch:

- Inserts to table A
- Inserts to table B
- Updates to table A
- Updates to table B
- Deletes from table A
- Deletes from table B

Note:

Oracle GoldenGate analyzes foreign-key referential dependencies in the batches before executing them. If dependencies exist among statements that are in different batches, more than one SQL statement per batch might be required to maintain the referential integrity.

Controlling the Number of Cached Statements

The `MAXSQLSTATEMENTS` parameter controls the number of statements that are cached. See "MAXSQLSTATEMENTS" for more information. Old statements are recycled using a least-recently-used algorithm. The batches are executed based on a specified threshold (see "Managing Memory").

Usage Restrictions

SQL statements that are treated as exceptions include:

- Statements that contain `LOB` or `LONG` data.
- Statements that contain rows longer than 25k in length.
- Statements where the target table has one or more unique keys besides the primary key. Such statements cannot be processed in batches because `BATCHSQL` does not guarantee the correct ordering for non-primary keys if their values could change.
- (SQL Server) Statements where the target table has a trigger.
- Statements that cause errors.

When Replicat encounters exceptions in batch mode, it rolls back the batch operation and then tries to apply the exceptions in the following ways, always maintaining transaction integrity:

- First Replicat tries to use normal mode: one SQL statement at a time within the transaction boundaries that are set with the `GROUPTRANSOPS` parameter. See "GROUPTRANSOPS" for more information.
- If normal mode fails, Replicat tries to use source mode: apply the SQL within the same transaction boundaries that were used on the source.

When finished processing exceptions, Replicat resumes `BATCHSQL` mode.

Table 3-32 Replicat Modes Comparison

Source Transactions *(Assumes same table and column list)*	**Replicat Transaction in Normal Mode**	**Replicat Transaction in BATCHSQL Mode**	**Replicat Transactions in Source Mode**
Transaction 1:	`INSERT`	`INSERT` (x3)	**Transaction 1:**
`INSERT`	`DELETE`	`DELETE` (x3)	`INSERT`
`DELETE`	`INSERT`		`DELETE`
Transaction2:	`DELETE`		**Transaction 2:**
`INSERT`	`INSERT`		`INSERT`
`DELETE`	`DELETE`		`DELETE`
Transaction 3:			**Transaction 3:**
`INSERT`			`INSERT`
`DELETE`			`DELETE`

When to Use BATCHSQL

When Replicat is in `BATCHSQL` mode, smaller row changes will show a higher gain in performance than larger row changes. At 100 bytes of data per row change, `BATCHSQL` has been known to improve the performance of Replicat by up to 300 percent, but actual performance benefits will vary, depending on the mix of operations. At around 5,000 bytes of data per row change, the benefits of using `BATCHSQL` diminish.

Managing Memory

The gathering of SQL statements into batches improves efficiency but also consumes memory. To maintain optimum performance, use the following `BATCHSQL` options:

```
BATCHESPERQUEUE
BYTESPERQUEUE
OPSPERBATCH
OPSPERQUEUE
```

As a benchmark for setting values, assume that a batch of 1,000 SQL statements at 500 bytes each would require less than 10 megabytes of memory.

Default

Disabled (Process in normal Replicat mode)

Syntax

```
BATCHSQL
[BATCHERRORMODE | NOBATCHERRORMODE]
[BATCHESPERQUEUE n]
[BATCHTRANSOPS n]
[BYTESPERQUEUE n]
```

```
[OPSPERBATCH n]
[OPSPERQUEUE n]
[THREADS (threadID[, threadID][, ...][, thread_range[, thread_range][, ...])]
[TRACE]
```

BATCHERRORMODE | NOBATCHERRORMODE
Sets the response of Replicat to errors that occur during `BATCHSQL` processing mode.

> **BATCHERRORMODE**
> Causes Replicat to try to resolve errors without leaving `BATCHSQL` mode. It converts inserts that fail on duplicate-record errors to updates, and it ignores missing-record errors for deletes. When using `BATCHERRORMODE`, use the `HANDLECOLLISIONS` parameter to prevent Replicat from abending.
>
> **NOBATCHERRORMODE**
> The default, causes Replicat to disable `BATCHSQL` processing temporarily when there is an error, and then retry the transaction first in normal mode and then, if normal mode fails, in source mode (same transaction boundaries as on the source).

BATCHESPERQUEUE *n*
Controls the maximum number of batches that one memory queue can contain. After `BATCHESPERQUEUE` is reached, a target transaction is executed.

- Minimum value is 1.
- Maximum value is 1000.
- Default is 50.

BATCHTRANSOPS *n*
Controls the maximum number of batch operations that can be grouped into a transaction before requiring a commit. When `BATCHTRANSOPS` is reached, the operations are applied to the target.

- Minimum value is 1.
- Maximum value is 100000.
- Default is 1000 for nonintegrated Replicat (all database types) and 50 for an integrated Oracle Replicat.

BYTESPERQUEUE *n*
Sets the maximum number of bytes that one queue can contain. After `BYTESPERQUEUE` is reached, a target transaction is executed.

- Minimum value is 1000000 bytes (1 megabyte).
- Maximum value is 1000000000 bytes (1 gigabyte).
- Default is 2000000 bytes (20 megabytes).

OPSPERBATCH *n*
Sets the maximum number of row operations that one batch can contain. After `OPSPERBATCH` is reached, a target transaction is executed.

- Minimum value is 1.
- Maximum value is 100000.
- Default is 1200.

`OPSPERQUEUE` ***`n`***
Sets the maximum number of row operations in all batches that one queue can contain. After `OPSPERQUEUE` is reached, a target transaction is executed.

- Minimum value is 1.
- Maximum value is 100000.
- Default is 1200.

`THREADS (`*`threadID`*`[, `*`threadID`*`][, ...][, `*`thread_range`*`[, `*`thread_range`*`][, ...])`
Valid for `BATCHESPERQUEUE`, `BATCHTRANSOPS`, and `BYTESPERQUEUE`. Applies these options to the specified thread or threads of a coordinated Replicat.

> ***`threadID`*`[, `*`threadID`*`][, ...]`**
> Specifies a thread ID or a comma-delimited list of threads in the format of `threadID, threadID, threadID`.
>
> **`[, `*`thread_range`*`[, `*`thread_range`*`][, ...]`**
> Specifies a range of threads in the form of `threadIDlow-threadIDhigh` or a comma-delimted list of ranges in the format of `threadIDlow-threadIDhigh`, `threadIDlow-threadIDhigh`.

A combination of these formats is permitted, such as threadID, threadID, `threadIDlow-threadIDhigh`.

`TRACE`
Enables detailed tracing of `BATCHSQL` activity to the console and to the report file. Do not set tracing without the guidance of an Oracle Support analyst.

`NUMTHREADS`
Enables detailed tracing of `BATCHSQL` activity to the console and to the report file. Do not set tracing without the guidance of an Oracle Support analyst.

- Minimum value is 0.
- Maximum value is 50.

`MAXTHREADQUEUEDEPTH`
Enables detailed tracing of `BATCHSQL` activity to the console and to the report file. Do not set tracing without the guidance of an Oracle Support analyst.

- Minimum value is 0.
- Maximum value is 50.
- Default is 10.

`CHECKUNIQUEKEYS`
Enables detailed tracing of `BATCHSQL` activity to the console and to the report file. Do not set tracing without the guidance of an Oracle Support analyst.

`ERRORHANDLING`
Enables detailed tracing of `BATCHSQL` activity to the console and to the report file. Do not set tracing without the guidance of an Oracle Support analyst.

`BYPASSCHECK`
Enables detailed tracing of `BATCHSQL` activity to the console and to the report file. Do not set tracing without the guidance of an Oracle Support analyst.

Example

```
BATCHSQL BATCHESPERQUEUE 100, OPSPERBATCH 2000
```

3.16 BEGIN

Valid For

Replicat

Description

Use the `BEGIN` parameter to direct Replicat to start processing at the first record in the Oracle GoldenGate trail that has a timestamp greater than, or equal to, the time specified with `BEGIN`. All subsequent records, including records where the timestamp is less than the specified time, are processed. Use `BEGIN` when `SPECIALRUN` is specified for the same Replicat group.

Default

None

Syntax

```
BEGIN date[time]
```

`date[time]`
Specifies a time at which to begin processing. Valid values are a date and optional time in the format of `yyyy-mm-dd[ hh:mi[:ss[.cccccc]]]` based on a 24-hour clock. Seconds and centiseconds are optional.

Example

```
BEGIN 2011-01-01 04:30:00
```

3.17 BLOBMEMORY

This parameter is an alias for `LOBMEMORY`. See "LOBMEMORY" for more information.

3.18 BOOTDELAYMINUTES

Valid For

Manager

Description

Use the `BOOTDELAYMINUTES` parameter on a Windows system to delay the activities that Manager performs when it starts, such as executing parameters. For example, `BOOTDELAYMINUTES` can be used to delay `AUTOSTART` parameters until database services are started.

Specify `BOOTDELAYMINUTES` before other parameter entries. This parameter only supports Windows.

Default

None (no delay)

Syntax

```
BOOTDELAYMINUTES minutes
```

`minutes`
The number of minutes to delay after system startup before starting Oracle GoldenGate processing.

Example

```
BOOTDELAYMINUTES 5
```

3.19 BR

Valid For

Extract (Oracle only)

Description

Use the `BR` parameter to control the Bounded Recovery (BR) feature. This feature currently supports Oracle databases.

Bounded Recovery is a component of the general Extract checkpointing facility. It guarantees an efficient recovery after Extract stops for any reason, planned or unplanned, no matter how many open (uncommitted) transactions there were at the time that Extract stopped, nor how old they were. Bounded Recovery sets an upper boundary for the maximum amount of time that it would take for Extract to recover to the point where it stopped and then resume normal processing.

> **Caution:**
>
> Before changing this parameter from its default settings, contact Oracle Support for guidance. Most production environments will not require changes to this parameter. You can, however, specify the directory for the Bounded Recovery checkpoint files without assistance.

How Extract Recovers Open Transactions

When Extract encounters the start of a transaction in the redo log (in Oracle, this is the first executable SQL statement) it starts caching to memory all of the data that is specified to be captured for that transaction. Extract must cache a transaction even if it contains no captured data, because future operations of that transaction might contain data that is to be captured.

When Extract encounters a commit record for a transaction, it writes the entire cached transaction to the trail and clears it from memory. When Extract encounters a rollback record for a transaction, it discards the entire transaction from memory. Until Extract processes a commit or rollback, the transaction is considered *open* and its information continues to be collected.

If Extract stops before it encounters a commit or rollback record for a transaction, all of the cached information must be recovered when Extract starts again. This applies to all transactions that were open at the time that Extract stopped.

Extract performs this recovery as follows:

- If there were no open transactions when Extract stopped, the recovery begins at the current Extract read checkpoint. This is a normal recovery.
- If there were open transactions whose start points in the log were very close in time to the time when Extract stopped, Extract begins recovery by re-reading the logs from the *beginning of the oldest open transaction*. This requires Extract to do redundant work for transactions that were already written to the trail or discarded before Extract stopped, but that work is an acceptable cost given the relatively small amount of data to process. This also is considered a normal recovery.
- If there were one or more transactions that Extract qualified as *long-running open transactions*, Extract begins its recovery with a *Bounded Recovery*.

How Bounded Recovery Works

A transaction qualifies as long-running if it has been open longer than one *Bounded Recovery interval*, which is specified with the `BRINTERVAL` option of the `BR` parameter. For example, if the Bounded Recovery interval is four hours, a long-running open transaction is any transaction that started more than four hours ago.

At each Bounded Recovery interval, Extract makes a *Bounded Recovery checkpoint*, which persists the current state and data of Extract to disk, including the state and data (if any) of long-running transactions. If Extract stops after a Bounded Recovery checkpoint, it will recover from a position within the previous Bounded Recovery interval or at the last Bounded Recovery checkpoint, instead of processing from the log position where the oldest open long-running transaction first appeared.

The *maximum Bounded Recovery time* (maximum time for Extract to recover to where it stopped) is never more than twice the current Bounded Recovery checkpoint interval. The actual recovery time will be a factor of the following:

- the time from the last valid Bounded Recovery interval to when Extract stopped.
- the utilization of Extract in that period.
- the percent of utilization for transactions that were previously written to the trail. Bounded Recovery processes these transactions much faster (by discarding them) than Extract did when it first had to perform the disk writes. This constitutes most of the reprocessing that occurs for transactional data.

When Extract recovers, it restores the persisted data and state that were saved at the last Bounded Recovery checkpoint (including that of any long running transactions).

For example, suppose a transaction has been open for 24 hours, and suppose the Bounded Recovery interval is four hours. In this case, the maximum recovery time will be no longer than eight hours worth of Extract processing time, and is likely to be less. It depends on when Extract stopped relative to the last valid Bounded Recovery checkpoint, as well as Extract activity during that time.

Advantages of Bounded Recovery

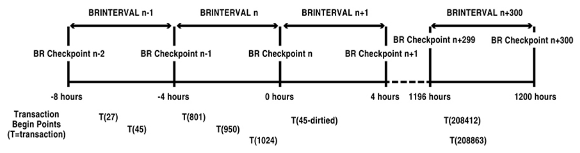
The use of disk persistence to store and then recover long-running transactions enables Extract to manage a situation that rarely arises but would otherwise significantly (adversely) affect performance if it occurred. The beginning of a long-running transaction is often very far back in time from the place in the log where Extract was processing when it stopped. A long-running transaction can span numerous old logs, some of which might no longer reside on accessible storage or might even have been deleted. Not only would it take an unacceptable amount of time to read the logs again from the start of a long-running transaction but, since long-running transactions are rare, most of that work would be the redundant capture of other transactions that were already written to the trail or discarded. Being able to restore the state and data of persisted long-running transactions eliminates that work.

Bounded Recovery Example

The following diagram illustrates a timeline over which a series of transactions were started. It shows how long-running open transactions are persisted to disk after a specific interval and then recovered after a failure. It will help to understand the terminology used in the example:

- A *persisted object* is any object in the cache that was persisted at a Bounded Recovery checkpoint. Typically this is the transactional state or data, but the cache is also used for objects that are internal to Extract. These are all collectively referred to as objects.
- The *oldest non-persisted object* is the oldest open object in the cache in the interval that immediately precedes the current Bounded Recovery checkpoint. Typically this is the oldest open transaction in that interval. Upon the restart of Bounded Recovery, runtime processing resumes from the position of the oldest non-persisted object, which, in the typical case of transactions, will be the position in the redo log of that transaction.

Figure 3-1   Sample Bounded Recovery Checkpoints



In this example, the Bounded Recovery interval is four hours. An open transaction is persisted at the current Bounded Recovery checkpoint if it has been open for more than one Bounded Recovery interval from the current Bounded Recovery checkpoint.

At BR Checkpoint n:

- There are five open transactions: T(27), T(45), T(801), T(950), T(1024). All other transactions were either committed and sent to the trail or rolled back. Transactions are shown at their start points along the timeline.
- The transactions that have been open for more than one Bounded Recovery interval are T(27) and T(45). At **BR Checkpoint n**, they are persisted to disk.
- The oldest non-persisted object is T(801). It is not eligible to be persisted to disk, because it has not been open across at least one Bounded Recovery interval. As

the oldest non-persisted object, its start position in the log is stored in the **BR Checkpoint n** checkpoint file. If Extract stops unexpectedly after **BR Checkpoint n**, it will recover to that log position and start to re-read the log there. If there is no oldest non-persisted object in the preceding Bounded Recovery interval, Extract will start re-reading the log at the log position of the current Bounded Recovery checkpoint.

At BR Checkpoint n+1:

- T(45) was dirtied (updated) in the previous Bounded Recovery interval, so it gets written to a new persisted object file. The old file will be deleted after completion of **BR Checkpoint n+1**.
- If Extract fails while writing **BR Checkpoint n+1** or at any time within that Bounded Recovery checkpoint interval between **BR Checkpoint n** and **BR Checkpoint n +1**, it will recover from **BR Checkpoint n**, the last valid checkpoint. The restart position for **BR Checkpoint n** is the start of the oldest non-persisted transaction, which is T(801). Thus, the worst-case recovery time is always no more than two Bounded Recovery intervals from the point where Extract stopped, in this case no more than eight hours.

At BR Checkpoint n+3000

- The system has been running for a long time. T(27) and T(45) remain the only persisted transactions. T(801) and T(950) were committed and written to the trail sometime before **BR Checkpoint n+2999**. Now, the only open transactions are T(208412) and T(208863).
- **BR Checkpoint n+3000** is written.
- There is a power failure in the interval after **BR Checkpoint n+3000**.
- The new Extract recovers to **BR Checkpoint n+3000**. T(27) and T(45) are restored from their persistence files, which contain the state from **BR Checkpoint n**. Log reading resumes from the beginning of T(208412).

Managing Long-running Transactions

Oracle GoldenGate provides the following parameters and commands to manage long-running transactions:

- Use the `WARNLONGTRANS` parameter to specify a length of time that a transaction can be open before Extract generates a warning message that the transaction is long-running. Also use `WARNLONGTRANS` to control the frequency with which Oracle GoldenGate checks for long-running transactions. Note that this setting is independent of, and does not affect, the Bounded Recovery interval.
- Use the `SEND EXTRACT` command with the `SKIPTRANS` option to force Extract to skip a specified transaction.
- Use the `SEND EXTRACT` command with the `FORCETRANS` option to force Extract to write a specified transaction to the trail as a committed transaction.
- Use the `TRANLOGOPTIONS` parameter with the `PURGEORPHANEDTRANSACTIONS` option to enable the purging of orphaned transactions that occur when a node fails and Extract cannot capture the rollback.

About the Files that are Written to Disk

At the expiration of a Bounded Recovery interval, Extract always creates a Bounded Recovery checkpoint file. Should there be long-running transactions that require persistence, they each are written to their own persisted-object files. A persisted-object file contains the state and data of a single transaction that is persisted to disk.

Field experience has shown that the need to persist long running transactions is rare, and that the transaction is empty in most of those cases.

If a previously persisted object is still open and its state and/or data have been modified during the just-completed Bounded Recovery interval, it is re-persisted to a new persisted object file. Otherwise, previously persisted object files for open transactions are not changed.

It is theoretically possible that more than one persisted file might be required to persist a long-running transaction.

Note:

The Bounded Recovery files cannot be used to recover the state of Extract if moved to another system, even with the same database, if the new system is not identical to the original system in all relevant aspects. For example, checkpoint files written on an Oracle 11g Solaris platform cannot be used to recover Extract on an Oracle 11g Linux platform.

Circumstances that Change Bounded Recovery to Normal Recovery

Most of the time, Extract uses normal recovery and not Bounded Recovery, the exception being the rare circumstance when there is a persisted object or objects. Certain abnormal circumstances may prevent Extract from switching from Bounded Recovery back to normal recovery mode. These include, but are not limited to, such occurrences as physical corruption of the disk (where persisted data is stored for long-running transactions), inadvertent deletion of the Bounded Recovery checkpoint files, and other actions or events that corrupt the continuity of the environment. There may also be more correctable reasons for failure.

In all but a very few cases, if Bounded Recovery fails during a recovery, Extract switches to normal recovery. After completing the normal recovery, Bounded Recovery is turned on again for runtime.

Bounded Recovery is not invoked under the following circumstances:

- The Extract start point is altered by CSN or by time.
- The Extract I/O checkpoint altered.
- The Extract parameter file is altered during recovery, such as making changes to the `TABLE` specification.

After completion of the recovery, Bounded Recovery will be in effect again for the next run.

What to Do if Extract Abends During Bounded Recovery

If Extract abends in Bounded Recovery, examine the error log to determine the reason. It might be something that is quickly resolved, such as an invalid parameter file or incorrect privileges on the directory that contains the Bounded Recovery files. In such cases, after the problem is fixed, Extract can be restarted with Bounded Recovery in effect.

If the problem is not correctable, attempt to restart Extract with the `BRRESET` option. Extract may recover in normal recovery mode and then turn on Bounded Recovery again.

Modifying the BR Parameter

Bounded Recovery is enabled by default with a default Bounded Recovery interval of four hours (as controlled with the `BRINTERVAL` option). This interval should be appropriate for most environments. Do not alter the `BR` parameter without first obtaining guidance from an Oracle support analyst. Bounded Recovery runtime statistics are available to help Oracle GoldenGate analysts evaluate the Bounded Recovery usage profile to determine the proper setting for `BRINTERVAL` in the unlikely event that the default is not sufficient.

Should you be requested to alter `BR`, be aware that the Bounded Recovery interval is a multiple of the regular Extract checkpoint interval. The Extract checkpoint is controlled by the `CHECKPOINTSECS` parameter. Thus, the `BR` parameter controls the ratio of the Bounded Recovery checkpoint to the regular Extract checkpoint. You might need to change both parameters, if so advised by your Oracle representative.

Supported Databases

This parameter applies to Oracle databases. For other databases, Extract recovers by reading the old logs from the start point of the oldest open transaction at the point of failure and does not persist long-running transactions.

Default

```
BR BRINTERVAL 4, BRDIR BR
```

Syntax

```
BR
[, BRDIR directory]
[, BRINTERVAL number {M | H}]
[, BRKEEPSTALEFILES]
[, BROFF]
[, BROFFONFAILURE]
[, BRFSOPTION { MS_SYNC | MS_ASYNC }]
```

`BRDIR` *`directory`*
Specifies the relative or full path name of the parent directory that will contain the `BR` directory. The `BR` directory contains the Bounded Recovery checkpoint files, and the name of this directory cannot be changed. The default parent directory for the `BR` directory is a directory named `BR` in the root directory that contains the Oracle GoldenGate installation files.

Each Extract group within a given Oracle GoldenGate installation will have its own sub-directory under the directory that is specified with `BRDIR`. Each of those directories is named for the associated Extract group.
For *`directory`*, do not use any name that contains the string `temp` or `tmp` (case-independent). Temporary directories are subject to removal during internal or external cleanup procedures.

`BRINTERVAL` ***`number`*** **`{M | H}`**
Specifies the time between Bounded Recovery checkpoints. This is known as the *Bounded Recovery interval*. This interval is an integral multiple of the standard Extract checkpoint interval, as controlled by the `CHECKPOINTSECS` parameter. However, it need not be set exactly. Bounded Recovery will adjust any legal `BRINTERVAL` parameter internally as it requires.
The minimum interval is 20 minutes. The maximum is 96 hours. The default interval is 4 hours.

`BRKEEPSTALEFILES`
Causes old Bounded Recovery checkpoint files to be retained. By default, only current checkpoint files are retained. Extract cannot recover from old Bounded Recovery checkpoint files. Retain old files only at the request of an Oracle support analyst.

`BROFF`
Turns off Bounded Recovery for the run and for recovery. Consult Oracle before using this option. In most circumstances, when there is a problem with Bounded Recovery, it turns itself off.

`BROFFONFAILURE`
Disables Bounded Recovery after an error. By default, if Extract encounters an error during Bounded Recovery processing, it reverts to normal recovery, but then enables Bounded Recovery again after recovery completes. `BROFFONFAILURE` turns Bounded Recovery off for the runtime processing.

`BRRESET`
`BRRESET` is a start up option that forces Extract to use normal recovery for the current run, and then turn Bounded Recovery back on after the recovery is complete. Its purpose is for the rare cases when Bounded Recovery does not revert to normal recovery if it encounters an error. Bounded Recovery is enabled during runtime. Consult Oracle Support before using this option.
To use this option, you must start Extract from the command line. To run Extract from the command line, use the following syntax:

```
extract paramfile name.prm reportfile name.rpt
```

Where:

- `paramfile` *`name`*`.prm` is the relative or fully qualified name of the Extract parameter file. The command name can be abbreviated to `pf`.
- `reportfile` *`name`*`.rpt` is the relative or fully qualified name of the Extract report file, if you want it in a place other than the default. The command name can be abbreviated to `rf`.

`BR BRFSOPTION {MS_SYNC | MS_ASYNC}`
Performs synchronous/asynchronous writes of the mapped data in Bounded Recovery.

`MS_SYNC`
Bounded Recovery writes of mapped data are synchronized for I/O data integrity completion.

`MS_ASYNC`
Bounded Recovery writes of mapped data are initiated or queued for servicing.

Example

`BR BRDIR /user/checkpt/br` specifies that the Bounded Recovery checkpoint files will be created in the `/user/checkpt/br` directory.

3.20 BULKLOAD

Valid For

Replicat

Description

Use the `BULKLOAD` parameter for an initial load Replicat when using the direct bulk load to Oracle SQL*Loader method. This method passes initial-load data directly to the interface of Oracle's SQL*Loader utility to perform a direct load. A Collector process and trails are not used.

For a complete guide to the methods of loading data with Oracle GoldenGate, see *Administering Oracle GoldenGate for Windows and UNIX*.

Default

None

Syntax

```
BULKLOAD
[LOGGING | NOLOGGING]
[PARALLEL | NOPARALLEL]
[SKIPALLINDEXES | SKIPUNUSEDINDEX | NOSKIPALLINDEXES]
```

`LOGGING | NOLOGGING`
Valid for Replicat for Oracle. `LOGGING` is the default and enables redo logging for the loaded objects. `NOLOGGING` increases `BULKLOAD` performance by disabling redo logging of the loaded objects. Do not specify `NOLOGGING` for cascading synchronization and multiple master configurations.
However, `BULKLOAD` must be set to `LOGGING` if the target is part of a cascading or bi-directional configuration, where a local Extract will capture the loaded objects.

`PARALLEL | NOPARALLEL`
Valid for Replicat for Oracle. `PARALLEL` enables `BULKLOAD` to use multiple load sessions to load the same segment concurrently. `NOPARALLEL` is the default and disables parallel loading.

`SKIPALLINDEXES | SKIPUNUSEDINDEX | NOSKIPALLINDEXES`
Valid for Replicat for Oracle. Controls the handling of indexes. `NOSKIPALLINDEXES` is the default, which allows index maintenance during a direct load. `SKIPALLINDEXES` skips all index maintenance. `SKIPUNUSEDINDEX` skips unusable indexes.

3.21 CACHEMGR

Valid For

Extract and Replicat, all databases except DB2 on z/OS. .

Description

Use the `CACHEMGR` parameter to specify a non-default file system location for the temporary files needed to hold uncommitted transaction data. The `CACHEMGR` parameter can also be used to control the amount of virtual memory and temporary disk space that is available for caching uncommitted transaction data. Both of these latter uses are discouraged.

Caution:

Do not change this parameter without consulting Oracle Support. `CACHEMGR` is internally self-configuring and self-adjusting. It is rare that this parameter requires modification. Doing so unnecessarily may result in performance degradation. It is best to acquire empirical evidence before opening an Oracle Service Request and consulting with Oracle Support.
However, you can specify the directory for the temporary files without assistance

Oracle GoldenGate only replicates committed transactions. Until a `COMMIT` is received, any transactional data is stored in an area of virtual memory known as a **cache**. This cache is managed by the `CACHEMGR`. If the amount of transaction data becomes too great for the virtual memory, then the `CACHEMGR` writes some of the cached data to temporary files on disk.

Your systems should have sufficient operating system swap and page file space. Oracle recommends a minimum of 512GB.

Identifying the Paging Directory

By default, Oracle GoldenGate maintains the transaction data that it swaps to disk a sub-directory of the Oracle GoldenGate installation directory. `CACHEMGR` assumes that all of the free space on the file system is available. This directory may fill up quickly if there is a large transaction volume with large transaction sizes. To prevent I/O contention and possible disk-related failures, dedicate a disk to this directory. You can assign directory location with the `CACHEDIRECTORY` option of the `CACHEMGR` parameter. A size can also be assigned. However, this is discouraged and should only be done after consulting Oracle Support.

Guidelines for Using CACHEMGR

- This parameter is valid for all databases supported by Oracle GoldenGate except DB2 z/OS.
- At least one argument must be supplied. `CACHEMGR` by itself is invalid.
- Parameter options can be listed in any order.

- Only one `CACHEMGR` parameter is permitted in a parameter file.

Default

None

Syntax

```
CACHEMGR {
[CACHEDIRECTORY path [size] [, CACHEDIRECTORY path [size] [, ...],]
CACHESIZE size
}
```

`CACHEDIRECTORY` *`path [size]`*
Specifies the name of the directory to which Oracle GoldenGate writes transaction data to disk temporarily when necessary. The default without this parameter is the `dirtmp` sub-directory of the Oracle GoldenGate installation directory. Any directory for temporary files can be on an Oracle Database file system, but cannot be on a direct I/O or concurrent I/O mounted file system that does not support the `mmap()` or `MapViewOfFile()` system calls, like AIX.

- *`path`* is a fully qualified directory name.
- *`size`* sets a maximum amount of disk space that can be allocated to the specified directory. The upper limit is imposed by the file system, such as the maximum file size or number of files. The minimum size is 2 GB, which is enforced. There is no default. Oracle discourages the use of the `size` option and you should only it when in consultation with Oracle Support.

You can specify more than one directory by using a `CACHEDIRECTORY` clause for each one. The maximum number of directories is 100.
The value can be specified in bytes or in terms of gigabytes, megabytes, or kilobytes in any of the following forms:
`GB | MB | KB | G | M | K | gb | mb | kb | g | m | k`

`CACHESIZE` *`size`*
Sets a soft limit for the amount of virtual memory (**`CACHESIZW`**) that is available for caching transaction data. You can internally adjust the `CACHESIZE` using `CACHEMGR` as necessary.
If you feel that the default `CACHEMGR` configuration and internal self-adjustment is adversely affecting your system performance, then you should open a Service Request with Oracle Support. It is best to have acquired empirical data showing the problem symptoms in question to aid in configuring a new default.

Example

```
CACHEMGR CACHEDIRECTORY /net/d4atd/ggs/temp
```

3.22 CATALOGEXCLUDE

Valid For

Extract, Replicat, DEFGEN

Description

Use the `CATALOGEXCLUDE` parameter to explicitly exclude source objects in the specified container or catalog from the Oracle GoldenGate configuration when the container or catalog name is being specified with a wildcard in `TABLE` or `MAP` statements. This parameter is valid when the database is an Oracle container database or a SQL/MX database, where fully qualified three-part names are being used.

The positioning of `CATALOGEXCLUDE` in relation to parameters that specify files or trails determines its effect. Parameters that specify trails or files are: `EXTFILE`, `RMTFILE`, `EXTTRAIL`, `RMTTRAIL`. The parameter works as follows:

- When a `CATALOGEXCLUDE` specification is placed before any `TABLE` or `SEQUENCE` parameters, and also before the parameters that specify trails or files, it applies globally to all trails or files, and to all `TABLE` and `SEQUENCE` parameters.
- When a `CATALOGEXCLUDE` specification is placed after a parameter that specifies a trail or file, it is effective only for that trail or file and only for the `TABLE` or `SEQUENCE` parameters that are associated with it. Multiple trail or file specifications can be made in a parameter file, each followed by a set of `TABLE`, `SEQUENCE`, and `CATALOGEXCLUDE` specifications.

`CATALOGEXCLUDE` is evaluated before evaluating the associated `TABLE` or `SEQUENCE` parameter. Thus, the order in which they appear does not make a difference.

See also the EXCLUDEWILDCARDOBJECTSONLY parameter.

Default

None

Syntax

```
CATALOGEXCLUDE {container | catalog}
```

`container | catalog`
The source Oracle container or SQL/MX catalog that is to be excluded. A wildcard can be used. Follow the rules for using wildcards described in *Administering Oracle GoldenGate for Windows and UNIX*.

Examples

Example 1
This example omits all source catalogs that contain the string `src_test`.

```
EXTRACT capt
RMTHOST sysb, MGRPORT 7809
RMTTRAIL /ggs/dirdat/aa
CATALOGEXCLUDE src_test*
TABLE *.*.*;
```

Example 2
This example omits the `pdb1` pluggable database.

```
EXTRACT capt
USERIDALIAS alias1
RMTHOST sysb, MGRPORT 7809
RMTTRAIL /ggs/dirdat/aa
CATALOGEXCLUDE pdb1
TABLE *.*.*;
```

3.23 CHARMAP

Valid For

Replicat

Description

Use the `CHARMAP` parameter to specify that the character mapping file overrides the character code point mapping. By enabling character set conversion for same character sets, you may encounter performance degradation.

Default

The encoding of the parameter file is operating system default character set.

Syntax

`CHARMAP` *`charmap filename`*

The character mapping file format is as follows:

```
       -- Sample character mapping file.
       --    Can use -- or COMMENT as comment line.
       --    Can use CHARSET parameter to specify file encoding.
       --
       -- Source character set
       SOURCECHARSET     shiftjis
       --
       -- Target character set
       TARGETCHARSET     ja16euc
       --
       -- Character map definition by one code point.
       --   left hand is source and right hand target code point.
       \xa2c1     \x89\xa2\xb7        -- override \xa2c1 to \x89\xa2\xb7
       --
       -- Character map definition by range. Number of source and target characters
must be the same.
      \x61 - \x7a        \x41 - \x5a
```

Example

In the following example, the character map definition is given using a character mapping text file:

`CHARMAP` *`charmapdesc.txt`*

`REPLACEBADCHAR FORCECHECK`

This enables strict character set conversion and check code point even if the source and target are the same.

Add the following to your character mapping file:

```
SOURCECHARSET   windows-932
TARGETCHARSET   windows-932
\x61 - \x7a    \x41 - \x5a
```

3.24 CHARSET

Valid For

Extract, Replicat, DEFGEN, Manager, and GLOBALS

Description

Use the `CHARSET` parameter to specify the character set of the parameter files in the local Oracle GoldenGate instance. By default, the parameter file is created in the default character set of the local operating system. `CHARSET` specifies an alternative character set to use in the event that the local platform does not support a required character or characters.

`CHARSET` cannot be used with query parameters.

`CHARSET` allows operating-system incompatible characters, including multi byte characters, to be used in the parameter file without the need for an escape sequence (`\uXXXX`) when the local platform does not support multibyte characters as the default character set of the operating system.

`CHARSET` can also be used when the parameter file is being created on one system but will be used on a different system with a different character set. To avoid possible incompatibilities between different character sets, you should create parameter files on the same system where they will be used by Oracle GoldenGate.

Note:

Use of `CHARSET` in the `mgr.prm` file is not supported in 12.1.2.x or earlier releases.

Placement in the Parameter File

`CHARSET` must be placed on the first line of the parameter file.

Usage in the GLOBALS File

`CHARSET` in a `GLOBALS` file sets a default character set for the parameter files of all local processes. `CHARSET` in an individual parameter file overrides the default that is set in `GLOBALS`.

Usage in Nested Parameter Files

You can use `CHARSET` in a parameter file that includes an `OBEY` or `INCLUDE` parameter, but the referenced parameter file does not inherit the `CHARSET` character set. The `CHARSET` character set is used to read wildcarded object names in the referenced file, but you must use an escape sequence (`\uXXXX`) to specify all other incompatible characters in the referenced file.

Default

None

Syntax

```
CHARSET character_set
```

character_set
Any supported character set.

Example

```
CHARSET UTF-8
```

3.25 CHECKMINUTES

Valid For

Manager

Description

Use the `CHECKMINUTES` parameter to control how often Manager performs maintenance activities. Decreasing this parameter can significantly affect performance if trail files roll over frequently. Other events, such as processes ending abnormally, also trigger the maintenance cycle.

Default

Every 10 minutes

Syntax

```
CHECKMINUTES minutes
```

minutes
The frequency, in minutes, to perform maintenance activities.

Example

```
CHECKMINUTES 15
```

3.26 CHECKPARAMS

Valid For

Extract and Replicat

Description

Use the `CHECKPARAMS` parameter to test the syntax of a parameter file. To start the test:

1. Edit the parameter file to add `CHECKPARAMS`.
2. (Optional) To verify the tables, add the `NODYNAMICRESOLUTION` parameter.
3. Start the process. Without processing data, Oracle GoldenGate audits the syntax. If `NODYNAMICRESOLUTION` exists, Oracle GoldenGate connects to the database to verify that the tables specified with `TABLE` or `MAP` exist. If there is a syntax failure,

the process abends with error 190. If the syntax succeeds, the process stops and writes a message to the report file that the parameters processed successfully.

4. Do one of the following:
   - If the test succeeds, edit the file to remove the `CHECKPARAMS` parameter and the `NODYNAMICRESOLUTION` parameter, if used, and then start the process again to begin processing.
   - If the test fails, edit the parameter file to fix the syntax based on the report's findings, and then remove `NODYNAMICRESOLUTION` and start the process again.

`CHECKPARAMS` can be positioned anywhere within the parameter file.

Default

None

Syntax

```
CHECKPARAMS
```

3.27 CHECKPOINTSECS

Valid For

Extract and Replicat

Description

Use the `CHECKPOINTSECS` parameter to control how often Extract and Replicat make their routine checkpoints.

- Decreasing the value causes more frequent checkpoints. This reduces the amount of data that must be reprocessed if the process fails, but it could cause performance degradation because data is written to disk more frequently.
- Increasing the value causes less frequent checkpoints. This might improve performance, but it increases the amount of data that must be reprocessed if the process fails. When using less frequent Extract checkpoints, make certain that the transaction logs remain available in case the data has to be reprocessed.

> **Note:**
>
> In addition to its routine checkpoints, Replicat also makes a checkpoint when it commits a transaction.

Avoid changing `CHECKPOINTSECS` unless you first open an Oracle service request.

Default

10 seconds

Syntax

```
CHECKPOINTSECS seconds
```

seconds
The number of seconds to wait before issuing a checkpoint.

Example

```
CHECKPOINTSECS 20
```

3.28 CHECKPOINTTABLE

Valid For

GLOBALS

Description

Use the `CHECKPOINTTABLE` parameter in a `GLOBALS` parameter file to specify the name of a default checkpoint table that can be used by all Replicat groups in one or more Oracle GoldenGate instances. All Replicat groups created with the `ADD REPLICAT` command will default to this table unless it is overridden by using the `CHECKPOINTTABLE` option of that command.

To create the checkpoint table, use the `ADD CHECKPOINTTABLE` command in GGSCI. Do not use a checkpoint table for a Replicat that is configured in integrated mode against an Oracle target database. It is not required in that mode and will be ignored.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about creating a checkpoint table.

Default

None

Syntax

```
CHECKPOINTTABLE [container. | catalog.] owner.table
```

[*container*. | *catalog*.]*owner*.*table*
The owner and name of the checkpoint table. Additionally, for an Oracle container database, specify the correct pluggable database (container). For a SQL/MX database, specify the correct catalog.

Example

```
CHECKPOINTTABLE finance.ggs.chkpt
```

3.29 CMDTRACE

Valid For

Extract and Replicat

Description

Use the `CMDTRACE` parameter to display macro expansion steps in the report file. You can use this parameter more than once in the parameter file to set different options for different macros.

Default

OFF

Syntax

```
CMDTRACE [ON | OFF | DETAIL]
```

ON
Enables the display of macro expansion.

OFF
Disables the display of macro expansion.

DETAIL
Produces a verbose display of macro expansion.

Example

In the following example, tracing is enabled before `#testmac` is invoked, and then disabled after the macro's execution.

```
MACRO #testmac
BEGIN
col1 = col2,
col3 = col4
END;
...
CMDTRACE ON
MAP test.table2 , TARGET test.table2,
COLMAP (#testmac);
CMDTRACE OFF
```

3.30 COLCHARSET

Valid For

Extract, Replicat, and DEFGEN

Description

Use `COLCHARSET` clause to specify particular column character set or disable character set conversion. This parameter overrides the column character set for the specified column.

The character set specified by the `COLCHARSET` parameter overrides the character set in the trail file, the character set specified by the `SOURCECHARSET OVERRIDE` parameter and the character set specified by the `CHARSET` parameter.

The character set specified by the `COLCHARSET` Replicat parameter overrides the column level character set specified in the source table definition file.

If the `COLCHARSET` is specified for DEFGEN file format less than level four, the parameter is ignored and warning message is issued. The column level character set attribute for the older table definition file format is not output.

The COLCHARSET parameter overrides the source column level character set and change the Replicat character set conversion behavior by assuming the source column character set as specified character set.

Default

None

Syntax

```
COLCHARSET character_set (column [, ...])
```

character_set
Any supported character set.

column
The name of a column. To specify multiple columns, create a comma-delimited list.

Examples

Example 1
The following example specifies multiple columns.

```
TABLE SchemaName.TableName, COLCHARSET( WE8MSWIN1252, col0, col2 );
```

Example 2
The following example specifies a different character set.

```
MAP SchemaName.*, TargetName *.*,
  COLCHARSET( WE8MSWIN1252, col1 ),
  COLCHARSET( WE8ISO8859P1, col2 )
```

Example 3
The following example specifies different character set.

```
MAP SchemaName.*, TargetName *.*,
  COLCHARSET( WE8MSWIN1252, col1 ),
  COLCHARSET( WE8ISO8859P1, col2 )
```

Example 4
The following example specifies a wildcard.

```
MAP SchemaName.*, TargetName *.*, COLCHARSET( WE8MSWIN1252, col* )
```

Example 5
The following example disables character set conversion on particular column.

```
MAP SchemaName.*, TargetName *.*, COLCHARSET(PASSTHRU, col )
```

3.31 COLMATCH

Valid For

Extract and Replicat

Description

Use the COLMATCH parameter to create global rules for column mapping. COLMATCH rules apply to all TABLE or MAP statements that follow the COLMATCH statement. Global rules can be turned off for subsequent TABLE or MAP entries with the RESET option.

With `COLMATCH`, you can map between tables that are similar in structure but have different column names for the same sets of data. `COLMATCH` provides a more convenient way to map columns of this type than does using a `COLMAP` clause in individual `TABLE` or `MAP` statements.

With `COLMATCH`, you can:

- Map explicitly based on column names.
- Ignore name prefixes or suffixes.

Either `COLMATCH` or a `COLMAP` clause of a `TABLE` or `MAP` statement is required when mapping differently named source and target columns.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about mapping columns.

Default

None

Syntax

```
COLMATCH
{NAMES target_column = source_column |
PREFIX prefix |
SUFFIX suffix |
RESET}
```

`NAMES target_column = source_column`
Specifies the name of a target and source column, for example `CUSTOMER_CODE` and `CUST_CODE`. If the database requires double quotes to enforce case-sensitivity, specify the column name that way. For example: `NAMES "ABC" = "ABC2"`. For other case-sensitive databases, specify the column name as it is stored in the database, for example: `NAMES ABC = abc`.

`PREFIX prefix | SUFFIX suffix`
Specifies a column name prefix or suffix to ignore. If the database requires double quotes to enforce case-sensitivity, specify the prefix or suffix that way if it is case-sensitive. For other case-sensitive databases, specify the prefix or suffix as it is stored in the database
For example, to map a target column named `"ORDER_ID"` to a source column named `"P_ORDER_ID"`, specify:

```
COLMATCH PREFIX "P_"
```

To map a target column named `"CUST_CODE_K"` to a source column named `CUST_CODE`, specify:

```
COLMATCH SUFFIX "_K"
```

`RESET`
Turns off previously defined `COLMATCH` rules for subsequent `TABLE` or `MAP` statements.

Examples

Example 1

```
COLMATCH NAMES "CUSTOMER_CODE" = "CUST_CODE"
```

Example 2

```
COLMATCH NAMES Customer_Code = "Cust_Code"
```

Example 3

```
COLMATCH PREFIX P_
```

Example 4

```
COLMATCH SUFFIX _K
```

Example 5

```
COLMATCH RESET
```

3.32 COMMENT | --

Valid For

Manager, Extract, Replicat

Description

Use the `COMMENT` parameter or double hyphens (--) to indicate comments anywhere within a parameter file. Anything on the same line after `COMMENT` or double hyphens is ignored during processing. Comments that continue to the next line must be preceded by another `COMMENT` keyword or double hyphens.

> **Note:**
>
> If any columns in the tables that are being synchronized contain the word "`comment`," there may be conflicts with the `COMMENT` parameter. Use double hyphens instead.

`COMMENT` cannot be used with query parameters.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about working with parameter files.

Default

None

Syntax

```
{COMMENT comment} | {-- comment}
```

Examples

Example 1

```
COMMENT GoldenGate param file for fin Extract group.
```

Example 2

```
-- GoldenGate param file for fin Extract group.
```

3.33 COMPRESSDELETES | NOCOMPRESSDELETES

Valid For

Extract

Description

Use the `COMPRESSDELETES` and `NOCOMPRESSDELETES` parameters to control the way that columns are written to the trail record for `DELETE` operations.

`COMPRESSDELETES` and `NOCOMPRESSDELETES` can be used globally for all `TABLE` statements in the parameter file, or they can be used as on-off switches for individual `TABLE` statements.

These parameters support the following databases:

DB2 LUW
DB2 z/OS
DB2 for i
Informix
MySQL
Oracle
SQL/MX
SQL Server
Sybase
Teradata

These parameters do not affect data pumps.

Default

`COMPRESSDELETES`

Syntax

```
{COMPRESSDELETES | NOCOMPRESSDELETES [FETCHMISSINGCOLUMNS]}
```

`COMPRESSDELETES`
Causes Extract to write only the primary key to the trail for `DELETE` operations. This is the default. The key provides enough information to delete the correct target record, while restricting the amount of data that must be processed.

`NOCOMPRESSDELETES [FETCHMISSINGCOLUMNS]`
`NOCOMPRESSDELETES` sends all of the columns to the trail. This becomes the default when a table definition does not include a primary key or unique index, or when a substitute key is defined with the `KEYCOLS` option of `TABLE`. The `KEYCOLS` option writes the specified columns to the trail whether or not a real key exists. See `KEYCOLS (`*`columns`*`)` for more information about the `KEYCOLS` option.
`NOCOMPRESSDELETES` is also required when using the Conflict Detection and Resolution (CDR) feature for a DB2 database on any of the platforms that are supported by Oracle GoldenGate. See *Administering Oracle GoldenGate for Windows and UNIX* for more information about CDR.

FETCHMISSINGCOLUMNS is valid for Oracle Database only. It causes the values of data types that are only supported by fetching to be fetched from the database on DELETE operations. These data types are LOB, UDT, LONG, and some XMLType columns. For detailed information about columns that are supported by fetching (rather than directly captured from the redo stream), see Installing and Configuring Oracle GoldenGate for Oracle Database. The columns that are fetched will appear in the trail file as part of the DELETE record. If NOCOMPRESSDELETES is used for Oracle Database data without the FETCHMISSINGCOLUMNS option, only the LOB data that can be read from the logs (without fetching) will be included in the DELETE operation in the trail.

3.34 COMPRESSUPDATES | NOCOMPRESSUPDATES

Valid For

Extract

Description

Use the COMPRESSUPDATES and NOCOMPRESSUPDATES parameters for Extract to control the way columns are written to the trail record for UPDATE operations.

COMPRESSUPDATES, the default, causes Extract to write only the primary key and the changed columns of a row to the trail for update operations. This provides enough information to update the correct target record (unless conflict resolution is required), while restricting the amount of data that must be processed.

If other columns are supplementally logged by the database for use by Oracle GoldenGate, Extract writes those columns to the trail as well. Additionally, if a substitute key is defined with the KEYCOLS option of the TABLE parameter, those columns are written to the trail, whether or not a primary or unique key is defined. See "KEYCOLS (*columns*)" for more information.

NOCOMPRESSUPDATES sends all of the columns to the trail. This becomes the default when a table definition does not include a primary key or unique index. NOCOMPRESSUPDATES also is required when using the Conflict Detection and Resolution (CDR) feature for a DB2 database on any of the platforms that are supported by Oracle GoldenGate. See *Administering Oracle GoldenGate for Windows and UNIX* for more information about CDR.

COMPRESSUPDATES and NOCOMPRESSUPDATES apply globally for all TABLE statements in a parameter file.

These parameters support the following databases:

DB2 LUW
DB2 z/OS
DB2 for i
Informix
MySQL
Oracle
SQL/MX
SQL Server
Sybase
Teradata

`COMPRESSUPDATES` and `NOCOMPRESSUPDATES` do not affect data pumps.

Default

`COMPRESSUPDATES`

Syntax

```
COMPRESSUPDATES | NOCOMPRESSUPDATES
```

3.35 COORDSTATINTERVAL

Valid For

Replicat in coordinated mode

Description

Use the `COORDSTATINTERVAL` parameter to set the amount of time, in seconds, between requests for statistics sent by the Replicat coordinator thread to the apply threads. If a thread does not return statistics within an internal heartbeat interval, Replicat logs a warning message. The heartbeat interval is not configurable and is always six times the `COORDSTATINTERVAL` interval. At the default `COORDSTATINTERVAL` interval of 10 seconds, for example, the heartbeat default is one minute (60 seconds).

Default

The minimum value is 0; the maximum value is 2147483647. The default value is 10 seconds

Syntax

```
COORDSTATINTERVAL interval
```

`interval`
The interval, in seconds, between requests for thread statistics. Valid values are 0 or any positive number.

3.36 COORDTIMER

Valid For

Replicat in coordinated mode

Description

Use the `COORDTIMER` parameter to set a base amount of time, in seconds, that the threads and coordinator wait for each other to start. A thread will wait for this base time interval before retrying a connection to the coordinator and it will do this a certain number of times. The coordinator waits for the length of this base time interval and it is reset after every thread is successfully registered. The overall time the coordinator waits before abending is dependent on this timer and it is variable depending on the register time of the threads.

A value of 0 disables this timing procedure. If timing is disabled, the coordinator thread may wait indefinitely for the threads to start, and Replicat will enter a suspended state.

In this case, the internal Replicat heartbeat timer is disabled regardless of the COORDSTATINTERVAL setting.

Default

The minimum value is 0; the maximum value is 2147483647. The default value is 180 seconds (three minutes)

Syntax

```
COORDTIMER wait_time
```

wait_time
The amount of time, in seconds, that the coordinator thread waits for the apply threads to start. Valid values are 0 or any positive number.

3.37 CREDENTIALSTORELOCATION

Valid For

GLOBALS

Description

Use the `CREDENTIALSTORE` parameter to change the location of the Oracle GoldenGate credential store from the default location. The default location is the `dircrd` directory in the Oracle GoldenGate installation directory. The default location is the preferred location.

The credential store stores database user names and passwords in encrypted format as a security measure. When `CREDENTIALSTORE` is used, the specified location is assumed for all GGSCI commands that manage the credential store. See *Administering Oracle GoldenGate for Windows and UNIX* for more information about configuring Oracle GoldenGate security.

Syntax

```
CREDENTIALSTORELOCATION directory
```

directory
The full path name of the directory where the credential store is to be stored.

Example

```
CREDENTIALSTORELOCATION /home/ogg/credentials
```

3.38 CRYPTOENGINE

Valid For

GLOBALS

Description

Use the `CRYPTOENGINE` to select which cryptographic library the Oracle GoldenGate processes use to provide implementation of security primitives.

Syntax

```
CRYPTOENGINE (CLASSIC | FIPS140 | NATIVE)
```

`CRYPTOENGINE`
Selects which cryptographic library will the OGG processes use to provide implementation of security primitives.

`CLASSIC`
Uses the Oracle NNZ security framework without FIPS-140 enhancements.

`FIPS140`
Uses the Oracle NNA security framework, but enhanced with the FIPS-140.2 compliant version of the RSA MES shared libraries.

`NATIVE`
For the platforms where this is available, it will use a native library that makes more efficient use of the CPU cryptographic primitives, resulting in higher product throughput when using trail and TCP encryption. Currently, Intel's IPP library version 9.0 is used for Linux.x64 and Windows.x64. All other platforms fall back to `CLASSIC` behavior.

3.39 CUSEREXIT

Valid For

Extract when fetching from a multitenant container database (CDB) and Replicat

Description

Use the `CUSEREXIT` parameter to call a custom exit routine written in C programming code from a Windows DLL or UNIX shared object at a defined exit point within Oracle GoldenGate processing. Your user exit routine must be able to accept different events and information from the Extract and Replicat processes, process the information as desired, and then return a response and information to the caller (the Oracle GoldenGate process that called it).

User exits can be used as an alternative to, or in conjunction with, the data transformation functions that are available within the Oracle GoldenGate solution.

Note:

When using a coordinated Replicat to call a user exit routine, you are responsible for writing the user exits in a thread-safe manner.

For help with creating and implementing user exits, see *Administering Oracle GoldenGate for Windows and UNIX*.

Default

None

Syntax

```
CUSEREXIT {DLL | shared_object} routine
[, INCLUDEUPDATEBEFORES]
[, PARAMS 'string']
```

{`DLL` | *`shared_object`*}
The name of the Windows DLL or UNIX shared object that contains the user exit function.

`routine`
The name of the exit routine to be executed.

`INCLUDEUPDATEBEFORES`
Passes the before images of column values to a user exit. When using this parameter, you must explicitly request the before image by setting the `requesting_before_after_ind` flag to `BEFORE_IMAGE_VAL` within a callback function that supports this flag. Otherwise, only the after image is passed to the user exit. By default, Oracle GoldenGate only works with after images.
When using `INCLUDEUPDATEBEFORES` for a user exit that is called from a data pump or from Replicat, always use the `GETUPDATEBEFORES` parameter for the primary Extract process, so that the before image is captured, written to the trail, and causes a `process_record` event in the user exit. In a case where the primary Extract also has a user exit, `GETUPDATEBEFORES` causes both the before image and the after image to be sent to the user exit as separate `EXIT_CALL_PROCESS_RECORD` events.
If the user exit is called from a primary Extract (one that reads the transaction log), only `INCLUDEUPDATEBEFORES` is needed for that Extract. `GETUPDATEBEFORES` is not needed in this case, unless other Oracle GoldenGate processes downstream will need the before image to be written to the trail. `INCLUDEUPDATEBEFORES` does not cause before images to be written to the trail.

`PARAMS` *`'string'`*
Passes the specified string at startup. Can be used to pass a properties file, startup parameters, or other string. Enclose the string within single quote marks.
Data in the string is passed to the user exit in the `EXIT_CALL_START` `exit_params_def.function_param`. If no quoted string is specified with `PARAMS`, the `exit_params_def.function_param` is `NULL`.

Examples

Example 1

```
CUSEREXIT userexit.dll MyUserExit
```

Example 2

```
CUSEREXIT userexit.dll MyUserExit, PARAMS 'init.properties'
```

Example 3

```
CUSEREXIT userexit.dll MyUserExit, INCLUDEUPDATEBEFORES, PARAMS 'init.properties'
```

Example 4

```
CUSEREXIT userexit.dll MyUserExit, INCLUDEUPDATEBEFORES, &
  PARAMS 'init.properties'
```

Example 5

```
CUSEREXIT cuserexit.dll MyUserExit, &
  INCLUDEUPDATEBEFORES, PARAMS 'Some text to start with during startup'
```

3.40 DBOPTIONS

Valid For

Extract and Replicat

Description

Use the `DBOPTIONS` parameter to specify database options. This is a global parameter, applying to all `TABLE` or `MAP` statements in the parameter file. Some `DBOPTIONS` options apply only to Extract or Replicat.

The `DBOPTIONS` parameter can be placed anywhere in the parameter file irrespective of other parameters.

Default

None

Syntax

```
DBOPTIONS
[ALLOWLOBDATATRUNCATE | NOALLOWLOBDATATRUNCATE]
[ALLOWUNUSEDCOLUMN | NOALLOWUNUSEDCOLUMN]
[BINDCHARFORBITASCHAR]
[CATALOGCONNECT | NOCATALOGCONNECT]
[CONNECTIONPORT port]
[DECRYPTPASSWORD shared_secret ENCRYPTKEY {DEFAULT | key_name}]
[DEFERREFCONST]
[DISABLECOMMITNOWAIT]
[DISABLELOBCACHING]
[ENABLE_INSTANTIATION_FILTERING]
[EMPTYLOBSTRING 'string']
[FETCHBATCHSIZE records]
[FETCHCHECKFREQ seconds]
[FETCHLOBS | NOFETCHLOBS]
[FETCHRETRYCOUNT number]
[FECHTIMEOUT seconds | NOFECHTIMEOUT]
[HOST {DNS_name | IP_address}]
[INTEGRATEDPARAMS(parameter[, ...])]
[LIMITROWS | NOLIMITROWS]
[LOBBUFSIZE bytes]
[LOBWRITESIZE bytes]
[SESSIONPOOLMAX max_value |
[SESSIONPOOLMIN min_value][SESSIONPOOLINCR increment_value]
[SETTAG [tag_value | NULL] ]
[SHOWINFOMESSAGES]
[SHOWWARNINGS]
[SKIPTEMPLOB | NOSKIPTEMPLOB]
[SOURCE_DB_NAME src_dbase_global_name]
[SPTHREAD | NOSPTHREAD]
[SUPPRESSTEMPORALUPDATES]
[SUPPRESSTRIGGERS | NOSUPPRESSTRIGGERS]
[TDSPACKETSIZE bytes]
[TRANSNAME trans_name]
```

```
[USEODBC | USEREPLICATIONUSER]
[XMLBUFSIZE bytes]
```

ALLOWUNUSEDCOLUMN | NOALLOWUNUSEDCOLUMN
Valid for Extract for Oracle. Controls whether Extract abends when it encounters a table with an unused column.
The default is ALLOWUNUSEDCOLUMN. When Extract encounters a table with an unused column, it continues processing and generates a warning.When using this parameter, either the same unused column must exist on the target or a source definitions file for the table must be specified to Replicat, so that the correct metadata mapping can be performed.
NOALLOWUNUSEDCOLUMN causes Extract to abend on unused columns.

ALLOWLOBDATATRUNCATE | NOALLOWLOBDATATRUNCATE
Valid for Replicat for DB2 LUW, Sybase, and MySQL. ALLOWLOBDATATRUNCATE prevents Replicat from abending when replicated LOB data is too large for a target CHAR, VARCHAR, BINARY or VARBINARY column and is applicable to target LOB columns only. or replicat of DB2 LUW, ALLOWLOBDATATRUNCATE prevents Replicat from abending when replicated LOB data is too large for a target LOB column. The LOB data is truncated to the maximum size of the target column *without any further error messages or warnings*.
NOALLOWLOBDATATRUNCATE is the default and causes Replicat to abend with an error message if the replicated LOB is too large.

BINDCHARFORBITASCHAR
Valid for DEFGEN, Extract, and Replicat for DB2 for i. Allows columns that are defined as CHAR or VARCHAR with CCSID 65535, or CHAR and VARCHAR FOR BIT DATA to be treated as if the field had a normal translatable encoding. The encoding is picked up from the job CCSID. When this option is in effect, DEFGEN does not indicate that the field is binary in the defs file.

CATALOGCONNECT | NOCATALOGCONNECT
Valid for Extract and Replicat for ODBC databases. By default, Oracle GoldenGate creates a new connection for catalog queries, but you can use NOCATALOGCONNECT to prevent that. On DB2 for z/OS, NOCATALOGCONNECT prevents Oracle GoldenGate from attempting multiple connections when the MVS DB2 initialization parameter mvsattachtype is set to CAF. Because CAF mode does not support multiple connections, it is possible that Oracle GoldenGate may issue commit locks on the system catalog tablespaces until it receives the commit for its open connection. To prevent commit locks, Oracle GoldenGate recommends using RRSAF (mvsattachtype=RRSAF), which supports multiple connections.

CONNECTIONPORT *port*
Valid for Replicat for multi-daemon MySQL. Specifies the TCP/IP port of the instance to which Replicat must connect. The minimum value is 1 and the default value is 3306.

DECRYPTPASSWORD *shared_secret algorithm* ENCRYPTKEY {*key_name* | DEFAULT}
Valid for Extract in classic capture mode (Oracle)
Specifies the shared secret (password) that decrypts the TDE key, which decrypts redo log data that was encrypted with Oracle Transparent Data Encryption (TDE). The TDE key is first encrypted in the Oracle server by using the shared secret as a key, and then it is delivered to Extract, which decrypts it by using the same shared secret. The shared secret must be created in the Oracle Wallet or Hardware Security Module by the Oracle Server Security Officer. The only other person who should know the shared secret is the Oracle GoldenGate Administrator.

To use the decryption options, you must first generate the encrypted shared secret with the `ENCRYPT PASSWORD` command in GGSCI and create an `ENCKEYS` file.
Parameter options:

`shared_secret`
Is the encrypted shared secret (password) that is copied from the `ENCRYPT PASSWORD` command results.

`algorithm`
Specifies the encryption algorithm that was used to encrypt the password: `AES128`, `AES192`, `AES256`, or `BLOWFISH`. AES is not supported on DB2 on z/OS, DB2 for i, and SQL/MX.

`ENCRYPTKEY key_name`
Specifies the logical name of a user-created encryption key in the `ENCKEYS` lookup file. Use if `ENCRYPT PASSWORD` was used with the `KEYNAME` *`key_name`* option. Requires an `ENCKEYS` file to be created on the local system.

`ENCRYPTKEY DEFAULT`
Directs Oracle GoldenGate to use a random key. Use if `ENCRYPT PASSWORD` was used with the `KEYNAME DEFAULT` option.

For more information about configuring Extract to support TDE, see Installing and Configuring Oracle GoldenGate for Oracle Database.
For more information about Oracle GoldenGate encryption options, including `ENCKEYS`, see *Administering Oracle GoldenGate for Windows and UNIX*.

`DEFERREFCONST`
Valid for nonintegrated Replicat for Oracle. Sets constraints to `DEFERRABLE` to delay the checking and enforcement of cascade delete and cascade update referential integrity constraints by the Oracle target database until the Replicat transaction is committed. At that point, if there are constraint violations, an error is generated. Integrated Replicat does not require disabling of referential constraints on the target system.
You can use `DEFERREFCONST` instead of disabling the constraints on the target tables or setting them to `DEFERRED`. When used, `DEFERREFCONST` defers both `DEFERABLE` and `NOT DEFERABLE` constraints. `DEFERREFCONST` applies to every transaction that is processed by Replicat. `DEFERREFCONST` is valid for Oracle Database 12*c*, 11*g* (11.2.0.2), and later 11*g* R2 releases.
If used with an Oracle Database release that does not support this functionality, `DEFERREFCONST` is ignored without returning a notification to the Oracle GoldenGate log.
To handle errors on the commit operation, you can use `REPERROR` at the root level of the parameter file and specify the `TRANSDISCARD` or `TRANSEXCEPTION` option.

Note:

Do not to use with `DEFERREFCONST` coordinated Replicat because there is no way to guarantee that related rows in parent and child tables are processed by same thread

`DISABLECOMMITNOWAIT`
Valid for Replicat for Oracle. Disables the use of asynchronous `COMMIT` by Replicat. An asynchronous `COMMIT` statement includes the `NOWAIT` option.

When `DISABLECOMMITNOWAIT` is used, Replicat issues a standard synchronous `COMMIT` (`COMMIT` with `WAIT` option).

`DISABLELOBCACHING`
Valid for nonintegrated Replicat for Oracle. Disables Oracle's LOB caching mechanism. By default, Replicat enables Oracle's LOB caching mechanism.

`ENABLE_INSTANTIATION_FILTERING`
Valid for Oracle. Enables automatic per table instantiation CSN filtering on tables imported using Oracle Datapump or manually instantiated by the SET_INSTANTIATION_CSN command.

`EMPTYLOBSTRING '`*`string`*`'`
Valid for Replicat for Sybase. Substitutes a string value for empty (zero-length) LOB columns, such as Sybase `IMAGE` or `TEXT` values, that are replicated to the target. By default, Oracle GoldenGate sets empty columns to `NULL` on the target and will abend if the target database does not permit LOB columns to be `NULL`. This option prevents Replicat from abending.
For '*`string`*' use any string that the column accepts, and enclose the string within single quotes. The default is `NULL`.
Example:

```
DBOPTIONS EMPTYLOBSTRING 'empty'
```

`FETCHBATCHSIZE` ***`records`***
Valid for Extract for Oracle, DB2 for i, DB2 z/OS, SQL/MX, Sybase, SQL Server, Sybase, and Teradata. Enables array fetches for initial loads to improve performance, rather than one row at a time.
Valid values for Oracle, DB2 for i, DB2 z/OS, SQL/MX, Sybase, SQL Server, Sybase, and Teradata are 0 through 1000000 records per fetch. Valid values for DB2 LUW are 1 through 1000000 records per fetch; zero (0) is *not* a valid value.
The default is 1000. Performance slows when batch size gets very small or very large. If the table contains LOB data, Extract reverts to single-row fetch mode, and then resumes batch fetch mode afterward.

`FETCHCHECKFREQ` ***`seconds`***
Valid for Integrated Extract for Oracle. Specifies the number of seconds that Extract waits between each fetch check for the ADG to catch up. A low number improves latency though increases the number of queries of `current_scn from v$database`. The default is 3 seconds; the maximum is 120 seconds.

`FETCHLOBS | NOFETCHLOBS`
Valid for Extract for DB2 for z/OS and DB2 for LUW. Suppresses the fetching of LOBs directly from the database table when the LOB options for the table are set to `NOT LOGGED`. With `NOT LOGGED`, the value for the column is not available in the transaction logs and can only be obtained from the table itself. By default, Oracle GoldenGate captures changes to LOBs from the transaction logs. The default is `FETCHLOBS`.

`FETCHRETRYCOUNT` ***`number`***
Valid for Integrated Extract for Oracle. Specifies the number of times that Extract tries before it reports ADG progress or the reason for no progress when waiting for the ADG to catch up. This value is multiplied with `FETCHCHECKFREQ` to determine approximately how often the ADG progress is reported.

FECHTIMEOUT *seconds* | NOFECHTIMEOUT
Valid for Integrated Extract for Oracle. Specifies the number of seconds that Extract after which it will abend when ADG makes no progress. No progress can be because the MRP is not running or because it is not applying redo changes. When this occurs, the ADG database should be examined. The default is 30 seconds; valid values are 0 - 4294967295 (ub4 max value) seconds. `NOFETCHTIMEOUT` means never timeout (the same as `FECHTIMEOUT 0`) and seconds cannot be specified with it.

HOST *{DNS_name* | *IP_address}*
Valid for Replicat for multi-daemon MySQL. Specifies the DNS name or IP address of the system that hosts the instance to which Replicat must connect.

INTEGRATEDPARAMS(*parameter*[, ...])
Valid for Replicat for Oracle. Passes settings for parameters that control the database inbound server within the target Oracle database. Use this option only for an integrated Replicat. For more information about integrated Replicat and a list of supported inbound server parameters, see Installing and Configuring Oracle GoldenGate for Oracle Database.

LIMITROWS | NOLIMITROWS
Valid for Replicat for MySQL, Oracle, SQL Server, and Sybase. `LIMITROWS` prevents multiple rows from being updated or deleted by the same Replicat SQL statement when the target table does not have a primary or unique key.
`LIMITROWS` is the default. `LIMITROWS` and `NOLIMITROWS` apply globally to all `MAP` statements in a parameter file.
For MySQL, LIMITROWS uses a `LIMIT 1` clause in the `UPDATE` or `DELETE` statement.
For Oracle targets, `LIMITROWS` (the default) must be used. It uses either `WHERE ROWNUM = 1` or `AND ROWNUM = 1` in the `WHERE` clause.
For SQL Server and Sybase, LIMITROWS uses a `SET ROWCOUNT 1` clause before the `UPDATE` or `DELETE` statement.
`NOLIMITROWS` permits multiple rows to be updated or deleted by the same Replicat SQL statement.

LOBBUFSIZE *bytes*
Valid for Extract for Oracle. Determines the memory buffer size in bytes to allocate for each embedded LOB attribute that is in an Oracle object type. Valid values are from 1024 and 10485760 bytes. The default is 1048576 bytes.
If the length of embedded LOB exceeds the specified `LOBBUFSIZE` size, an error message similar to the following is generated:

```
GGS ERROR    ZZ-0L3  Buffer overflow, needed: 2048, allocated: 1024.
```

LOBWRITESIZE *bytes*
Valid for nonintegrated Replicat for Oracle. Specifies a fragment size in bytes for each LOB that Replicat writes to the target database. The LOB data is stored in a buffer until this size is reached. Because LOBs must be written to the database in fragments, writing in larger blocks prevents excessive I/O. The higher the value, the fewer I/O calls that are made by Replicat to the database server to write the whole LOB to the database.
Specify a multiple of the Oracle LOB fragment size. A given value will be rounded up to a multiple of the Oracle LOB fragment size, if necessary. The default LOB write size is 32k if `DBOPTIONS NOSKIPTEMPLOB` is specified, or 1MB if `DBOPTIONS SKIPTEMPLOB` is specified. Valid values are from 2,048 bytes to 2,097,152 bytes (2MB).
By default, Replicat enables Oracle's LOB caching mechanism. To disable Oracle's LOB caching, use the `DISABLELOBCACHING` option of `DBOPTIONS`.

SHOWINFOMESSAGES
Valid for Extract and Replicat for Sybase. Enables the following Sybase server messages to be printed to the error log.

```
0: /* General informational message */
5701: /* Changed Database Context */
5703: /* Changed language setting */
5704: /* Changed client character set */
7326: /* Non ANSI Escaping */
```

Normally, these messages are suppressed because they do not affect Oracle GoldenGate processing.

SHOWWARNINGS
Valid for Extract and Replicat for Sybase. Enables the logging of Sybase server messages with a severity level greater than 10. These messages may be useful for debugging when Sybase performs corrective action that causes data to change.

SESSIONPOOLMAX *max_value*
Valid for Extract in integrated mode for Oracle. Sets a maximum value for the number of sessions in the OCI Session Pool, which is used by Extract for fetching from a container database. The default value is 10 sessions. Must be specified before the `USERID` or `USERIDALIAS` parameter; otherwise will be ignored and the default will be used.

SESSIONPOOLMIN *min_value*
Valid for Extract in integrated mode for Oracle. Sets a minimum value for the number of sessions in the OCI Session Pool, which is used by Extract for fetching from a container database. The default value is 2 sessions. Must be specified before the `USERID` or `USERIDALIAS` parameter; otherwise will be ignored and the default will be used.

SESSIONPOOLINCR *increment_value*
Valid for Extract in integrated mode for Oracle. Sets a value for the number of incremental sessions that can be added to the OCI Session Pool, which is used by Extract for fetching from a container database. The default value is 2 sessions. Must be specified before the `USERID` or `USERIDALIAS` parameter; otherwise will be ignored and the default will be used.

SETTAG [*tag_value* | NULL
Valid for Replicat for Oracle. Sets the value for an Oracle redo tag that will be used to identify the transactions of the associated Replicat in the redo log. A redo tag also can be used to identify transactions other than those of Replicat.
Use this option to prevent cycling (loop-back) of Replicat the individual records in a bi-directional configuration or to filter other transactions from capture. The default `SETTAG` value is 00 and is limited to 2K bytes. A valid value is any single Oracle Streams tag. A tag value can be up to 2000 hexadecimal digits (0-9 A-F) long. For more information about Streams tags, see Oracle Streams Replication Administrator's Guide.
Transactions in the redo that are marked with the specified tag can be filtered by an Extract that has the `TRANLOGOPTIONS` parameter with the `EXCLUDETAG` option set to the *`tag_value`*. Use tag-based filtering to prevent cycling (loop-back) of Replicat transactions in a bi-directional configuration or to filter other transactions from capture. For more information, see TRANLOGOPTIONS.
You can disable the tagging of DDL by using the DDLOPTIONS parameter with the `NOTAG` option.

hex_value
A hexadecimal value from 0 through F. The default value is 00. The following are valid examples:

```
DBOPTIONS SETTAG 00112233445566778899AABBCCDDEEFF
DBOPTIONS SETTAG 00112233445566778899aabbccddeeff
DBOPTIONS SETTAG 123
```

NULL
Disables tag-based filtering for the associated Replicat.

SKIPTEMPLOB | NOSKIPTEMPLOB
Valid for Replicat for Oracle Database versions 11*g* and 12*c*. Controls how LOBs are applied to a target Oracle database. The default of SKIPTEMPLOB .
SKIPTEMPLOB improves performance by directly writing LOB data to the target LOB column. Replicat creates a SQL statement with an empty LOB value and returns the LOB locator to the bind variable. After the SQL statement is executed successfully, the LOB data is written directly to the LOB column using the returned LOB locator.
NOSKIPTEMPLOB uses a temporary LOB in the SQL statement. Replicat declares a bind variable within SQL statement and associates a temporary LOB, then writes to the temporary LOB. The Oracle Database applies the LOB column data from the temporary LOB.
SKIPTEMPLOB applies to INSERT and UPDATE operations that contain LOB data. It does not apply if the table has a functional index with a LOB column, if the LOB data is NULL, empty, or stored inline. It does not apply to partial LOB operations.
SKIPTEMPLOB causes Replicat to generate/perform 1 DML+ n LOB_WRITE (piece-wise) operations when updating/inserting a row with LOB columns. However, SKIPTEMPLOB should not be used with FETCHPARTIALLOB (an Extract Parameter) because it results in excessive fetching.
NOSKIPTEMPLOB is provided for backward compatibility; otherwise the default of SKIPTEMPLOB should be retained.

SOURCE_DB_NAME *src_dbase_global_name*
Valid for Oracle. Indicates the Global Name of the Trail Source Database. It is used to query the relevant instantiation information when DBOPTIONS ENABLE_INSTANTIATION_FILTERING is enabled. This option is optional for instantiation filtering in a 12.2. trail file with metadata enabled.
When the source has no DOMAIN, do not specify a DOMAIN for the downstream database.

SPTHREAD | NOSPTHREAD
Valid for Extract and Replicat for SQL Server. Creates a separate database connection thread for stored procedures. The default is NOSPTHREAD.

SUPPRESSTEMPORALUPDATES
Valid for DB2 LUW 10.1 FixPack 2 and greater replication of temporal table.
Use SUPPRESSTEMPORALUPDATES to replicate system-period and bitemporal tables along with associated history tables. Oracle GoldenGate replicates the row begin, row end, and transaction start id columns along with the other columns of the table. You must ensure that the database instance has the execute permission to run the SYSPROC.SET_MAINT_MODE_RECORD_NO_TEMPORALHISTORY¿ stored procedure at the apply side.
By default, Oracle GoldenGate does not replicate row begin, row end, and transaction start id columns. To preserve the original values of these columns, implement one of the followings options.

- Add extra timestamp columns in the target temporal table and map the columns accordingly.
- Use a non-temporal table at the apply side and map the columns accordingly.

Replication in Heterogeneous Environment:
In heterogeneous environments where there is no temporal tables at the apply side, you need to set the row begin, row end and transaction start id columns value. These source columns will have timestamp values that the target database may not support. You should first use the map conversion functions to convert these values into the format that target database supports, and then map the columns accordingly. For example, MySQL has a `DATETIME` range from `1000-01-01 00:00:00.000000' to '9999-12-31 23:59:59.999999¿'. You cannot replicate a DB2 LUW timestamp value of `0001-01-01-00.00.00.000000000000¿ to MySQL. To replicate such values you must convert this value into the MySQL `DATETIME` format. For example, if a system-period or bitemporal table has the following timestamp column:

```
SYS_START
--------------------------------
0001-01-01-00.00.00.000000000000
```

Then to replicate this column into MySQL, you would use the function `colmap()` as follows:

```
map <source_schema>.<source_table>, target <target_schema>.<target_table>
colmap(sys_start= @IF( ( @NUMSTR( @STREXT(sys_start,1,4))) > 1000, sys_start,
'1000-01-01 00.00.00.000000'));
```

Initial Load of Temporal Table:
Oracle GoldenGate supports initial load of temporal table as usual.
Take into account the following considerations with temporal table:

- Replication between system-period and application-period temporal table is not supported.
- Replication from a non-temporal table to a temporal table is not supported.
- Replication of system-period, bi-temporal tables, and `SUPPRESSTEMPORALUPDATES` with the `INSERTALLRECORDS` parameter is not supported.
- If any unique index is created for application-period temporal table using `BUSINESS_TIME WITHOUT OVERLAPS` for the target table, then the same unique index must be created for the source table.
- Bidirectional replication between temporal tables is advised only with the default.
- CDR is supported only with `SUPPRESSTEMPORALUPDATES`. There is no CDR support in bidirectional replication.
- By default, there are inconsistencies in row begin, row end, and transaction start id columns of the temporal tables when the source and target databases operate with different time zones. These timestamp columns of system-period and bitemporal tables are automatically populated by the respective database managers and will have values as per the respective time zones of the databases.
- Using the default with `GETUPDATEBEFORES` is in the replicate parameter file, you cannot use the row begin, row end, and transaction start id columns in any delta calculations. For example, taking before and after image of such columns in any kind of calculations is not possible. These columns can be used in delta calculations using `SUPPRESSTEMPORALUPDATES`.

SUPPRESSTRIGGERS | NOSUPPRESSTRIGGERS
Valid for Integrated Replicat and Classic Replicat for Oracle. Controls whether or not triggers are fired during the Replicat session. Provides an alternative to manually disabling triggers. (Integrated Replicat does not require disabling of triggers on the target system.)
SUPPRESSTRIGGERS is the default and prevents triggers from firing on target objects that are configured for replication with Oracle GoldenGate. SUPPRESSTRIGGERS is valid for Oracle Database 12*c*, 11*g* (11.2.0.2), and later 11*g* R2 releases. SUPPRESSTRIGGERS is not valid for 11*g* R1.
To allow a specific trigger to fire, you can use the following SQLEXEC statement in the Replicat parameter file, where *trigger_owner* is the owner of the trigger and *trigger_name* is the name of the trigger.

```
SQLEXEC 'DBMS_DDL.SET_TRIGGER_FIRING_PROPERTY('"S1"','"MY_TRIGGER"',FALSE);'
```

Note:

Once this SQLEXEC is executed with FALSE, the trigger will continue to fire until the command is run again with a setting of TRUE.

NOSUPPRESSTRIGGERS allows target triggers to fire. To use [NO]SUPPRESSTRIGGERS, the Replicat user must have the privileges granted through the dbms_goldengate_auth.grant_admin_privilege package. This procedure is part of the Oracle database installation. See the database documentation for more information.
The USERID or USERIDALIAS parameter must precede a DBOPTIONS statement that contains SUPPRESSTRIGGERS or NOSUPPRESSTRIGGERS.

TDSPACKETSIZE *bytes*
Valid for Extract and Replicat for Sybase. Sets the TDS packet size for replication to a Sybase target.
Valid values:

- Sybase version 12.5.4:

  Note:

  This version is de-supported as of Oracle GoldenGate 11.2.1.

  512 to 65024

  Default is 0 for Extract, 512 for Replicat

- Sybase15 or higher:

  2048 to 65024

  Default is 0 for Extract, 2048 for Replicat

The value must be a multiple of 512. The range of values that are set for the Sybase Adaptive Server max network packet size and additional network memory parameters must support the value that is set with TDSPACKETSIZE.

Note:

The higher the `max network packet size` value, the more memory (as set with `additional network memory`) the database server needs to allocate for the network data.

For best performance, choose a server packet size that works efficiently with the underlying packet size on your network. The goals of this procedure are to:

- Reduce the number of server reads and writes to the network.
- Reduce unused space in the network packets to increase network throughput.

For example, if your network packet size carries 1500 bytes of data, you can achieve better transfer performance by setting the packet size on the server to 1024 (512 x 2) than by setting it to 1536 (512 x 3).
For optimal performance, start with the following configuration:

```
DBOPTIONS TDSPACKETSIZE 8192
```

The `DBOPTIONS` parameter can be placed anywhere in the parameter file irrespective of other parameters.

`TRANSNAME` ***`trans_name`***
Valid for Replicat for SQL Server. Allows an individual Replicat to use a specific transaction name that is specified in the parameter file. The *`trans_name`* is the name of the transaction that the Replicat uses for target DML transactions and overrides the default `ggs_repl` transaction name when used.

`USEODBC`
Valid for Replicat for SQL Server. Configures Replicat to use ODBC to perform DML operations. The default is to use OLE DB. Not valid if `USEREPLICATIONUSER` is enabled; will cause Replicat to abend.

Note:

Replicat always uses ODBC to connect to the database catalog to obtain metadata.

`USEREPLICATIONUSER`
Valid for Replicat for SQL Server. Configures Replicat to perform target DML operations as the SQL Server replication user. The replication user is not a SQL Server user or account, but is a property of the database connection. `USEREPLICATIONUSER` honors the SQL Server `NOT FOR REPLICATION` flag when set on an object or property, such as an Identity column or cascade constraint.
When the replication user is used, the following concerns must be addressed for their effect on data integrity:

- `IDENTITY` seeds on the target are not updated. A partitioning scheme is needed to avoid primary key violations unless the target is read-only.
- Foreign key constraints are not enforced.

- `ON UPDATE CASCADE`, `ON DELETE CASCADE` and triggers are disabled. This is beneficial to Replicat, since it prevents duplicate operations, but may not be appropriate for the target applications and might require modification to the code of the constraint or trigger to ensure data integrity.
- `CHECK` constraints are not enforced, so data integrity cannot be certain on the target.

When using `USEREPLICATIONUSER`, `IDENTITY` properties and constraints must be set with the '`not for replication`' option at the object level within the database. For more information about these considerations, see Installing and Configuring Oracle GoldenGate for SQL Server.
By default, `USEREPLICATIONUSER` is disabled and the default is to use OLE DB. The use of `USEREPLICATIONUSER` is only advised if delivery performance must be increased. Not valid if `USEODBC` is enabled; will cause Replicat to abend.

`XMLBUFSIZE` ***`bytes`***
Valid for Extract for Oracle. Sets the size of the memory buffer that stores XML data that was extracted from the `sys.xmltype` attribute of a `SDO_GEORASTER` object type. The default is 1048576 bytes (1MB). If the data exceeds the default buffer size, Extract will abend. If this occurs, increase the buffer size and start Extract again. The valid range of values is 1024 to 10485760 bytes.

Examples

Example 1

```
DBOPTIONS HOST 127.0.0.1, CONNECTIONPORT 3307
```

Example 2

```
DBOPTIONS DECRYPTPASSWORD AACAAAAAAAAAAAIALCKDZIRHOJBHOJUH ENCRYPTKEY DEFAULT
```

Example 3

```
DBOPTIONS TDSPACKETSIZE 2048
```

Example 4

```
DBOPTIONS FETCHBATCHSIZE 2000
```

Example 5

```
DBOOPTION XMLBUFSIZE 2097152
```

3.41 DDL

Valid For

Extract and Replicat

Description

Use the `DDL` parameter to:

- enable DDL support
- filter DDL operations
- configure a processing action based on a DDL record

When used without options, the `DDL` parameter performs no filtering, and it causes all DDL operations to be propagated as follows:

- As an Extract parameter, it captures all supported DDL operations that are generated on all supported database objects and sends them to the trail.
- As a Replicat parameter, it replicates all DDL operations from the Oracle GoldenGate trail and applies them to the target. This is the same as the default behavior without this parameter.

When used with options, the `DDL` parameter acts as a filtering agent to include or exclude DDL operations based on:

- scope
- object type
- operation type
- object name
- strings in the DDL command syntax or comments, or both

Only one DDL parameter can be used in a parameter file, but you can combine multiple inclusion and exclusion options to filter the DDL to the required level.

- The filtering options of the `DDL` parameter are valid for a primary Extract that captures from the transaction source, but not for a data-pump Extract.
- When combined, multiple filter option specifications are linked logically as `AND` statements.
- All filter criteria specified with multiple options must be satisfied for a DDL statement to be replicated.
- When using complex filtering criteria in a `DDL` parameter statement, it is recommended that you test your configuration in a test environment before using it in production.
- See Example 1, Example for more information.

Do not use the `DDL` parameter for:

- an Extract data pump
- a VAM-sort Extract (Teradata source databases)

These process types do not permit the mapping or conversion of DDL and will propagate DDL records automatically in pass-through mode. DDL that is performed on a source table (for example `ALTER TABLE TableA...`) will be applied by Replicat with the same table name (`ALTER TABLE TableA`). It cannot be mapped as `ALTER TABLE TableB`.

For additional information about how to use Oracle GoldenGate DDL support, see Installing and Configuring Oracle GoldenGate for Oracle Database or *Installing and Configuring Oracle GoldenGate for Teradata*, as applicable.

Syntax

```
DDL [
{INCLUDE | EXCLUDE}
  [, MAPPED | UNMAPPED | OTHER | ALL]
  [, OPTYPE type]
  [, OBJTYPE 'type']
  [, SOURCECATALOG catalog | ALLCATALOGS]
  [, ALLOWEMPTYOBJECT]
  [, ALLOWEMPTYOWNER]
  [, OBJNAME name]
  [, INSTR 'string']
  [, INSTRWORDS 'word_list']
  [, INSTRCOMMENTS 'comment_string']
  [, INSTRCOMMENTSWORDS 'word_list']
  [, STAYMETADATA]
  [, EVENTACTIONS (action)
]
[...]
```

DDL Filtering Options

The following are the syntax options for filtering and operating upon the DDL that is replicated by Oracle GoldenGate. These options apply to the INCLUDE and EXCLUDE clauses of the DDL parameter and other parameters that support DDL replication.

INCLUDE | EXCLUDE
Use INCLUDE or EXCLUDE to identify the beginning of an inclusion or exclusion clause.

- An inclusion clause contains filtering criteria that identifies the DDL that this parameter will affect.
- An exclusion clause contains filtering criteria that excludes specific DDL from this parameter.

The inclusion or exclusion clause must consist of the INCLUDE or EXCLUDE keyword followed by any valid combination of the other filtering options of the DDL parameter.
If you use EXCLUDE, you must create a corresponding INCLUDE clause. For example, the following is invalid:

```
DDL EXCLUDE OBJNAME "hr".*
```

However, you can use either of the following:

```
DDL INCLUDE ALL, EXCLUDE OBJNAME "hr"."*"
DDL INCLUDE OBJNAME fin.* EXCLUDE OBJNAME "fin.ss"
```

An EXCLUDE takes priority over any INCLUDEs that contain the same criteria. You can use multiple inclusion and exclusion clauses.
Do not include any Oracle GoldenGate installed DDL objects in a DDL parameter, in a TABLE parameter, or in a MAP parameter, nor in a TABLEEXCLUDE or MAPEXCLUDE parameter. Make certain that wildcard specifications in those parameters do not include Oracle GoldenGate-installed DDL objects. These objects must not be part of the Oracle GoldenGate configuration, but the Extract process must be aware of operations on them, and that is why you must *not* explicitly exclude them from the configuration with an EXCLUDE, TABLEEXCLUDE, or MAPEXCLUDE parameter statement.

MAPPED | UNMAPPED | OTHER | ALL
Use MAPPED, UNMAPPED, OTHER, and ALL to apply INCLUDE or EXCLUDE based on the DDL operation scope.

- MAPPED applies INCLUDE or EXCLUDE to DDL operations that are of MAPPED scope. MAPPED filtering is performed before filtering that is specified with other DDL parameter options.
- UNMAPPED applies INCLUDE or EXCLUDE to DDL operations that are of UNMAPPED scope.

- `OTHER` applies `INCLUDE` or `EXCLUDE` to DDL operations that are of `OTHER` scope.
- `ALL` applies `INCLUDE` or `EXCLUDE` to DDL operations of all scopes.

`DDL EXCLUDE ALL` is a special processing option that maintains up-to-date object metadata for Oracle GoldenGate, while blocking the replication of the DDL operations themselves. You can use `DDL EXCLUDE ALL` when using a method other than Oracle GoldenGate to apply DDL to the target, but you want Oracle GoldenGate to replicate data changes to the target objects. It provides the current metadata to Oracle GoldenGate as objects change, thus preventing the need to stop and start the Oracle GoldenGate processes. The following special conditions apply to `DDL EXCLUDE ALL`:

- `DDL EXCLUDE ALL` does not require the use of an `INCLUDE` clause.
- When using `DDL EXCLUDE ALL`, you can set the `WILDCARDRESOLVE` parameter to `IMMEDIATE` to allow immediate DML resolution if required.

`OPTYPE` *`type`*
Use `OPTYPE` to apply `INCLUDE` or `EXCLUDE` to a specific type of DDL operation, such as `CREATE`, `ALTER`, and `RENAME`. For *`type`*, use any DDL command that is valid for the database. For example, to include `ALTER` operations, the correct syntax is:

```
DDL INCLUDE OPTYPE ALTER
```

`OBJTYPE '`*`type`*`'`
Use `OBJTYPE` to apply `INCLUDE` or `EXCLUDE` to a specific type of database object. For *`type`*, use any object type that is valid for the database, such as `TABLE`, `INDEX`, and `TRIGGER`. For an Oracle materialized view and materialized views log, the correct types are `snapshot` and `snapshot log`, respectively. Enclose the name of the object type within single quotes. For example:

```
DDL INCLUDE OBJTYPE 'INDEX'
DDL INCLUDE OBJTYPE 'SNAPSHOT'
```

For Oracle object type `USER`, do not use the `OBJNAME` option, because `OBJNAME` expects `owner.object` or *`container.owner.object`* whereas `USER` only has a schema.

`SOURCECATALOG` *`catalog`* `| ALLCATALOGS`
Use these options to specify how unqualified object names in an `OBJNAME` clause are resolved to the correct container. Use these options when the source database is an Oracle container database.
`SOURCECATALOG` specifies a default container for all of the object names that are specified in the same `INCLUDE` or `EXCLUDE` clause. To take effect, `SOURCECATALOG` must be specified before the `OBJNAME` specification. See "SOURCECATALOG" for more information including using statements that contain two-part names, where three-part object names are required to fully identify an object.
`ALLCATALOGS` specifies that all of the containers of the database should be considered when resolving object names that are specified in the same `INCLUDE` or `EXCLUDE` clause. `ALLCATALOGS` can be placed before or after the `OBJNAME` specification.
The following is the order of precedence that is given when there are different catalog specifications in a parameter file:

1. `ALLCATALOGS` in an `INCLUDE` or `EXCLUDE` clause overrides all `SOURCECATALOG` specifications in the `INCLUDE` or `EXCLUDE` clause and at the root of the parameter

file, and it overrides the container specification of a fully qualified object name in the `OBJNAME` clause.

2. An explicit catalog specification in the `OBJNAME` clause overrides all instances of `SOURCECATALOG` (but not `ALLCATALOGS`).
3. `SOURCECATALOG` in an `INCLUDE` or `EXCLUDE` clause overrides the global `SOURCECATALOG` parameter that is specified at the root of the `TABLE` or `MAP` statement.
4. The global `SOURCECATALOG` parameter takes effect for any unqualified object names in `OBJNAME` clauses if the `INCLUDE` or `EXCLUDE` clause does not specify `SOURCECATALOG` or `ALLCATALOGS`.
5. In the absence of any of the preceding parameters, all catalogs are considered.

`ALLOWEMPTYOBJECT`
Use `ALLOWEMPTYOBJECT` to allow an `OBJNAME` specification to process DDL that contains no object name. For example:

```
DDL INCLUDE OBJNAME sch.* ALLOWEMPTYOBJECT
```

`ALLOWEMPTYOWNER`
Use `ALLOWEMPTYOWNER` to allow an `OBJNAME` specification to process DDL that contains no owner name. For example:

```
DDL INCLUDE OBJNAME pdb.sch.* ALLOWEMPTYOWNER
```

`OBJNAME` ***`name`***
Use `OBJNAME` to apply `INCLUDE` or `EXCLUDE` to the fully qualified name of an object. To specify two-part and three-part object names and wildcards correctly, see *Administering Oracle GoldenGate for Windows and UNIX*.
Enclose case-sensitive object names within double quote marks.
Case-insensitive example:

```
DDL INCLUDE OBJNAME accounts.*
```

Case-sensitive example:

```
DDL INCLUDE OBJNAME accounts."cust"
```

Do not use `OBJNAME` for the Oracle `USER` object, because `OBJNAME` expects *`owner.object`* or *`container.owner.object`*, whereas `USER` only has a schema.
When using `OBJNAME` with `MAPPED` in a Replicat parameter file, the value for `OBJNAME` must refer to the name specified with the `TARGET` clause of the `MAP` statement. For example, given the following `MAP` statement, the correct value is `OBJNAME fin2.*`.

```
MAP fin.exp_*, TARGET fin2.*;
```

In the following example, a `CREATE TABLE` statement executes as follows on the source:

```
CREATE TABLE fin.exp_phone;
```

That same statement executes as follows on the target:

```
CREATE TABLE fin2.exp_phone;
```

If a target owner is not specified in the `MAP` statement, Replicat maps it to the database user that is specified with the `USERID` or `USERIDALIAS` parameter.
For DDL that creates derived objects, such as a trigger, the value for `OBJNAME` must be the name of the base object, not the name of the derived object.
For example, to include the following DDL statement, the correct value is `hr.accounts`, not `hr.insert_trig`.

```
CREATE TRIGGER hr.insert_trig ON hr.accounts;
```

For `RENAME` operations, the value for `OBJNAME` must be the new table name. For example, to include the following DDL statement, the correct value is `hr.acct`.

```
ALTER TABLE hr.accounts RENAME TO acct;
```

`INSTR` *`'string'`*
Use `INSTR` to apply `INCLUDE` or `EXCLUDE` to DDL statements that contain a specific character string within the command syntax itself, but not within comments. For example, the following excludes DDL that creates an index.

```
DDL INCLUDE ALL EXCLUDE INSTR 'CREATE INDEX'
```

Enclose the string within single quotes. The string search is not case sensitive.
`INSTR` does not support single quotation marks (' ') that are within the string, nor does it support `NULL` values.

`INSTRCOMMENTS` *`'comment_string'`*
(Valid for Oracle) Use `INSTRCOMMENTS` to apply `INCLUDE` or `EXCLUDE` to DDL statements that contain a specific character string within a comment, but not within the DDL command itself. By using `INSTRCOMMENTS`, you can use comments as a filtering agent.
For example, the following excludes DDL statements that include the string 'source only' in the comments.

```
DDL INCLUDE ALL EXCLUDE INSTRCOMMENTS 'SOURCE ONLY'
```

In this example, DDL statements such as the following are not replicated.

```
CREATE USER john IDENTIFIED BY john /*source only*/;
```

Enclose the string within single quotes. The string search is not case sensitive.
You can combine `INSTR` and `INSTRCOMMENTS` to filter on a string in the command syntax and in the comments of the same DDL statement.
`INSTRCOMMENTS` does not support single quotation marks (' ') that are within the string, nor does it support `NULL` values.

`INSTRWORDS` *`'word_list'`*
Use `INSTRWORDS` to apply `INCLUDE` or `EXCLUDE` to DDL statements that contain the specified words.
For *`word_list`*, supply the words in any order, within single quotes. To include spaces, put the space (and the word, if applicable) in double quotes. Double quotes also can be used to enclose sentences.
All specified words must be present in the DDL for `INSTRWORDS` to take effect.
Example:

```
DDL INCLUDE OPTYPE ALTER OBJTEYP 'TABLE' INSTRWORDS 'ALTER CONSTRAINT " xyz"'
```

This example matches the following DDL statements:

```
ALTER TABLE ADD CONSTRAINT xyz CHECK
```

```
ALTER TABLE DROP CONSTRAINT xyz
```

`INSTRWORDS` does not support single quotation marks (' ') that are within the string, nor does it support `NULL` values.

`INSTRCOMMENTSWORDS '`*`word_list`*`'`
(Valid for Oracle) Works the same way as `INSTRWORDS`, but only applies to comments within a DDL statement, not the DDL syntax itself. By using `INSTRCOMMENTS`, you can use comments as a filtering agent.
`INSTRCOMMENTSWORDS` does not support single quotation marks (' ') that are within the string, nor does it support `NULL` values.
You can combine `INSTRWORDS` and `INSTRCOMMENTSWORDS` to filter on a string in the command syntax and in the comments of the same DDL statement.

`STAYMETADATA`
(Valid for Oracle). Prevents metadata from being captured by Extract or applied by Replicat.
When Extract first encounters DML on a table, it retrieves the metadata for that table. When DDL is encountered on that table, the old metadata is invalidated. The next DML on that table is matched to the new metadata so that the target table structure always is up-to-date with that of the source.
However, if you know that a particular DDL operation will not affect the table's metadata, you can use `STAYMETADATA` so that the current metadata is not retrieved or replicated. This is a performance improvement that has benefit for such operations as imports and exports, where such DDL as truncates and the disabling of constraints are often performed. These operations do not affect table structure, as it relates to the integrity of subsequent data replication, so they can be ignored in such cases. For example `ALTER TABLE ADD FOREIGN KEY` does not affect table metadata.
An example of how this can be applied selectively is as follows:

```
DDL INCLUDE ALL INCLUDE STAYMETADATA OBJNAME xyz
```

This example states that all DDL is to be included for replication, but only DDL that operates on object `xyz` will be subject to `STAYMETADATA`.
`STAYMETADATA` also can be used the same way in an `EXCLUDE` clause.
`STAYMETADATA` must be used the same way on the source and target to ensure metadata integrity.
When `STAYMETADATA` is in use, a message is added to the report file. DDL reporting is controlled by the `DDLOPTIONS` parameter with the `REPORT` option.
This same functionality can be applied globally to all DDL that occurs on the source by using the `@ddl_staymetadata` scripts:

- `@ddl_staymetadata_on` globally turns off metadata versioning.
- `@ddl_staymetadata_off` globally enables metadata versioning again.

This option should be used with the assistance of Oracle GoldenGate technical support staff, because it might not always be apparent which DDL affects object metadata. If improperly used, it can compromise the integrity of the replication environment.

`EVENTACTIONS (`*`action`*`)`
Causes the Extract or Replicat process take a defined action based on a DDL record in the transaction log or trail, which is known as the *event record*. The DDL event is triggered if the DDL record is eligible to be written to the trail by Extract or a data pump, or to be executed by Replicat, as determined by the other filtering options of the `DDL` parameter. You can use this system to customize processing based on database events.
For *`action`*, see `EVENTACTIONS` under the `MAP` and `TABLE` parameters.
Guidelines for using `EVENTACTIONS` on DDL records:

- `CHECKPOINTBEFORE`: Since each DDL record is autonomous, the DDL record is guaranteed to be the start of a transaction; therefore, the `CHECKPOINT BEFORE` event action is implied for a DDL record.
- `IGNORE`: This option is not valid for DDL records. Because DDL operations are autonomous, ignoring a record is equivalent to ignoring the entire transaction.

`EVENTACTIONS` does not support the following DDL objects because they are derived objects:

- indexes
- triggers
- synonyms
- `RENAME` on a table and `ALTER TABLE RENAME`

In a Teradata configuration where Extract is configured in maximum protection mode, use `EVENTACTIONS` only in the VAM-sort Extract group. It is not supported by the primary Extract in this configuration because concurrent changes are not sorted in transaction order at this point in the processing stream. For more information, see *Installing and Configuring Oracle GoldenGate for Teradata*.

Examples

Example 1 Combining DDL Parameter Options

The following is an example of how to combine the options of the `DDL` parameter.

```
DDL  &
INCLUDE UNMAPPED &
    OPTYPE alter &
    OBJTYPE 'table' &
    OBJNAME users.tab* &
INCLUDE MAPPED OBJNAME * &
EXCLUDE MAPPED OBJNAME temporary.tab
```

The combined filter criteria in this statement specify the following:

- `INCLUDE` all `ALTER TABLE` statements for tables that are not mapped with a `TABLE` or `MAP` statement (`UNMAPPED` scope), but only if those tables are owned by `users` and their names start with `tab`,
- `INCLUDE` all DDL operation types for all tables that are mapped with a `TABLE` or `MAP` statement (`MAPPED` scope),
- `EXCLUDE` all DDL operation types for all tables that are `MAPPED` in scope, but only if those tables are owned by `temporary` and only if their names begin with `tab`.

Example 2 Including an Event Action

The following example specifies an event action of `REPORT` for all DDL records.

```
DDL INCLUDE ALL EVENTACTIONS (REPORT)
```

Example 3 Using an Event Action on a Subset of DDL
The following example shows how EVENTACTIONS can be used on a subset of the DDL. All DDL is to be replicated, but only the DDL that is executed on explicitly named objects qualifies to trigger the event actions of REPORT and LOG.

```
DDL INCLUDE ALL &
    INCLUDE OBJNAME sales.t* EVENTACTIONS (REPORT) &
    INCLUDE OBJNAME fin.my_tab EVENTACTIONS (LOG) &
```

Example 4
The following example demonstrates the different ways to specify catalog names for DDL that is issued on objects in a source Oracle container database.

- This includes pdb1.sch1.obj1 and pdb2.sch2.obj2 for DDL processing.

  ```
  SOURCECATALOG pdb1
  DDL INCLUDE OBJNAME sch1.obj1 INCLUDE SOURCECATALOG pdb2 OBJNAME sch2.obj2
  ```

- This includes all objects with the name sch.obj in any catalog for DDL processing.

  ```
  DDL INCLUDE ALLCATALOGS OBJNAME sch.obj
  ```

- This also includes all objects with the name sch.obj in any catalog for DDL processing, because ALLCATALOGS overrides any other catalog specification.

  ```
  DDL INCLUDE ALLCATALOGS OBJNAME pdb.sch.obj
  ```

Example 5
The following shows the combined use of ALLOWEMPTYOBJECT and ALLOWEMPTYOWNER.

```
DDL INCLUDE pdb.*.* ALLOWEMPTYOWNER ALLOWEMPTYOBJECT
```

3.42 DDLERROR

Valid For

Extract and Replicat

Description

Use the DDLERROR parameter to handle DDL errors on the source and target systems. Options are available for Extract and Replicat.

DDLERROR for Extract

Use the Extract option of the DDLERROR parameter to handle errors on objects found by Extract for which metadata cannot be found.

Default

Abend

Syntax

```
DDLERROR [RESTARTSKIP number_of_skips] [RETRYDELAY seconds] [SKIPTRIGGERERROR
number_of_errors]
```

RESTARTSKIP *number_of_skips*
Causes Extract to skip and ignore a specific number of DDL operations on startup, to prevent Extract from abending on an error. By default, a DDL error causes Extract to abend so that no operations are skipped. Valid values are 1 to 100000.
To write information about skipped operations to the Extract report file, use the `DDLOPTIONS` parameter with the `REPORT` option.

SKIPTRIGGERERROR *number_of_errors*
(Oracle) Causes Extract to skip and ignore a specific number of DDL errors that are caused by the DDL trigger on startup. Valid values are 1 through 100000.
`SKIPTRIGGERERROR` is checked before the `RESTARTSKIP` option. If Extract skips a DDL operation because of a trigger error, that operation is not counted toward the `RESTARTSKIP` specification.

DDLERROR for Replicat

Use the Replicat options of the `DDLERROR` parameter to handle errors that occur when DDL is applied to the target database. With `DDLERROR` options, you can handle most errors in a default manner, for example to stop processing, and also handle other errors in a specific manner. You can use multiple instances of `DDLERROR` in the same parameter file to handle all errors that are anticipated.

Default

Abend

Syntax

```
DDLERROR
{error | DEFAULT} {response}
{INCLUDE inclusion_clause | EXCLUDE exclusion_clause}
[IGNOREMISSINGOBJECTS | ABENDONMISSINGOBJECTS]
[RETRYDELAY seconds]
```

{*error* | DEFAULT} {*response*}

error
Specifies an explicit DDL error for this `DDLERROR` statement to handle.

DEFAULT
Specifies a default *response* to any DDL errors for which there is not an explicit `DDLERROR` statement.

response
The action taken by Replicat when a DDL error occurs. Can be one of the following:

ABEND
Roll back the operation and terminate processing abnormally. `ABEND` is the default.

DISCARD
Log the offending operation to the discard file but continue processing subsequent DDL.

`IGNORE`
Ignore the error.

`{INCLUDE` ***`inclusion_clause`*** **`| EXCLUDE`** ***`exclusion_clause`*** **`}`**
Identifies the beginning of an inclusion or exclusion clause that controls whether specific DDL is handled or not handled by the `DDLERROR` statement. See "DDL Filtering Options" for syntax and usage.

`[IGNOREMISSINGOBJECTS | ABENDONMISSINGOBJECTS]`
Controls whether or not Extract abends when DML is issued on objects that could not be found on the target. This condition typically occurs when DDL that is not in the replication configuration is issued directly on the target, or it can occur when there is a discrepancy between the source and target definitions.

`IGNOREMISSINGOBJECTS`
Causes Replicat to skip DML operations on missing tables.

`ABENDONMISSINGOBJECTS`
Causes Replicat to abend on DML operations on missing tables.

`[RETRYDELAY` ***`seconds`*** **`]`**
Specifies the delay in seconds between attempts to retry a failed operation. The default is 10 seconds.

Examples

Example 1 DDLERROR Basic Example

In the following example, the `DDLERROR` statement causes Replicat to ignore the specified error, but not before trying the operation again three times at ten-second intervals. Replicat applies the error handling to DDL operations executed on objects whose names satisfy the wildcard of `tab*` (any user, any operation) except those that satisfy `tab1*`.

```
DDLERROR 1234 IGNORE RETRYOP MAXRETRIES 3 RETRYDELAY 10 &
INCLUDE ALL OBJTYPE TABLE OBJNAME tab* EXCLUDE OBJNAME tab1*
```

To handle all errors except that error, the following `DDLERROR` statement can be added.

```
DDLERROR DEFAULT ABEND
```

In this case, Replicat abends on DDL errors.

Example 2 Using Multiple DDLERROR Statements

The order in which you list `DDLERROR` statements in the parameter file does not affect their validity unless multiple `DDLERROR` statements specify the same error, without any additional qualifiers. In that case, Replicat only uses the first one listed. For example, given the following statements, Replicat will abend on the error.

```
DDLERROR 1234 ABEND
DDLERROR 5678 IGNORE
```

With the proper qualifiers, however, the previous configuration becomes a more useful one. For example:

```
DDLERROR 1234 ABEND INCLUDE OBJNAME tab*
DDLERROR 5678 IGNORE
```

In this case, because there is an `INCLUDE` statement, Replicat will abend only if an object name in an errant DDL statement matches wildcard `tab*`. Replicat will ignore errant operations that include any other object name.

3.43 DDLOPTIONS

Valid For

Extract and Replicat

Description

Use the `DDLOPTIONS` parameter to configure aspects of DDL processing other than filtering and string substitution. You can use multiple `DDLOPTIONS` statements, but using one is recommended. If using multiple `DDLOPTIONS` statements, make each of them unique so that one does not override the other. Multiple `DDLOPTIONS` statements are executed in the order listed in the parameter file.

Default

See the argument descriptions

Syntax

```
DDLOPTIONS
[, ADDTRANDATA {ABEND | RETRYOP RETRYDELAY seconds MAXRETRIES retries}
[, DEFAULTUSERPASSWORD password [algorithm [ENCRYPTKEY DEFAULT | ENCRYPTKEY key_name]
[, CAPTUREGLOBALTEMPTABLE ]
[, DEFAULTUSERPASSWORDALIAS alias [DOMAIN domain] ]
[, GETAPPLOPS | IGNOREAPPLOPS]
[, GETREPLICATES | IGNOREREPLICATES]
[, IGNOREMAPPING]
[, MAPDERIVED | NOMAPDERIVED]
[, MAPSCHEMAS]
[, MAPSESSIONSCHEMA source_schema TARGET target_schema]
[, NOTAG]
[, PASSWORD algorithm ENCRYPTKEY {key_name | DEFAULT}]
[, REMOVECOMMENTS {BEFORE | AFTER}]
[, REPLICATEPASSWORD | NOREPLICATEPASSWORD]
[, REPORT | NOREPORT]
[, UPDATEMETADATA]
[, USEPASSWORDVERIFIERLEVEL {10|11}]
[, _USEOWNERFORSESSION]
```

`ADDTRANDATA {ABEND | RETRYOP RETRYDELAY` *`seconds`* `MAXRETRIES` *`retries`*`}`
Valid for Extract (Teradata)
Not supported when Classic Extract is reading from an Active Data Guard standby database because supplemental logging must be enabled on the primary database, which is read/write. Not supported for multitenant container databases. Supplemental logging must be enabled when using `ADD SCHEMATRANDATA`. This option should *only* be used when schema-level supplemental logging is not an option in your environment. No longer valid for Oracle and a warning is issued if used.
Use `ADDTRANDATA` to:

- Enable Oracle supplemental logging automatically for new tables created with a `CREATE TABLE` statement.

- Update supplemental logging for tables affected by an `ALTER TABLE` statement to add or drop columns.
- Update supplemental logging for tables that are renamed.
- Update supplemental logging for tables where unique or primary keys are added or dropped.

By default, `ADDTRANDATA` is disabled. The default for `ADDTRANDATA` when used without additional options is:

```
DDLOPTIONS ADDTRANDATA RETRYOP RETRYDELAY 10 MAXRETRIES 10
```

To use `ADDTRANDATA` functionality, Oracle GoldenGate, the database, and the appropriate tables must be configured for DDL capture. For Oracle, the Oracle GoldenGate DDL objects must be installed and configured. For more information, see Installing and Configuring Oracle GoldenGate for Oracle Database or the *Installing and Configuring Oracle GoldenGate for Teradata*, depending on your environment.
For new tables created with `CREATE TABLE`, `ADDTRANDATA` produces the same results as the default `ADD TRANDATA` command in GGSCI by issuing the Oracle `ALTER TABLE` command with the `ADD SUPPLEMENTAL LOG GROUP` option. Oracle GoldenGate executes this command when the `CREATE TABLE` or `ALTER TABLE` is captured on the source. If you have special requirements for the supplemental logging, use the `ADD TRANDATA` command, not `DDLOPTIONS ADDTRANDATA`. By default, the `ALTER TABLE` statement that adds the supplemental logging is not replicated to the target unless the `GETREPLICATES` option is in use.
For renamed tables, `ADDTRANDATA` deletes the supplemental log group for the old table and creates it for the new one. If you do not use `ADDTRANDATA` and tables will be renamed, do the following to create the log group before doing the rename:

1. Drop the supplemental log group using the database interface or the `DELETE TRANDATA` command in GGSCI.

   ```
   DELETE TRANDATA table_name
   ```

2. Rename the table.
3. Create the new supplemental log group using the database interface or the `ADD TRANDATA` command in GGSCI.

   ```
   ADD TRANDATA table_name
   ```

There might be a lag between the time when an original DDL operation occurs and when the `ADD TRANDATA` takes effect. During this time, do not allow DML operations (insert, update, delete) on the affected table if the data is to be replicated; otherwise, it will not be captured. To determine when DML can be resumed after `ADDTRANDATA`, do the following:

1. Edit the Extract parameter file in GGSCI.

   WARNING:

   Do not use the `VIEW PARAMS` or `EDIT PARAMS` command to view or edit a parameter file that was created in a character set other than that of the local operating system. View the file from outside GGSCI; otherwise, the contents may become corrupted.

2. Add the `REPORT` option to `DDLOPTIONS`, then save and close the file.

   ```
   DDLOPTIONS [, DDLOPTIONS_option] [,...] , REPORT
   ```

3. Stop and start Extract to activate the parameter changes.

   ```
   STOP EXTRACT group_name
   START EXTRACT group_name
   ```

4. View the Extract process report.

   ```
   VIEW REPORT group_name
   ```

5. Look for the `ALTER TABLE` statement that added the log group to the table, and make a note of the time that the command took effect. The entry looks similar to the following:

   ```
   Successfully added TRAN DATA for table with the key, table [MYSCHEMA1.MYTABLE],
   operation [ALTER TABLE "MYSCHEMA1"."MYTABLE" ADD SUPPLEMENTAL LOG GROUP
   "GGS_MYTABLE_53475" (MYID) ALWAYS  /* GOLDENGATE_DDL_REPLICATION */ ].
   ```

6. Permit DML operations on the new table.

The `ADDTRANDATA` options are:

`ABEND`
Causes Extract to abend.

`RETRYOP`
Causes Extract to try again based on `RETRYDELAY` and `MAXRETRIES`.

`RETRYDELAY` *`seconds`*
Sets the delay before Extract tries again. The default is 10 seconds. The maximum delay is 10,000 seconds.

`MAXRETRIES` *`retries`*
Sets the number of retries that Extract can make before abending. The default is 10 seconds. The maximum is 10,000 retries.

`DEFAULTUSERPASSWORD` *`password`* `[`*`algorithm`* `ENCRYPTKEY {`*`key_name`* `| DEFAULT}]`
Valid for Replicat. (Oracle only)
Can be used instead of the `DEFAULTUSERPASSWORDALIAS` option if an Oracle GoldenGate credential store is not being used. Specifies a different password for a replicated `{CREATE | ALTER} USER` *`name`* `IDENTIFIED BY` *`password`* statement from the one used in the source statement. Replicat will replace the placeholder that Extract writes to the trail with the specified password. When using `DEFAULTUSERPASSWORD`, use the `NOREPLICATEPASSWORD` option of `DDLOPTIONS` for Extract.
`DEFAULTUSERPASSWORD` *`password`* without options specifies a clear-text password. If the password is case-sensitive, type it that way.

Note:

Replication of CREATE | ALTER PROFILE will fail as the profile/password verification function must exist in the SYS schema. To replicate these DDLs successfully, password verification function must be created manually on both source/target(s) since DDL to SYS schema is excluded.

Use the following options if the password was encrypted with the `ENCRYPT PASSWORD` command in GGSCI:

> ***`algorithm`***
> Specifies the encryption algorithm that was used to encrypt the password with the `ENCRYPT PASSWORD` command: `AES128`, `AES192`, `AES256`, or `BLOWFISH`. Use AES unless Blowfish is required for backward compatibility. AES is more secure than Blowfish.
>
> **`ENCRYPTKEY`** ***`key_name`***
> Specifies the logical name of a user-created encryption key in the `ENCKEYS` lookup file. Use if `ENCRYPT PASSWORD` was used with the `KEYNAME` *`key_name`* option, and specify the same key name.
>
> **`ENCRYPTKEY DEFAULT`**
> Directs Oracle GoldenGate to use a random key. Use if `ENCRYPT PASSWORD` was used with the `KEYNAME DEFAULT` option.

For more information about Oracle GoldenGate security options, see *Administering Oracle GoldenGate for Windows and UNIX*.

`CAPTUREGLOBALTEMPTABLE`
Valid for Oracle
Allows Global Temporary Tables (GTT) DDLs to be visible to Extract so that they can be replicated. By default, GTT DDLs are not visible to Extract so using `CAPTUREGLOBALTEMPTABLE` you can set Extract to include GTT DDLs that then can be filtered by the DDL statement and if passed, written to the trail. The GTT DDLs are included in Replicat, if present in trail, and are filtered by the DDL statement then if they are passed they are executed.
For trigger-version of Extract, this option is set to false regardless of whether the table is GTT or not.

`DEFAULTUSERPASSWORDALIAS` ***`alias`*** **`[DOMAIN`** ***`domain`*****`]`**
Valid for Replicat. (Oracle only)
Can be used instead of the `DEFAULTUSERPASSWORD` option if an Oracle GoldenGate credential store is being used. Specifies the alias of a credential whose password replaces the one in the `IDENTIFIED BY` clause of a replicated `CREATE USER` or `ALTER USER` statement. The alias is resolved to the encrypted password in the Oracle GoldenGate credential store. Replicat replaces the placeholder that Extract writes to the trail with the resolved password before applying the DDL to the target.
When using `DEFAULTUSERPASSWORDALIAS`, use the `NOREPLICATEPASSWORD` option of `DDLOPTIONS` for Extract.

> ***`alias`***
> Specifies the alias of the credential whose password will be used for the replacement password. This credential must exist in the Oracle GoldenGate credential store. If you are not sure what alias to use, you can inspect the content of the credential store by issuing the `INFO CREDENTIALSTORE` command. See "INFO CREDENTIALSTORE".
>
> **`DOMAIN`** ***`domain`***
> Specifies the domain that is assigned to the specified user in the credential store.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about Oracle GoldenGate security.

GETAPPLOPS | IGNOREAPPLOPS
Valid for Extract. (Oracle only)
Controls whether or not DDL operations produced by business applications *except* Replicat are included in the content that Extract writes to a trail or file. GETAPPLOPS and IGNOREAPPLOPS can be used together with the GETREPLICATES and IGNOREREPLICATES options to control which DDL is propagated in a bidirectional or cascading configuration.

- For a bidirectional configuration, use GETAPPLOPS with IGNOREREPLICATES . You also must use the UPDATEMETADATA option.
- For a cascading configuration, use IGNOREAPPLOPS with GETREPLICATES on the systems that will be cascading the DDL operations to the target.

The default is GETAPPLOPS.

GETREPLICATES | IGNOREREPLICATES
Valid for Extract (Oracle only). Controls whether or not DDL operations produced by Replicat are included in the content that Extract writes to a trail or file. The default is IGNOREREPLICATES. For more information, see the GETAPPLOPS | IGNOREAPPLOPS options of DDLOPTIONS.

IGNOREMAPPING
Valid for Replicat. Disables the evaluation of name mapping that determines whether DDL is of MAPPED or UNMAPPED scope. This option improves performance in like-to-like DDL replication configurations, where source and target schema names and object names match, and where mapping functions are therefore unnecessary. With IGNOREMAPPING enabled, MAPPED or UNMAPPED scope cannot be determined, so all DDL statements are treated as OTHER scope. Do not use this parameter when source schemas and object names are mapped to different schema and object names on the target.

MAPDERIVED | NOMAPDERIVED
Valid for Replicat (Oracle and Teradata). Controls how derived object names are mapped.

> **MAPDERIVED**
> If a MAP statement exists for the derived object, the name is mapped to the name specified in that TARGET clause. Otherwise, the name is mapped to the name specified in the TARGET clause of the MAP statement that contains the base object. MAPDERIVED is the default.
>
> **NOMAPDERIVED**
> Prevents name mapping. NOMAPDERIVED overrides any explicit MAP statements that contain the name of the derived object.

For more information about how derived objects are handled during DDL replication, see the Installing and Configuring Oracle GoldenGate for Oracle Database or *Installing and Configuring Oracle GoldenGate for Teradata*, depending on your installation.

MAPSCHEMAS
Valid for Replicat (Oracle and Teradata). Use only when MAPSESSIONSCHEMA is used.

- MAPSESSIONSCHEMA establishes a source-target mapping for session schemas and is used for objects whose schemas are not qualified in the DDL.

- `MAPSCHEMAS` maps objects that do have qualified schemas in the source DDL, but which do not qualify for mapping with `MAP`, to the same session-schema mapping as in `MAPSESSIONSCHEMA`. Examples of such objects are the Oracle `CREATE TABLE AS SELECT` statement, which contains a derived object in the `AS SELECT` clause, or the Teradata `CREATE REPLICATION RULESET` statement.

This mapping takes place after the mapping that is specified in the `MAP` statement.
As an example, suppose the following DDL statement is issued on a source Oracle database:

```
create table a.t as select from b.t;
```

Suppose the `MAP` statement on the target is as follows:

```
MAP a.*, TARGET c.*;
DDLOPTIONS MAPSESSIONSCHEMA b, TARGET b1, MAPSCHEMAS
```

As a result of this mapping, Replicat issues the following DDL statement on the target:

```
create table c.t as select from b1.t;
```

- The base table gets mapped according to the `TARGET` clause (to schema `c`).
- The qualified derived object (table `t` in `SELECT FROM`) gets mapped according to `MAPSESSIONSCHEMA` (to schema `b1`) because `MAPSCHEMAS` is present.

Without `MAPSCHEMAS`, the derived object would get mapped to schema `c` (as specified in the `TARGET` clause), because `MAPSESSIONSCHEMA` alone only maps unqualified objects.

`MAPSESSIONSCHEMA` ***`source_schema`*** **`TARGET`** ***`target_schema`***
Valid for Replicat (Oracle only). Enables a source session schema to be mapped to (transformed to) a different session schema on the target.

- *`source_schema`* is the session schema that is set with `ALTER SESSION set CURRENT_SCHEMA` on the source.
- *`target_schema`* is the session schema that is set with `ALTER SESSION set CURRENT_SCHEMA` on the target.

Wildcards are not supported. You can use multiple `MAPSESSIONSCHEMA` parameters to map different schemas.
`MAPSESSIONSCHEMA` overrides any mapping of schema names that is based on master or derived object names
See the example at the end of this topic for usage.
See also `MAPSCHEMAS`.

`NOTAG`
Valid for Replicat
Prevents the tagging of DDL that is applied by Replicat with a redo tag (either the default tag '00' or one set with the `DBOPTIONS` parameter with the `SETTAG` option). Use this option for bidirectional configurations where `GETREPLICATES` is used and DDL applied by Replicat must be captured back by Extract for a metadata refresh.

`PASSWORD` ***`algorithm`*** **`ENCRYPTKEY {`*`key_name`*` | DEFAULT}`**
Valid for Extract (Oracle only)
Directs Extract to encrypt all passwords in source DDL before writing the DDL to the trail.

`algorithm`
Specifies the encryption algorithm to be used to encrypt the password. Valid values are `AES128`, `AES192`, `AES256`, or `BLOWFISH`. Use AES unless Blowfish is required for backward compatibility. AES is more secure than Blowfish.

`ENCRYPTKEY` ***`key_name`***
Specifies the logical name of a user-created encryption key in an `ENCKEYS` lookup file.

`ENCRYPTKEY DEFAULT`
Directs Oracle GoldenGate to use a random key.

`REMOVECOMMENTS {BEFORE | AFTER}`
(Optional) Valid for Extract and Replicat (Oracle only). Controls whether or not comments are removed from the DDL operation. By default, comments are not removed, so that they can be used for string substitution with the `DDLSUBST` parameter. See "DDLSUBST" for more information.

`REMOVECOMMENTS BEFORE`
Removes comments before the DDL operation is processed by Extract or Replicat. They will not be available for string substitution.

`REMOVECOMMENTS AFTER`
Removes comments after they are used for string substitution. This is the default behavior if `REMOVECOMMENTS` is not specified.

`REPLICATEPASSWORD | NOREPLICATEPASSWORD`
Valid for Extract (Oracle only). Applies to the password in a `{CREATE | ALTER} USER` *`user`* `IDENTIFIED BY` *`password`* command.

- By default (`REPLICATEPASSWORD`), Oracle GoldenGate uses the source password in the target `CREATE` or `ALTER` statement.
- To prevent the source password from being sent to the target, use `NOREPLICATEPASSWORD`.

When using `NOREPLICATEPASSWORD`, specify a password for the target DDL statement by using a `DDLOPTIONS` statement with the `DEFAULTUSERPASSWORD` or `DEFAULTUSERPASSWORDALIAS` option in the Replicat parameter file.

`REPORT | NOREPORT`
Valid for Extract and Replicat (Oracle and Teradata). Controls whether or not expanded DDL processing information is written to the report file. The default of `NOREPORT` reports basic DDL statistics. `REPORT` adds the parameters being used and a step-by-step history of the operations that were processed.

`UPDATEMETADATA`
Valid for Replicat (Oracle only). Use in an active-active bi-directional configuration. This parameter notifies Replicat on the system where DDL originated that this DDL was propagated to the other system, and that Replicat should now update its object metadata cache to match the new metadata. This keeps Replicat's metadata cache synchronized with the current metadata of the local database.

`USEPASSWORDVERIFIERLEVEL {10|11}`
Only valid in an Oracle to Oracle configuration. Checks if the password verifier being sent in a DDL `CREATE USER` statement requires modifying. The reason for this check is because Oracle has different password verifiers, depending on the database version:

- 10g: A weak verifier kept in `user$.password`.
- 11g: The SHA-1 verifier.
- 12c: The SHA-2 and HTTP digest verifiers.

The SHA-1, SHA-2 and HTTP verifiers are captured in `user$.spare4` in the format of: `'S:<SHA-1-verifier>;H:<http-verifier>;T:<SHA-2-verifier>'`. Integrated Extract returns the following DDL in 12c for create user DDL statements:

- In 12.0.1.0 it returns: `CREATE USER` *`username`* `IDENTIFIED BY VALUES` 'S:*`SHA-1`*;H:*`http`*;*`weak`*'.
- In 12.0.2.0 and later it returns: `CREATE USER` *`username`* `IDENTIFIED BY VALUES` 'S:*`SHA-1`*;H:*`http`*;T:*`SHA-2`*;*`weak`*'.

If Replicat runs against Oracle 12*c*, these forms of `CREATE USER` are handled at the RDBMS level, but if Replicat runs against Oracle 10*g* or 11, these forms are not handled by the RDBMS. Oracle 10*g* only accepts the weak verifier, whereas Oracle 11*g* only accepts the `S:`*`SHA-1`* and weak verifiers.
To allow the `CREATE USER` DDL generated for an Extract connected to Oracle 12*c* to work with a Replicat connected to Oracle 10*g* or 11*g*, this parameter can be used to filter out the unwanted verifiers, as follows:

- If `USEPASSWORDVERIFIERLEVEL` is set to 10, everything except the weak verifier is filtered out of the `CREATE USER` DDL verification string.
- If `USEPASSWORDVERIFIERLEVEL` is set to 11, everything except the S:*`SHA-1`* and weak verifiers is filtered out of the `CREATE USER` DDL verification string.

Examples

Example 1
The following shows how `MAPSESSIONSCHEMA` works to allow mapping of a source session schema to another schema on the target.
Assume the following DDL capture and mapping configurations in Extract and Replicat:
Extract:

```
DDL INCLUDE OBJNAME SRC.* INCLUDE OBJNAME SRC1.*
TABLE SRC.*;
TABLE SRC1.*;
DDL INCLUDE OBJNAME SRC.* INCLUDE OBJNAME SRC1.*
TABLE SRC.*;
TABLE SRC1.*;
```

Replicat:

```
DDLOPTIONS MAPSESSIONSCHEMA SRC TARGET DST
DDLOPTIONS MAPSESSIONSCHEMA SRC1 TARGET DST1
MAP SRC.*, TARGET DST.*;
MAP SRC1.*, TARGET DST1.*;
DDL INCLUDE OBJNAME DST.* INCLUDE OBJNAME DST1.*
```

Assume that the following DDL statements are issued by the logged-in user on the source:

```
ALTER SESION SET CURRENT_SCHEMA=SRC;
CREATE TABLE tab (X NUMBER);
CREATE TABLE SRC1.tab (X NUMBER) AS SELECT * FROM tab;
```

Replicat will perform the DDL as follows (explanations precede each code segment):

```
-- Set session to DST, because SRC.* is mapped to DST.* in MAP statement.
ALTER SESION SET CURRENT_SCHEMA=DST;
-- Create the first TAB table in the DST schema, using the DST session schema.
CREATE TABLE DST.tab (X NUMBER);
-- Restore Replicat schema.
ALTER SESSION SET CURRENT_SCHEMA=REPUSER
-- Set session schema to DST, per MAPSESSIONSCHEMA, so that AS SELECT succeeds.
ALTER SESION SET CURRENT_SCHEMA=DST;
-- Create the DST1.TAB table AS SELECT * FROM the first table (DST.TAB).
CREATE TABLE DST1.tab (X NUMBER) AS SELECT * FROM tab;
-- Restore Replicat schema.
ALTER SESSION SET CURRENT_SCHEMA=REPUSER
```

Without `MAPSESSIONSCHEMA`, the `SELECT * FROM TAB` would attempt to select from a non-existent `SRC.TAB` table and fail. The default is to apply the source schema to unqualified objects in a target DDL statement. The DDL statement in that case would look as follows and would fail:

```
-- Set session to DST, because SRC.* is mapped to DST.* in MAP statement.
ALTER SESION SET CURRENT_SCHEMA=DST;
-- Create the first TAB table in the DST schema, using the DST session schema.
CREATE TABLE DST.tab (X NUMBER);
-- Restore Replicat schema.
ALTER SESSION SET CURRENT_SCHEMA=REPUSER
-- Set session schema to SRC, because TAB in the AS SELECT is unqualified-- and SRC
is the source session schema.
ALTER SESSION SET CURRENT_SCHEMA=SRC;
-- Create DST1.TAB AS SELECT * from SRC.TAB (SRC=current session schema).
CREATE TABLE DST1.tab (X NUMBER) AS SELECT * FROM tab;
-- SRC.TAB does not exist.
-- Abend with an error unless the error is handled by a DDLERROR statement.
```

Example 2
The following shows how to use `DEFAULTUSERPASSWORDALIAS` to specify a different password for a replicated `{CREATE | ALTER} USER` *`name`* `IDENTIFIED BY` *`password`* statement from the one used in the source statement. In this example, the alias `ddlalias` is in the `target` domain in the credential store.

```
DDLOPTIONS DEFAULTUSERPASSWORDALIAS ddlalias DOMAIN target
```

3.44 DDLSUBST

Valid For

Extract and Replicat

Description

Use the `DDLSUBST` parameter to substitute strings in a DDL operation. For example, you could substitute one table name for another or substitute a string within comments. The search is not case-sensitive. To represent a quotation mark in a string, use a double quote mark.

Guidelines for Using DDLSUBST

- Do not use `DDLSUBST` to convert column names and data types to something different on the target. Changing the structure of a target object in this manner will cause errors when data is replicated to it. Likewise, do not use `DDLSUBST` to change owner and table names in a target DDL statement. Always use a `MAP` statement to map a replicated DDL operation to a different target object.

- `DDLSUBST` always executes after the `DDL` parameter, regardless of their relative order in the parameter file. Because the filtering executes first, use filtering criteria that is compatible with the criteria that you are using for string substitution. For example, consider the following parameter statements:

  ```
  DDL INCLUDE OBJNAME fin.*
  DDLSUBST 'cust' WITH 'customers' INCLUDE OBJNAME sales.*
  ```

  In this example, no substitution occurs because the objects in the `INCLUDE` and `DDLSUBST` statements are different. The `fin`-owned objects are included in the Oracle GoldenGate DDL configuration, but the `sales`-owned objects are not.
- You can use multiple `DDLSUBST` parameters. They execute in the order listed in the parameter file.
- For Oracle DDL that includes comments, do not use the `DDLOPTIONS` parameter with the `REMOVECOMMENTS BEFORE` option if you will be doing string substitution on those comments. `REMOVECOMMENTS BEFORE` removes comments before string substitution occurs. To remove comments, but allow string substitution, use the `REMOVECOMMENTS AFTER` option.
- There is no maximum string size for substitutions, other than the limit that is imposed by the database. If the string size exceeds the database limit, the Extract or Replicat process that is executing the operation abends.

Default

No substitution

Syntax

```
DDLSUBST 'search_string' WITH 'replace_string'
[INCLUDE inclusion_clause | EXCLUDE exclusion_clause]
```

'search_string'
The string in the source DDL statement that you want to replace. Enclose the string within single quote marks. To represent a quotation mark in a string, use a double quotation mark.

WITH
Required keyword.

'replace_string'
The string that you want to use as the replacement in the target DDL. Enclose the string within single quote marks. To represent a quotation mark in a string, use a double quotation mark.

INCLUDE *inclusion_clause* | EXCLUDE *exclusion_clause*
Specifies one or more `INCLUDE` and `EXCLUDE` statements to filter the DDL operations for which the string substitution rules are applied. See "DDL Filtering Options" for syntax and usage.

Examples

Example 1
The following replaces the string `cust` with the string `customers` for tables in the `fin` schema.

```
DDLSUBST 'cust' WITH 'customers'
INCLUDE ALL OBJTYPE 'table' OBJNAME fin.*
```

Example 2
The following substitutes a new directory only if the `DDL` command includes the word `logfile`. If the search string is found multiple times, the replacement string is inserted multiple times.

```
DDLSUBST '/file1/location1' WITH '/file2/location2' INCLUDE INSTR 'logfile'
```

Example 3
The following uses multiple `DDLSUBST` statements, which execute in the order shown.

```
DDLSUBST 'a' WITH 'b' INCLUDE ALL
DDLSUBST 'b' WITH 'c' INCLUDE ALL
```

The net effect of the preceding substitutes all `a` and `b` strings with `c`.

3.45 DDLRULEHINT

Valid For

GLOBALS

Description

Use the `DDLRULEHINT` parameter to add a `RULE` hint to the DDL trigger. For example you can add the `RULE` (`/*+NO_UNNEST*/`) hint to improve the performance of the trigger when performing SQL queries.

You can also use the `define _ddl_rule_hint` parameter in the `params.sql` file to add a hint. For example: `define _ddl_rule_hint = '/*+NO_UNNEST*/'`

Default

None

Syntax

```
DDLRULEHINT hint_syntax
```

`hint_syntax`
The syntax of the hint. Spaces are not permitted within the hint syntax.

Example

```
DDLRULEHINT /*+NO_UNNEST*/
```

3.46 DDLTABLE

Valid For

GLOBALS

Description

Use the `DDLTABLE` parameter to specify the name of the DDL history table, if other than the default of `GGS_DDL_HIST`. The DDL history table stores a history of DDL operations processed by Oracle GoldenGate.

The name of the history table must also be specified with the `ddl_hist_table` parameter in the `params.sql` script. This script resides in the root Oracle GoldenGate installation directory.

This parameter is only valid for an Oracle database in which the capture configuration uses the Oracle GoldenGate DDL trigger to support DDL replication. For more information about the Oracle GoldenGate DDL objects, see *Installing and Configuring Oracle GoldenGate for Oracle Database*.

Default

```
GGS_DDL_HIST
```

Syntax

```
DDLTABLE table_name
```

`table_name`
The fully qualified name of the DDL history table. This can be a two-part name (*`schema.table`*) or a three-part name, if stored in a container database (*`container.schema.table`*).

Example

```
DDLTABLE GG_DDL_HISTORY
```

3.47 DECRYPTTRAIL

Valid For

Extract data pump and Replicat

Description

Use the `DECRYPTTRAIL` parameter to decrypt data in a trail or extract file. This parameter is required in the following cases:

- If the trail was encrypted with the master key and wallet method, use `DECRYPTTRAIL` for a data pump only if you want the data to be decrypted when written to the output trail of the data pump. Otherwise, this parameter is not needed. If the data-pump requires further processing of records, it decrypts automatically and then re-encrypts the data before writing it to the output trail. Replicat always decrypts data automatically when the master key and wallet method is used.

- When DECRYPTTRAIL is used for a data pump, use the ENCRYPTTRAIL parameter before specifying any output trails that must be encrypted.
- If the trail was encrypted with the ENCKEYS method, use DECRYPTTRAIL for Replicat to decrypt the data before applying it to the target.

Data encryption is controlled by the ENCRYPTTRAIL | NOENCRYPTTRAIL parameters.

For Oracle, if you are using wallet based encryption DECRYPTTRAIL does not require a cipher because it is recorded in the trail file header.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about trail or file encryption.

Default

None

Syntax

```
DECRYPTTRAIL [{AES128 | AES192 | AES256}]
```

DECRYPTTRAIL
Valid without any other options only if the trail or file was encrypted with ENCRYPTTRAIL without options to use 256-key byte substitution.

{AES128 | AES192 | AES256}
Valid for master key and wallet method and ENCKEYS method. Specify the same AES cipher that was used in ENCRYPTTRAIL to encrypt the trail or file.

Example

Example 1
The following is an example of the ENCKEYS method.

```
DECRYPTTRAIL AES192
```

Example 2
The following is all that is needed to decrypt using the master key and wallet method.

```
DECRYPTTRAIL
```

3.48 DEFERAPPLYINTERVAL

Valid For

Replicat

Description

Use the DEFERAPPLYINTERVAL parameter to set an amount of time that Replicat waits before applying captured transactions to the target database. To determine when to apply the transaction, Replicat adds the delay value to the commit timestamp of the source transaction, as recorded in the local GMT time of the source system.

You can use DEFERAPPLYINTERVAL for such purposes as to prevent the propagation of erroneous changes made to the source data, to control data arrival across different time zones, and to allow time for other planned events to occur before the data is applied to the target. Note that by using DEFERAPPLYINTERVAL, you are purposely building latency into the target data, and it should be used with caution if the target applications are time-sensitive.

To find out if Replicat is deferring operations, use the `SEND REPLICAT` command with the `STATUS` option and look for a status of `Waiting on deferred apply`.

Note:

If the `TCPSOURCETIMER` parameter is in use, it is possible that the timestamps of the source and target transactions could vary by a few seconds, causing Replicat to hold its transaction (and hence row locks) open for a few seconds. This small variance should not have a noticeable affect on performance.

Default

0 (no delay)

Syntax

```
DEFERAPPLYINTERVAL n unit
```

n
A numeric value for the amount of time to delay. The minimum delay time is the value that is set for the `EOFDELAY` parameter. The maximum delay time is seven days.

unit
The unit of time for the delay. Can be:

```
S | SEC | SECS | SECOND | SECONDS | MIN | MINS | MINUTE | MINUTES | HOUR | HOURS |
DAY | DAYS
```

Example

This example directs Replicat to wait ten hours before posting its transactions.

```
DEFERAPPLYINTERVAL 10 HOURS
```

If a transaction completes at 08:00:00 source GMT time, and the delay time is 10 hours, the transaction will be applied to the target at 18:00:00 target GMT time the same day.

3.49 DEFSFILE

Valid For

DEFGEN

Description

Use the `DEFSFILE` parameter to identify the name of the file to which DEFGEN will write data definitions. By default, the data definitions file is written in the character set of the local operating system. You can change the character set with the `CHARSET` option.

For more information about definitions files, see *Administering Oracle GoldenGate for Windows and UNIX*.

Default

None

Syntax

```
DEFSFILE file_name [APPEND | PURGE] [CHARSET character_set] [FORMAT RELEASE
major.minor]
```

`file_name`
The relative or fully qualified file name. The file is created when you run DEFGEN.

`APPEND`
Directs DEFGEN to write new content (from the current run) at the end of any existing content, if the specified file already exists. If the definitions file already exists, but is of an older Oracle GoldenGate release version, you can set the `FORMAT RELEASE` option to the same version as the existing file to prevent errors. Otherwise, DEFGEN will try to add newer metadata features and abend. The following are the restrictions when using `APPEND`:

- If the existing data definitions file is in a format older than Oracle GoldenGate 11.2.1, DEFGEN appends the table definitions in the old format, where table and column names with multi-byte and special characters are not supported.
- If the existing data definitions file is in the newer format introduced in version 11.2.1, DEFGEN appends the table definitions in the existing character set of the file.
- If the existing file is from version 11.2 or earlier, it was written when DEFGEN did not support three-part object names and will cause an error if the new metadata contains three-part names. You can specify objects from an Oracle container database or SQL/MX if you remove the container or catalog portion by using the `NOCATALOG` parameter in the DEFGEN parameter file.

`PURGE`
Directs DEFGEN to purge the specified file before writing new content from the current run. When using `PURGE`, you can overwrite an existing definitions file that was created by an older version of DEFGEN with newer metadata that supports newer features, such as three-part object names.

`CHARSET` ***`character_set`***
Generates the definitions file in the specified character set. Without `CHARSET`, the default character set of the operating system is used. If `APPEND` mode is specified for a definitions file that is version 11.2.1 or later, `CHARSET` is ignored, and the character set of the existing definitions file is used.

`FORMAT RELEASE` ***`major.minor`***
Specifies the metadata format of the definitions that are sent by DEFGEN to the definitions file. The metadata tells the reader process whether the file records are of a version that it supports. The metadata format depends on the version of the Oracle GoldenGate process. Older Oracle GoldenGate versions contain different metadata than newer ones. Use `FORMAT` when the definitions file will be used by a process that is of an older Oracle GoldenGate version than the current one.

- `FORMAT` is a required keyword.
- `RELEASE` specifies an Oracle GoldenGate release version. *`major`* is the major version number, and *`minor`* is the minor version number. The `X.x` must reflect a current or earlier, generally available (GA) release of Oracle GoldenGate. Valid values are 9.0 through the current Oracle GoldenGate `X.x` version number, for example 11.2 or 12.1. (If you use an Oracle GoldenGate version that is earlier than 9.0, specify either 9.0 or 9.5.)

  The release version is programmatically mapped back to an appropriate internal compatibility level. The default is the current version of the process that writes to this trail. Note that `RELEASE` versions earlier than 12.1 do not support three-part object names.

Example

```
DEFSFILE ./dirdef/orcldef CHARSET ISO-8859-11 FORMAT RELEASE 11.2
```

3.50 DISCARDFILE | NODISCARDFILE

Valid For

Extract and Replicat

Description

Use the `DISCARDFILE` parameter to do the following:

- Customize the name, location, size, and write mode of the discard file. By default, a discard file is generated whenever a process is started with the `START` command through GGSCI. To retain the default properties, a `DISCARDFILE` parameter is not required.
- Specify the use of a discard file for processing methods where the process starts from the command line of the operating system and a discard file is not created by default.

Use the `NODISCARDFILE` parameter to disable the use of a discard file. If `NODISCARDFILE` is used with `DISCARDFILE`, the process abends.

When using `DISCARDFILE`, use either the `PURGE` or `APPEND` option. Otherwise, you must specify a different discard file name before starting each process run, because Oracle GoldenGate will not write to an existing discard file without one of these instructions and will terminate.

See "DISCARDROLLOVER" for how to control how often the discard file is rolled over to a new file.

For more information about the discard file, see *Administering Oracle GoldenGate for Windows and UNIX*.

Default

If a process is started with the `START` command in GGSCI, it generates a discard file as follows:

- The file is named after the process that creates it, with a `.dsc` extension. If the process is a coordinated Replicat, it generates one file per thread. Each file name is appended with the thread ID of the corresponding thread.

- The file is created in the `dirrpt` sub-directory of the Oracle GoldenGate installation directory.
- The maximum file size is 50 MB.
- At startup, if a discard file exists, it is purged before new data is written.
- The maximum filename is 250 characters including the directory.

When you start a process from the command line of the operating system, you should not generate a discard file by default.

Syntax

```
DISCARDFILE { [file_name]
[, APPEND | PURGE]
[, MAXBYTES n | MEGABYTES n] } |
NODISCARDFILE
```

`DISCARDFILE`
Indicates that the name or other attribute of the discard file is being changed.

`file_name`
The relative or fully qualified name of the discard file, including the actual file name. For a coordinated Replicat, specify a file name of up to five characters, because each file name is appended with the thread ID of the thread that writes it. To store the file in the Oracle GoldenGate directory, a relative path name is sufficient, because Oracle GoldenGate qualifies the name with the Oracle GoldenGate installation directory.

`APPEND`
Adds new content to existing content if the file already exists. If neither `APPEND` nor `PURGE` is used, you must specify a different discard file name before starting each process run.

`PURGE`
Purges the file before writing new content. If neither `PURGE` nor `APPEND` is used, you must specify a different discard file name before starting each process run.

`MAXBYTES` ***`n`***
Sets the maximum size of the file in bytes. The valid range is from 1 to 4096967295. The default is 3000000. If the specified size is exceeded, the process abends.

`MEGABYTES` ***`n`***
Sets the maximum size of the file in megabytes. The valid range is from 1 to 4096. The default is 3. If the specified size is exceeded, the process abends.

`NODISCARDFILE`
Prevents the process from creating a discard file.

Example

Example 1

This example specifies a non-default file name and extension, non-default write mode, and non-default maximum file size. This example shows how you could change the default properties of a discard file for an online (started through GGSCI) process or specify the use of a discard file for a process that starts from the command line of the operating system and has no discard file by default.

```
DISCARDFILE .dirrpt/discard.txt, APPEND, MEGABYTES 20
```

Example 2
This example changes only the write mode of the default discard file for an online process (started through GGSCI).

```
DISCARDFILE .dirrpt/finance.dsc, APPEND
```

Example 3
This example disables the use of a discard file for an online process (started through GGSCI).

```
NODISCARDFILE
```

3.51 DISCARDROLLOVER

Valid For

Extract and Replicat

Description

Use the `DISCARDROLLOVER` parameter to set a schedule for aging discard files. For long or continuous runs, setting an aging schedule prevents the discard file from filling up and causing the process to abend, and it provides a predictable set of archives that can be included in your archiving routine.

When the `DISCARDROLLOVER` age point is reached, a new discard file is created, and old files are renamed in the format of *`GROUPn.extension`*, where:

- *`GROUP`* is the name of the Extract or Replicat group.
- *`n`* is a number that gets incremented by one each time a new file is created, for example: `myext0.dsc`, `myext1.dsc`, `myext2.dsc`, and so forth.
- *`extension`* is the file extension, such as `.dsc`.

You can specify a time of day, a day of the week, or both. Specifying just a time of day (`AT` option) without a day of the week (`ON` option) generates a discard file at the specified time every day.

Discard files always roll over at the start of a process run, regardless of whether `DISCARDROLLOVER` is used or not.

If the `NODISCARDFILE` parameter is used with the `DISCARDROLLOVER` parameter, the process abends.

For more information about the discard file, see *Administering Oracle GoldenGate for Windows and UNIX*.

Default

Disabled. By default, discard files are rolled over when a process starts.

Syntax

```
DISCARDROLLOVER
{AT hh:mi |
ON day |
AT hh:mm ON day}
```

`AT` *`hh:mi`*
The time of day to age the file.
Valid values:

- *`hh`* is an hour of the day from 00 through 23.
- *`mm`* is minutes from 00 through 59.

`ON` *`day`*
The day of the week to age the file.
Valid values:

```
SUNDAY
MONDAY
TUESDAY
WEDNESDAY
THURSDAY
FRIDAY
SATURDAY
```

They are not case-sensitive.

Examples

Example 1

```
DISCARDROLLOVER AT 05:30
```

Example 2

```
DISCARDROLLOVER ON friday
```

Example 3

```
DISCARDROLLOVER AT 05:30 ON friday
```

3.52 DOWNREPORT

Valid For

Manager

Description

Use the `DOWNREPORTMINUTES` or `DOWNREPORTHOURS` parameter to specify the frequency with which Manager reports Extract and Replicat processes that are not running. Whenever a process starts or stops, events are generated to the error log, and those messages can easily be overlooked if the log is large. `DOWNREPORTMINUTES` and `DOWNREPORTHOURS` report on a periodic basis to ensure that you are aware of stopped processes.

If `DOWNREPORT` is explicitly indicated and the value of the `CHECKMINUTES` parameter is greater than that of `DOWNREPORT`, then `CHECKMINUTES` acquires the value of `DOWNREPORT`.

To report on running processes, use the `UPREPORT` parameter.

Default

Do not report down processes.

Syntax

```
DOWNREPORTMINUTES minutes | DOWNREPORTHOURS hours
```

minutes
The frequency, in minutes, to report processes that are not running. The minimum is 0.

hours
The frequency, in hours, to report processes that are not running. The minimum is 0.

Example

The following generates a report every 30 minutes.

```
DOWNREPORTMINUTES 30
```

3.53 DSOPTIONS

Valid For

Extract

Description

Use the `DSOPTIONS` parameter to specify processing options for an Extract that uses a Teradata Access Module (TAM). For more information about configuring Oracle GoldenGate for Teradata extraction, see *Installing and Configuring Oracle GoldenGate for Teradata*. Use of this parameter is identical to using the `TRANLOGOPTIONS` parameter so many of the options are described in "TRANLOGOPTIONS".

Default

None

Syntax

```
DSOPTIONS
[CHECKOPCOMPLETE]
[CHECKTRANDATA]
[COMMITTEDTRANLOG]
[CREATETRANLOG]
[EXCLUDETRANS]
[EXCLUDEUSER]
[GETMETADATAFROMVAM]
[IGNOREMETADATAFROMVAM]
[NOCHECKPOINTERROR]
[NOCHECKTRANDATA]
[RESTARTAPPEND]
[VAMCOMPATIBILITY]
```

COMMITTEDTRANLOG
(Maximum performance mode) Specifies that transaction data will not be persisted to disk. The TAM sends transaction data changes to an Extract process that saves it to a regular Oracle GoldenGate trail in transaction commit order. The trail can be read by Replicat or by a data pump Extract group.

`CREATETRANLOG`
(Maximum protection mode) Causes Extract to create a VAM trail, which is a local trail to which transaction data changes are persisted for further processing by a VAM-sort Extract. Data is written to the VAM trail in log-style format which interleaves change records from different transactions. Use this option for the primary Extract process that interfaces with a Teradata Access Module (TAM) and writes to the VAM trail. Specify the VAM trail with the `ADD EXTTRAIL` command in GGSCI.

`SORTTRANLOG`
(Maximum protection mode) Indicates that Extract needs to perform transaction sorting functions. Use this option for a VAM-sort Extract group that reads a VAM trail that is populated by a primary Extract process. The VAM-sort Extract sorts the interleaved operations into the correct prepare/commit/rollback transactional units before further processing by Oracle GoldenGate.

`RESTARTAPPEND`
(Maximum performance mode and maximum protection mode) Directs Extract to append data to the end of the Oracle GoldenGate trail upon restart, rather than rewriting data that was written in a previous run. Use this option with the `COMMITTEDTRANLOG` or `CREATETRANLOG` argument.

`VAMCOMPATIBILITY 1`
(Maximum performance mode and maximum protection mode) A value of 1 means the original VAM API metadata structure is being used. This structure was originally created for Teradata, which is a separate implementation from the other databases, and Teradata still uses this level. To maintain backwards compatibility with Extract, it may be necessary to manually set `VAMCOMPATIBILITY` to 1 if running an earlier version of a TAM module against the later releases of Extract that contain VAM versioning. Extract abends with a message if `VAMCOMPATIBILITY` 1 is required and not set. The range is 2–3.

3.54 DYNAMICPORTLIST

Valid For

Manager

Description

Use the `DYNAMICPORTLIST` parameter to specify a list of available ports to which the following local Oracle GoldenGate processes can bind for communication with a remote Oracle GoldenGate process:

- Collector: to communicate with a remote Extract to receive incoming data.
- Replicat: to communicate with a remote Extract to receive data during an initial load task.
- Passive Extract: to communicate with a remote Collector
- GGSCI: to issue remote commands

Specify enough ports to accommodate expansion of the number of processes without having to stop and restart Manager to add them to the list. You can specify an individual port, a range of ports, or both.

Default

None

Syntax

```
DYNAMICPORTLIST {port | port-port} [ , ...]
```

`port`
A port number that can be allocated. The maximum number of port entries is 5000.

- To specify multiple ports, use a comma-delimited list. Example:

  ```
  7830, 7833
  ```

- To specify a range of ports, use a dash (-) to separate the first and last port in the range. Do not put any spaces before or after the dash. Example:

  ```
  7830-7835
  ```

- To specify a range of ports plus an individual port, place a comma between the range and the individual port number. Example:

  ```
  7830-7835, 7839
  ```

Example

```
DYNAMICPORTLIST 7820-7830, 7833, 7835
```

3.55 DYNAMICRESOLUTION | NODYNAMICRESOLUTION

Valid For

Extract and Replicat

Description

Use the `DYNAMICRESOLUTION` and `NODYNAMICRESOLUTION` parameters to control how table names are resolved.

`DYNAMICRESOLUTION`, the default, enables fast process startup when there are numerous tables specified in `TABLE` or `MAP` statements. To get metadata for transaction records that it needs to process, Oracle GoldenGate queries the database and then builds a record of the tables that are involved. `DYNAMICRESOLUTION` causes the record to be built one table at a time, instead of all at once. The metadata of any given table is added when Extract first encounters the object ID in the transaction log, while record-building for other tables is deferred until their object IDs are encountered. `DYNAMICRESOLUTION` is the same as `WILDCARDRESOLVE DYNAMIC`.

`NODYNAMICRESOLUTION` causes the entire object record (for all tables) to be built at startup, which can be time-consuming if the database is large. This option is not supported for Teradata. `NODYNAMICRESOLUTION` is the same as `WILDCARDRESOLVE IMMEDIATE`.

See "WILDCARDRESOLVE" for more information.

Default

```
DYNAMICRESOLUTION
```

Syntax

```
DYNAMICRESOLUTION | NODYNAMICRESOLUTION
```

3.56 EBCDICTOASCII

Valid For

Extract data pump and Replicat

Description

Use the `EBCDICTOASCII` parameter to convert character data in the input trail from EBCDIC to ASCII format when sending it to a DB2 target database on a z/OS system. This parameter can be specified to request conversion of all EBCDIC columns and user token data to ASCII. This parameter must precede the `SOURCEDB` parameter. This parameter is only needed if the input trail file was created by an Extract version prior to v10.0. It is ignored for all other cases, because the conversion is done automatically.

As of version 11.2.1, conversion is not allowed by a data pump.

Default

None

Syntax

```
EBCDICTOASCII
```

3.57 ENABLECATALOGNAMES

Valid For

GLOBALS

Description

Use the `ENABLECATALOGNAMES` to enable Oracle GoldenGate support for three-part object names in SQL/MX databases. A three-part name includes the catalog with the schema and object name. `USEENABLECATALOGNAMES` is ignored for all other databases.

Default

Disabled

Syntax

```
ENABLECATALOGNAMES
```

3.58 ENABLEMONITORING

Valid For

GLOBALS

Description

Use the `ENABLEMONITORING` parameter to enable the monitoring of Oracle GoldenGate instances from Oracle GoldenGate Monitor and to collect trend data for Performance Metrics Server. It directs Manager to publish the monitoring points that provide status and other information to the Oracle GoldenGate Monitor clients.

Before enabling monitoring on any given platform, see the installation guide for your database to make certain that the operating system is supported. That guide also contains instructions for installing and configuring Oracle GoldenGate Monitor. For help with using Oracle GoldenGate Monitor, see the online help.

This parameter is not valid for NonStop or SQL/MX.

> **Note:**
>
> When monitoring is enabled on a UNIX system for a high number of Oracle GoldenGate processes (approximately 400), the system-imposed limit on the maximum amount of allowed shared memory may be exceeded. The message returned by Manager is similar to this:
>
> ```
> WARNING OGG-01934  Datastore repair failed" reported during "start...
> ```
>
> If this occurs, increase the kernel parameter `kernel.shmall` by 8 times the default for the operating system.

Default

Disabled

Syntax

```
ENABLEMONITORING
```

3.59 ENABLE_HEARTBEAT_TABLE | DISABLE_HEARTBEAT_TABLE

Valid For

Extract, Replicat, and GLOBALS

Description

The `ENABLE_HEARTBEAT_TABLE` and `DISABLE_HEARTBEAT_TABLE` commands specify whether the Oracle GoldenGate process will be handling records from `GG_HEARTBEAT` table or not. When specified as a `GLOBALS`, it is true for the entire installation unless overridden by a specific process.

Default

```
ENABLE_HEARTBEAT_TABLE
```

Syntax

```
ENABLE_HEARTBEAT_TABLE | DISABLE_HEARTBEAT_TABLE
```

`ENABLE_HEARTBEAT_TABLE`
Enables Oracle GoldenGate processes to handle records from a `GG_HEARTBEAT` table. This is the default.

`DISABLE_HEARTBEAT_TABLE`
Disables Oracle GoldenGate processes from handing records from a `GG_HEARTBEAT` table

3.60 ENCRYPTTRAIL | NOENCRYPTTRAIL

Valid For

Extract

Description

Use the `ENCRYPTTRAIL` and `NOENCRYPTTRAIL` parameters to control whether Oracle GoldenGate encrypts or does not encrypt data that is written to a trail or extract file.

`ENCRYPTTRAIL` supports the following encryption methods:

- **Master key and wallet method**: Generate a one-time AES key for each trail file and uses it to encrypt the contents. Then, the one-time key is encrypted by the master-key and stored in the trail file header.
- **ENCKEYS method**: Generate a AES encryption key, store it under a given name in an `ENCKEYS` file, and configure Oracle GoldenGate to use that key to directly encrypt or decrypt the contents of the trail file.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about these encryption methods. `ENCRYPTTRAIL` requirements are different for these methods.

You can use encryption for local and remote trails that are specified with the following parameters in an Extract parameter file:

RMTTRAIL

EXTTRAIL

You can use encryption for local and remote extract files that are specified with the following parameters in an Extract parameter file:

RMTFILE

EXTFILE

`ENCRYPTTRAIL` and `NOENCRYPTTRAIL` are trail or file-specific. One affects all subsequent trail or extract file specifications in the parameter file until the other parameter is encountered. The parameter must be placed before the parameter entry for the trail that it will affect.

`ENCRYPTTRAIL` and `NOENCRYPTTRAIL` cannot be used when `FORMATASCII` is used to write data to a file in ASCII format. The trail or file must be written in the default Oracle GoldenGate canonical format.

`ENCRYPTTRAIL` encrypts the trail data across all data links and within the files themselves. Only the data blocks are encrypted. User tokens are not encrypted.

Default

```
NOENCRYPTTRAIL
```

Syntax

```
ENCRYPTTRAIL [{AES128 | AES192 | AES256}] | NOENCRYPTTRAIL]
```

`ENCRYPTTRAIL`
`ENCRYPTTRAIL` without options specifies 256-key byte substitution `AES256` as the default for all database types except the iSeries, z/OS, and NonStop platforms because Advanced Encryption Standard (AES) encryption is not supported on those platforms.

`{AES128 | AES192 | AES256}`
Specifies the AES encryption key length to use. This is a symmetric-key encryption standard that is used by governments and other organizations that require a high degree of data security. This option is not supported by the iSeries, z/OS, and NonStop platforms.
For both the master key and wallet method and the `ENCKEYS` method, you must specify one of the AES ciphers to encrypt the file(s):

- `AES128` has a 128-bit block size with a key size of 128 bits.
- `AES192` has a 128-bit block size with a key size of 192 bits.
- `AES256` has a 128-bit block size with a key size of 256 bits.

To use AES encryption for any database other than Oracle on a 32-bit platform, the path of the `lib` sub-directory of the Oracle GoldenGate installation directory must be specified as an environment variable before starting any processes. This is not required on 64-bit platforms. Set the path as follows:

- UNIX: Specify the path as an entry to the `LD_LIBRARY_PATH` or `SHLIB_PATH` variable. For example:

  ```
  setenv LD_LIBRARY_PATH ./lib:$LD_LIBRARY_PATH
  ```

- Windows: Add the path to the `PATH` variable.

You can use the `SETENV` parameter to set it as a session variable for the process.

`NOENCRYPTTRAIL`
Prevents the trail from being encrypted. This is the default.

Examples

Example 1

In the following example, the master key and wallet method is used. The Extract process writes to two trails. The data for the `emp` table is written to trail `/home/ggsora/dirdat/em`, which is encrypted with the AES-192 cipher. The data for the `stores` table is written to trail `/home/ggsora/dirdat/st`, which is not encrypted.

```
ENCRYPTTRAIL AES192
RMTTRAIL /home/ggsora/dirdat/em
TABLE hr.emp;
NOENCRYPTTRAIL
RMTTRAIL /home/ggsora/dirdat/st
TABLE ops.stores;
```

Example 2
As an alternative to the preceding example, you can omit `NOENCRYPTTRAIL` if you list all non-encrypted trails before the `ENCRYPTTRAIL` parameter.

```
RMTTRAIL /home/ggsora/dirdat/st
TABLE ops.stores;
ENCRYPTTRAIL AES192
RMTTRAIL /home/ggsora/dirdat/em
TABLE hr.emp;
```

Example 3
In the following example, the `ENCKEYS` method is used.

```
ENCRYPTTRAIL AES192, KEYNAME mykey1
RMTTRAIL /home/ggsora/dirdat/em
TABLE hr.emp;
TABLE ops.stores;
```

3.61 END

Valid For

Replicat

Description

Use the `END` parameter to terminate Replicat when it encounters the first record in the data source whose timestamp is the specified point in time.

Without `END`, the process runs continuously until:

- the end of the transaction log or trail is reached, at which point it will stop gracefully.
- manually terminated from the command shell.

Use `END` with the `SPECIALRUN` parameter to post data as a point-in-time snapshot, rather than continuously updating the target tables.

Default

Continuous processing

Syntax

```
END {date [time] | RUNTIME}
```

`date [time]`
Causes Replicat to terminate when it reaches a record in the data source whose timestamp exceeds the one that is specified with this parameter.
Valid values:

- *`date`* is a date in the format of *`yyyy-mm-dd`*.
- *`time`* is the time in the format of *`hh:mi[:ss[.cccccc]]`* based on a 24-hour clock.

`RUNTIME`
Causes Replicat to terminate when it reaches a record in the data source whose timestamp exceeds the current date and clock time. All unprocessed records with

timestamps up to this point in time are processed. One advantage of using `RUNTIME` is that you do not have to alter the parameter file to change dates and times from run to run. Instead, you can control the process start time within your batch programming.

Examples

Example 1

```
SPECIALRUN
END 2010-12-31 17:00:00
```

Example 2

```
SPECIALRUN
END RUNTIME
```

3.62 EOFDELAY | EOFDELAYCSECS

Valid For

Extract and Replicat

Description

Use the `EOFDELAY` or `EOFDELAYCSECS` parameter to control how often Extract, a data pump, or Replicat checks for new data after it has reached the end of the current data in its data source. You can reduce the system I/O overhead of these reads by increasing the value of this parameter.

Note:

Large increases can increase the latency of the target data, especially when the activity on the source database is low

This parameter is not valid when `SOURCEISTABLE` is used. This parameter cannot be set to zero (0).

Default

The minimum is 1 second ; the maximum is 60 seconds (6000 centiseconds). The default is 1 second (100 centiseconds).

Syntax

```
EOFDELAY seconds | EOFDELAYCSECS centiseconds
```

seconds
The delay, in seconds, before searching for data to process.

centiseconds
The delay, in centiseconds, before searching for data to process.

Example

```
EOFDELAY 3
```

3.63 EXCLUDEHIDDENCOLUMNS

Valid For

Oracle Integrated Extract Capture; It's not valid for data pump.

Description

The parameter disables all the Oracle hidden columns including the timestamp columns created using automatic CDR. The parameter requires Oracle GoldenGate 12c (12.2.01) format trail or higher and must not specify the `NO_OBJECTDEFES` parameter. The `userexit` callback structure has the hidden column attributes and callback structure version is 5. You can specify the parameter at any location of the parameter file, as long as it is after the `EXTRACT group` parameter.

Syntax

```
EXTRACT ext1...
EXCLUDEHIDDENCOLUMNS
EXTTRAIL ./dirdat/a1
TABLE src.tab1;
```

3.64 EXCLUDETAG

Valid For

(Oracle) Extract and Replicat or data pump

(All databases) Extract Pump or Replicat

Description

Use `EXCLUDETAG` *`tag`* in your data pump or Replicat parameter file to specify changes to be excluded from trail files. The limitation for this parameter is that the tag value can be up to 2000 hexadecimal digits (0-9A-F) or the plus sign (`+`). You can have multiple `EXCLUDETAG` lines, but each `EXCLUDETAG` should have a single value. By default, Replicat the individual records every change it applies to the database by `00` in both classic mode or integrated mode.Compared with older versions, new trail file contains tag tokens, which would not introduce problems for older trail readers.

Use `EXCLUDETAG +` to ignore the individual records that are tagged with any redo tag.

Do not use `NULL` with `tag` or `+` because it operates in conflict resulting in errors.

To tag the individual records, use the `DBOPTIONS` parameter with the `SETTAG` option in the Replicat parameter file. Use these parameters to prevent cycling (loop-back) of Replicat the individual records in a bi-directional configuration or to filter other transactions from capture. The default `SETTAG` value is 00. Valid value is any single Oracle Streams tag. A tag value can be up to 2000 hexadecimal digits (0-9 A-F) long. For more information about Streams tags, see *Oracle Streams Replication Administrator's Guide*.

Default

None

Syntax

```
[EXCLUDETAG [tag | NULL] | [+]
```

Example 1

For Replicat:

```
excludetag tag
```

Example 2

For data pumps:

```
excludetag 00
```

3.65 EXCLUDEWILDCARDOBJECTSONLY

Valid For

GLOBALS

Description

Use the `EXCLUDEWILDCARDOBJECTSONLY` parameter to force the inclusion of non-wildcarded source objects specified in `TABLE` or `MAP` parameters when an exclusion parameter contains a wildcard that otherwise would exclude that object. Exclusion parameters are `CATALOGEXCLUDE`, `SCHEMAEXCLUDE`, `MAPEXCLUDE`, and `TABLEEXCLUDE`.

The exclusion parameters get evaluated and satisfied before the `TABLE` or `MAP` statements. Without `EXCLUDEWILDCARDOBJECTSONLY`, it would be possible for an object in a `TABLE` or `MAP` statement to be wrongly excluded because it satisfies the wildcard in the exclude specification. For `EXCLUDEWILDCARDOBJECTSONLY` to work on an object, that object must be explicitly named without using wildcards in any of the name components.

Default

None

Syntax

```
EXCLUDEWILDCARDOBJECTSONLY
```

Example

In this example, `schema1.src_table1` is included in processing because the `TABLEEXCLUDE` parameter is wildcarded and the `TABLE` specification is not wildcarded. Without `EXCLUDEWILDCARDOBJECTSONLY`, `schema1.src_table1` would be excluded because of the wildcard specification in `TABLEEXCLUDE`.

```
TABLEEXCLUDE schema1.src_table*;
    TABLE schema1.src_table1;
```

3.66 EXTFILE

Valid For

Extract and Replicat

Description

Use the EXTFILE parameter to specify an extract file, which is a local file that will be read by a data pump Extract group on the local system, or to specify a local extract file that Replicat reads when SPECIALRUN is used.

EXTFILE must precede all associated TABLE or MAP statements. Multiple EXTFILE statements can be used to define different files.

EXTFILE parameter is deprecated and ignored for Data Pump

You can encrypt the data in this file by using the ENCRYPTTRAIL parameter. See "ENCRYPTTRAIL | NOENCRYPTTRAIL" for more information.

Default

None

Syntax

```
EXTFILE file_name
[, FORMAT RELEASE major.minor]
[, MEGABYTES megabytes]
[,     OBJECTDEFS | NO_OBJECTDEFS]
[, TRAILBYTEORDER {BIGENDIAN | LITTLEENDIAN | NATIVEENDIAN}]
```

file_name
Valid for Extract and Replicat. Specifies the relative or fully qualified name of the extract file.

FORMAT RELEASE *major.minor*
Specifies the metadata format of the data that is sent by Extract to a trail, a file, or (if a remote task) to another process. The metadata tells the reader process whether the data records are of a version that it supports. The metadata format depends on the version of the Oracle GoldenGate process. Older Oracle GoldenGate versions contain different metadata than newer ones.

- FORMAT is a required keyword.
- RELEASE specifies an Oracle GoldenGate release version. *major* is the major version number, and *minor* is the minor version number. The X.x must reflect a current or earlier, generally available (GA) release of Oracle GoldenGate. Valid values are 9.0 through the current Oracle GoldenGate X.x version number, for example 11.2 or 12.1. (If you use an Oracle GoldenGate version that is earlier than 9.0, specify either 9.0 or 9.5.) The release version is programmatically mapped back to the appropriate trail format compatibility level. The default is the current version of the process that writes to this trail. Note that RELEASE versions earlier than 12.1 do not support three-part object names.

`MEGABYTES` ***`megabytes`***
Valid for Extract. The maximum size, in megabytes, of a file in the trail. The default is 2000.

`OBJECTDEFS | NO_OBJECTDEFS`
Use the `OBJECTDEFS` and `NO_OBJECTDEFS` options to control whether or not to include the object definitions in the trail. These two options are applicable only when the output trail is formatted in Oracle GoldenGate canonical format and the trail format release is greater than 12.1. Otherwise, both options are ignored because no metadata record will be added to the trail.
When replicating from an Open Systems database to NonStop, specify format version below 12.2 to avoid including the object definitions in the trail since NonStop does not support processing object definitions from the trail.

`TRAILBYTEORDER {BIGENDIAN | LITTLEENDIAN | NATIVEENDIAN}`
Sets the byte format of the metadata in the file records. This parameter does not affect the column data. Valid only for files that have a `FORMAT RELEASE` version of at least 12.1. Valid values are `BIGENDIAN` (big endian), `LITTLEENDIAN` (little endian), and `NATIVEENDIAN` (default of the local system). The default is `BIGENDIAN`. See the `GLOBALS` version of TRAILBYTEORDER for additional usage instructions.

Examples

Example 1

```
EXTFILE dirdat/datafile
```

Example 2

```
EXTFILE dirdat/extdat, MEGABYTES 2
```

Example 3

```
EXTFILE /ggs/dirdat/extdat, FORMAT RELEASE 10.4
```

3.67 EXTRACT

Valid For

Extract

Description

Use the `EXTRACT` parameter to specify an Extract group for online (continuous) change synchronization. This parameter links the current run with previous runs, so that data continuity is maintained between source and target tables. Unless stopped by a user, Extract runs continuously and maintains checkpoints in the data source and trail to ensure data integrity and fault tolerance throughout planned or unplanned process termination, system outages, or network failure. `EXTRACT` must be the first entry in the parameter file.

For more information about implementing change synchronization, see the *Administering Oracle GoldenGate for Windows and UNIX*.

Default

None

Syntax

```
EXTRACT group_name
```

`group_name`
The group name as defined with the `ADD EXTRACT` command.

Example

The following specifies an Extract group named `finance`.

```
EXTRACT finance
```

3.68 EXTTRAIL

Valid For

Extract

Description

Use the `EXTTRAIL` parameter to specify a trail on the local system that was created with the `ADD EXTTRAIL` command. The trail is read by a data pump Extract group or by a Replicat group on the local system.

`EXTTRAIL` must precede all associated `TABLE` statements. Multiple `EXTTRAIL` statements can be used to define different trails.

Do not use `EXTTRAIL` for an Extract that is configured in `PASSIVE` mode. See *Administering Oracle GoldenGate for Windows and UNIX* for more information about `PASSIVE` mode, an Oracle GoldenGate security feature.

You can encrypt the data in this trail by using the `ENCRYPTTRAIL` parameter. See "ENCRYPTTRAIL | NOENCRYPTTRAIL" for more information.

Default

None

Syntax

```
EXTTRAIL file_name
[, FORMAT RELEASE major.minor]
[, OBJECTDEFS | NO_OBJECTDEFS]
[, TRAILBYTEORDER {BIGENDIAN | LITTLEENDIAN | NATIVEENDIAN}]
```

`file_name`
The relative or fully qualified name of the trail. Use a maximum of two characters for the name. As trail files are aged, a six-character sequence number will be added to this name, for example `/ogg/dirdat/rt000001`.

`FORMAT RELEASE` ***`major.minor`***
Specifies the metadata format of the data that is sent by Extract to a trail, a file, or (if a remote task) to another process. The metadata tells the reader process whether the data records are of a version that it supports. The metadata format depends on the version of the Oracle GoldenGate process. Older Oracle GoldenGate versions contain different metadata than newer ones.

- `FORMAT` is a required keyword.
- `RELEASE` specifies an Oracle GoldenGate release version. *`major`* is the major version number, and *`minor`* is the minor version number. The `X.x` must reflect a current or earlier, generally available (GA) release of Oracle GoldenGate. Valid values are 9.0 through the current Oracle GoldenGate `X.x` version number, for example 11.2 or 12.1. (If you use an Oracle GoldenGate version that is earlier than 9.0, specify either 9.0 or 9.5.)

  The release version is programmatically mapped back to an appropriate internal compatibility level. The default is the current version of the process that writes to this trail. Note that `RELEASE` versions earlier than 12.1 do not support three-part object names.

There is a dependency between `FORMAT` and the `RECOVERYOPTIONS` parameter. See "RECOVERYOPTIONS" for more information.
See the *Administering Oracle GoldenGate for Windows and UNIX* for additional information about Oracle GoldenGate trail file versioning and recovery modes.

`OBJECTDEFS | NO_OBJECTDEFS`
Use the `OBJECTDEFS` and `NO_OBJECTDEFS` options to control whether or not to include the object definitions in the trail. These two options are applicable only when the output trail is formatted in Oracle GoldenGate canonical format and the trail format release is greater than 12.1. Otherwise, both options are ignored because no metadata record will be added to the trail.
When replicating from an Open Systems database to NonStop, specify format version below 12.2 to avoid including the object definitions in the trail since NonStop does not support processing object definitions from the trail.

`TRAILBYTEORDER {BIGENDIAN | LITTLEENDIAN | NATIVEENDIAN}`
Sets the byte format of the metadata in the trail records. This parameter does not affect the column data. Valid only for trails that have a `FORMAT RELEASE` version of at least 12.1. Valid values are `BIGENDIAN` (big endian), `LITTLEENDIAN` (little endian), and `NATIVEENDIAN` (default of the local system). The default is `BIGENDIAN`. See the `GLOBALS` version of TRAILBYTEORDER for additional usage instructions.

Examples

Example 1

```
EXTTRAIL dirdat/ny
```

Example 2

```
EXTTRAIL /ggs/dirdat/ex, FORMAT RELEASE 10.4
```

3.69 FETCHOPTIONS

Valid For

Extract

Description

Use the `FETCHOPTIONS` parameter to control certain aspects of the way that Oracle GoldenGate fetches data in the following circumstances:

- When the transaction record does not contain enough information for Extract to reconstruct an update operation.
- When Oracle GoldenGate must fetch a column value as the result of a `FETCHCOLS` clause of a `TABLE` statement.

`FETCHOPTIONS` is table-specific. One `FETCHOPTIONS` statement applies for all subsequent `TABLE` statements until a different `FETCHOPTIONS` statement is encountered.

Default fetch properties are adequate for most installations.

`FETCHOPTIONS` is not valid for SQL/MX.

Default

Ignore missing rows and continue processing

Syntax

```
FETCHOPTIONS
[, FETCHPKUPDATECOLS]
[, INCONSISTENTROW action]
[, MAXFETCHSTATEMENTS number]
[, MISSINGROW action]
[, NOFETCH]
[, SUPPRESSDUPLICATES]
[, USEKEY | NOUSEKEY]
[, USELATESTVERSION | NOUSELATESTVERSION]
[, USESNAPSHOT | NOUSESNAPSHOT]
[, USEROWID | NOUSEROWID]
```

`FETCHPKUPDATECOLS`
Fetches all unavailable columns when a primary key is updated. This option is off by default. When off, column fetching is performed according to other `FETCHOPTIONS` options that are enabled.
When on, it only takes effect during an update to a primary key column. The results are the same as using `FETCHCOLS (*)` in the `TABLE` statement. `LOB` columns are included in the fetch.
Use this parameter when using `HANDLECOLLISIONS.` When Replicat detects a missing update, all of the columns will be available to turn the update into an insert.

`INCONSISTENTROW` *`action`*
Indicates that column data was successfully fetched by row ID, but the key did not match. Either the row ID was recycled or a primary key update occurred after this operation (and prior to the fetch).
`action` can be one of the following:

> **`ALLOW`**
> Allow the condition and continue processing.
>
> **`IGNORE`**
> Ignore the condition and continue processing. This is the default.
>
> **`REPORT`**
> Report the condition and contents of the row to the discard file, but continue processing the partial row.

`DISCARD`
Discard the data and do not process the partial row.

`ABEND`
Discard the data and quit processing.

`MAXFETCHSTATEMENTS` ***`number`***
Controls the maximum allowable number of prepared queries that can be used by Extract to fetch row data from a source database. The fetched data is used when not enough information is available to construct a logical SQL statement from a transaction log record. Queries are prepared and cached as needed. When the value set with `MAXFETCHSTATEMENTS` is reached, the oldest query is replaced by the newest one. The value of this parameter controls the number of open cursors maintained by Extract for fetch queries only. Additional cursors may be used by Extract for other purposes, such as those required for stored procedures. This parameter is only valid for Oracle databases.The default is 100 statements. Make certain that the database can support the number of cursors specified, plus cursors used by other applications and processes.
For Informix Extracts with multiple databases, you must should add `FETCHOPTIONS MAXFETCHSTATEMENTS 1` to your Extract parameter file. This does cause slight performance degradation for the capture process. This is not necessary for a single database Extract.

`MISSINGROW` ***`action`***
Provides a response when Oracle GoldenGate cannot locate a row to be fetched, causing only part of the row (the changed values) to be available for processing. Typically a row cannot be located because it was deleted between the time the change record was created and when the fetch was triggered, or because the row image required was older than the undo retention specification.
`action` can be one of the following:

`ALLOW`
Allow the condition and continue processing. This is the default.

`IGNORE`
Ignore the condition and continue processing.

`REPORT`
Report the condition and contents of the row to the discard file, but continue processing the partial row.

`DISCARD`
Discard the data and do not process the partial row.

`ABEND`
Discard the data and quit processing.

`NOFETCH`
Prevents Extract from fetching the column from the database. Extract writes the record to the trail, but inserts a token indicating that the column is missing.

`SUPPRESSDUPLICATES`
Valid for Oracle. Avoids target tablespaces becoming overly large when updates are made on LOB columns. For example, after replication a source tablespace of 232MB becomes a target tablespace of 7.52GB.

USEKEY | NOUSEKEY
Determines whether or not Oracle GoldenGate uses the primary key to locate the row to be fetched.
If both `USEKEY` and `USEROWID` are specified, `ROWID` takes priority for faster access to the record. `USEROWID` is the default.

USELATESTVERSION | NOUSELATESTVERSION
Valid for Oracle. Use with `USESNAPSHOT`. The default, `USELATESTVERSION`, directs Extract to fetch data from the source table if it cannot fetch from the undo tablespace. `NOUSELATESTVERSION` directs Extract to ignore the condition if the snapshot fetch fails, and continue processing.
To provide an alternate action if a snapshot fetch does not succeed, use the `MISSINGROW` option.

USESNAPSHOT | NOUSESNAPSHOT
Valid for Oracle. The default, `USESNAPSHOT`, causes Extract to use the Oracle Flashback mechanism to fetch the correct snapshot of data that is needed to reconstruct certain operations that cannot be fully captured from the redo record. `NOUSESNAPSHOT` causes Extract to fetch the needed data from the source table instead of the flashback logs.

USEROWID | NOUSEROWID
Valid for Oracle. Determines whether or not Oracle GoldenGate uses the row ID to locate the row to be fetched.
If both `USEKEY` and `USEROWID` are specified, `ROWID` takes priority for faster access to the record. `USEROWID` is the default.

Examples

Example 1
The following directs Extract to fetch data by using Flashback Query and to ignore the condition and continue processing the record if the fetch fails.

```
FETCHOPTIONS USESNAPSHOT, NOUSELATESTVERSION
```

Example 2

```
MAXFETCHSTATEMENTS 150
```

Example 3
The following directs Extract to fetch data by using Flashback Query and causes Extract to abend if the data is not available.

```
FETCHOPTIONS USESNAPSHOT, NOUSELATESTVERSION, MISSINGROW ABEND
```

3.70 FETCHUSERID

Valid For

Integrated primary Extract on Oracle; data pump Extract is not valid

Description

Use the `FETCHUSERID` parameter to specify the type of authentication for an Oracle GoldenGate process to use when logging into a database, and to specify password encryption information. This parameter can be used instead of `FETCHUSERIDALIAS` when an Oracle GoldenGate credential store is not being used.

Always use FETCHUSERID or FETCHUSERIDALIAS for a primary Extract. Use FETCHUSERID or FETCHUSERIDALIAS for a data pump Extract.

FETCHUSERID Compared to FETCHUSERIDALIAS

FETCHUSERID requires either specifying the clear-text password in the parameter file or encrypting it with the ENCRYPT PASSWORD command and, optionally, storing an encryption key in an ENCKEYS file. FETCHUSERID supports a broad range of the databases that Oracle GoldenGate supports.

FETCHUSERIDALIAS enables you to specify an alias, rather than a user ID and password, in the parameter file. The user IDs and encrypted passwords are stored in a credential store. FETCHUSERIDALIAS supports databases running on Linux, UNIX, and Windows platforms.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about Oracle GoldenGate security features.

FETCHUSERID Requirements

FETCHUSERID is not always required, nor is PASSWORD always required when FETCHUSERID is required. In some cases, it is sufficient just to use FETCHUSERID or even just to use the SOURCEDB or TARGETDB parameter, depending on how authentication for the database is configured.

See "SOURCEDB" and "TARGETDB" for more information.

Use FETCHUSERID for Oracle GoldenGate processes that connect to an Oracle database. The purpose of this connection is to offload fetch operations to an Active Data Guard standby database, which eliminates overhead that would otherwise be placed on the source database.

- To use an operating system login, use FETCHUSERID with the / argument.
- To use a database user name and password, use FETCHUSERID with PASSWORD.
- Optionally, you can specify the user to log in as sysdba.
- (*Oracle Enterprise Edition earlier than 11.2.0.2*) Special database privileges are required for the FETCHUSERID user when Extract is configured to use LOGRETENTION. These privileges might have been granted when Oracle GoldenGate was installed. See the Installing and Configuring Oracle GoldenGate for Oracle Database for more information about LOGRETENTION.
- (*Oracle Standard or Enterprise Edition 11.2.0.2 or later*) To use FETCHUSERID for an Extract group that is configured for integrated capture, the user must have the privileges granted in the dbms_goldengate_auth.grant_admin_privilege.
- To support capture from an Oracle container database, the user that is specified with FETCHUSERID must log into the root container and must be a common user. A connect string must be supplied for this user and must include the required C## prefix of the common user, such as C##GGADMIN@FINANCE. For more information, see Installing and Configuring Oracle GoldenGate for Oracle.
- The connection specified by FETCHUSERI or FETCHUSERIDALIAS must be to an Active Data Guard standby database of the source database.
- FETCHUSERID can be specified anywhere in the parameter file. Ordering does not matter. It can come before or after a TABLE or MAP statement.

Default

None

Syntax

```
FETCHUSERID {/ | user}[, PASSWORD password]
[algorithm ENCRYPTKEY {key_name | DEFAULT}] [SYSDBA]
```

`/`
Directs Oracle GoldenGate to use an operating-system login for Oracle, not a database user login. Use this argument only if the database allows authentication at the operating-system level. Bypassing database-level authentication eliminates the need to update Oracle GoldenGate parameter files if application passwords frequently change. To use this option, the correct user name must exist in the database, in relation to the value of the Oracle `OS_AUTHENT_PREFIX` initialization parameter, as follows:

- The value set with `OS_AUTHENT_PREFIX` is concatenated to the beginning of a user's operating system account name and then compared to the database name. Those two names must match.
- If `OS_AUTHENT_PREFIX` is set to `' '` (a null string), the user name must be created with `IDENTIFIED EXTERNALLY`. For example, if the OS user name is `ogg`, you would use the following to create the database user:

  ```
  CREATE USER ogg IDENTIFIED EXTERNALLY;
  ```
- If `OS_AUTHENT_PREFIX` is set to `OPS$` or another string, the user name must be created in the following format:

  ```
  OS_AUTHENT_PREFIX_value OS_user_name
  ```

  For example, if the OS user name is `ogg`, you would use the following to create the database user:

  ```
  CREATE USER ops$ogg IDENTIFIED BY oggpassword;
  ```

user
Specifies the name of a database user or a schema, depending on the database configuration. A SQL*Net connect string can be used.

password
Use when database authentication is required to specify the password for the database user. If the password was encrypted by means of the `ENCRYPT PASSWORD` command, supply the encrypted password; otherwise, use the clear-text password. If the password is case-sensitive, type it that way.
If either the user ID or password changes, the change must be made in the Oracle GoldenGate parameter files, including the re-encryption of the password if necessary.

algorithm
Specifies the encryption algorithm that was used to encrypt the password with `ENCRYPT PASSWORD`.
The algorithm can be one of:
`AES128`
`AES192`
`AES256`
`BLOWFISH`

`ENCRYPTKEY {`*`key_name`*` | DEFAULT}`
Specifies the encryption key that was specified with `ENCRYPT PASSWORD`.

- `ENCRYPTKEY` *`key_name`* specifies the logical name of a user-created encryption key in the `ENCKEYS` lookup file. Use if `ENCRYPT PASSWORD` was used with the *`KEYNAME key_name`* option.
- `ENCRYPTKEY DEFAULT` directs Oracle GoldenGate to use a random key. Use if `ENCRYPT PASSWORD` was used with the `KEYNAME DEFAULT` option.

`SYSDBA`
Specifies that the user logs in as `sysdba`.

Example

```
fetchuserid gg_user@adg_inst password pwd
```

3.71 FETCHUSERIDALIAS

Valid For

Integrated primary Extract on Oracle; data pump Extract is not valid

Description

Use the `FETCHUSERIDALIAS` parameter to specify authentication for an Oracle GoldenGate process to use when logging into a database. The use of `FETCHUSERIDALIAS` requires the use of an Oracle GoldenGate credential store. Specify `FETCHUSERIDALIAS` before any `TABLE` or `MAP` entries in the parameter file.

FETCHUSERIDALIAS Compared to FETCHUSERID

`FETCHUSERIDALIAS` enables you to specify an alias, rather than a user ID and password, in the parameter file. The user IDs and encrypted passwords are stored in a credential store. `FETCHUSERIDALIAS` supports databases running on Linux, UNIX, and Windows platforms.

`FETCHUSERID` requires either specifying the clear-text password in the parameter file or encrypting it with the `ENCRYPT PASSWORD` command and, optionally, storing an encryption key in an `ENCKEYS` file. `FETCHUSERID` supports a broad range of the databases that Oracle GoldenGate supports. In addition, it supports the use of an operating system login for Oracle databases.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about these parameters and Oracle GoldenGate security features.

FETCHUSERID Requirements

Note:

Logins that require a database user and password must be stored in the Oracle GoldenGate credential store. See *Administering Oracle GoldenGate for Windows and UNIX* for more information about the credential store.

Use FETCHUSERIDALIAS for Oracle GoldenGate processes that connect to an Oracle database. The purpose of this connection is to offload fetch operations to an Active Data Guard standby database, which eliminates overhead that would otherwise be placed on the source database.

- The SOURCEDB or TARGETDB parameter is not required.
- Specify the alias of a database credential that is stored in the Oracle GoldenGate credential store.
- (*Oracle Enterprise Edition earlier than 11.2.0.2*) Special database privileges are required for the FETCHUSERIDALIAS user when Extract is configured to use LOGRETENTION. These privileges might have been granted when Oracle GoldenGate was installed. See the Installing and Configuring Oracle GoldenGate for Oracle Database for more information about LOGRETENTION.
- (*Oracle Standard or Enterprise Edition 11.2.0.2 or later*) To use FETCHUSERIDALIAS for an Extract group that is configured for integrated capture, the user must have the privileges granted in the `dbms_goldengate_auth.grant_admin_privilege`.
- To support capture from an Oracle container database, the user that is specified with FETCHUSERID must log on to the root container and must be a common database user. A connect string must be supplied for this user, for example: C##GGADM@FINANCE. For more information, see Installing and Configuring Oracle GoldenGate for Oracle Database.
- The connection specified by FETCHUSERI or FETCHUSERIDALIAS must be to an Active Data Guard standby database of the source database.
- FETCHUSERID can be specified anywhere in the parameter file. Ordering does not matter. It can come before or after a TABLE or MAP statement.

Default

None

Syntax

```
FETCHUSERIDALIAS alias [DOMAIN domain] [SYSDBA]
```

alias
Specifies the alias of a database user credential that is stored in the Oracle GoldenGate credential store.

DOMAIN *domain*
Specifies the credential store domain for the specified alias. A valid domain entry must exist in the credential store for the specified alias.

SYSDBA
Specifies that the user logs in as `sysdba`.

Example

```
fetchuseridalias gg_user@adg_inst password pwd
```

3.72 FILTERDUPS | NOFILTERDUPS

Valid For

Replicat

Description

Use the `FILTERDUPS` and `NOFILTERDUPS` parameters to handle anomalies that can occur on a NonStop system when an application performs multiple operations on the same record within the same transaction. This type of transaction can cause out-of-order records in the TMF audit trail and will cause Replicat to abend. For example:

- An insert can occur in the audit trail before a delete on the same primary key, even though the source application performed the delete first, followed by the insert (resulting in a duplicate-record error when the insert is performed by Replicat).
- An update can occur in the audit trail before an insert on the same primary key (resulting in a missing-record error when the update is performed by Replicat).

`FILTERDUPS` prevents Replicat from abending by resolving the conditions as follows:

- In the event of a duplicate insert, Replicat saves the duplicated insert until the end of the transaction. If a delete with the same primary key is subsequently encountered, Replicat performs the delete, then the insert.
- In the event of a missing update, Replicat saves the missing update until the end of the transaction. If an insert with the same primary key is subsequently encountered, Replicat performs the insert, then the update.

IDX hospital applications and some BASE24 bank applications are the typical, but not the only, sources of this anomaly. Use `FILTERDUPS` only if Replicat is abending on duplicate or missing records and you know they were caused by out-of-order transactions originating on a NonStop system. The Logdump utility can be used to diagnose this condition.

`FILTERDUPS` and `NOFILTERDUPS` can be used as on-off switches for different groups of `MAP` statements to enable or disable the exception processing as needed.

Default

`NOFILTERDUPS`

Syntax

```
FILTERDUPS | NOFILTERDUPS
```

Example

This example turns on `FILTERDUPS` for `ORDERS` but disables it for any `MAP` statements that are defined later in the same parameter file.

```
FILTERDUPS
MAP $DATA1.SQLDAT.ORDERS, TARGET MASTER.ORDERS;
NOFILTERDUPS
```

3.73 FLUSHSECS | FLUSHCSECS

Valid For

Extract

Description

Use the `FLUSHSECS` or `FLUSHCSECS` parameters to control when Oracle GoldenGate flushes the Extract memory buffer. When sending data to remote systems, Extract buffers data to optimize network performance. The buffer is flushed to the target system when it is full or after the amount of time specified with `FLUSHSECS` or `FLUSHCSECS`. Data changes are not available to the target users until the buffer is flushed and the data is posted. To control the size of the buffer, use the `TCPBUFSIZE` option of `RMTHOST`. See "RMTHOST" for more information.

Increasing the value of `FLUSHSECS` or `FLUSHCSECS` could result in slightly more efficient use of the network, but it could increase the latency of the target data if activity on the source system is low and the buffer does not fill up. When source tables remain busy, `FLUSHSECS` and `FLUSHCSECS` have little effect.

This parameter cannot be set to zero (0).

Default

The default is 1. The minimum is 0; the maximum is 5000.

Syntax

```
FLUSHSECS seconds | FLUSHCSECS centiseconds
```

`seconds`
The delay, in seconds, before flushing the buffer.

`centiseconds`
The delay, in centiseconds, before flushing the buffer.

Example

```
FLUSHSECS 80
```

3.74 FORMATASCII

Valid For

Extract

Description

Use the `FORMATASCII` parameter to output data in external ASCII format instead of the default Oracle GoldenGate canonical format. Using `FORMATASCII`, you can format output that is compatible with most database load utilities and other programs that require ASCII input. This parameter is required by the *file-to-database-utility* initial load method.

A FORMATASCII statement affects all extract files or trails that are listed after it in the parameter file. The relative order of the statements in the parameter file is important. If listed after a file or trail specification, FORMATASCII will not take effect.

Limitations

- Do not use FORMATASCII if the data will be processed by the Replicat process. Replicat expects the default canonical format.
- Do not use FORMATASCII if FORMATSQL or FORMATXML is being used.
- Do not use FORMATASCII if the data contains LOBs.
- Do not use FORMATASCII if Extract is connected to a multi-byte DB2 subsystem.
- Do not use FORMATASCII if Oracle GoldenGate DDL support is active.
- Do not use FORMATASCII in pass-through mode in a data pump because there is no table metadata available to generate trail output in the specified form.

Default Output

Database object names, such as table and column names, and CHAR and VARCHAR data are written in the default character set of the operating system.

Without specifying any parameter options, FORMATASCII generates records in the following format.

Line 1 contains the following tab-delimited list:

- The operation-type indicator: I, D, U, V (insert, delete, update, compressed update).
- A before or after image indicator: B or A.
- The table name in the character set of the operating system.
- A column name, column value, column name, column value, and so forth.
- A newline character (starts a new line).

Line 2 contains the following tab-delimited begin-transaction record:

- The begin transaction indicator, B.
- The timestamp at which the transaction committed.
- The sequence number of the transaction log in which the commit was found.
- The relative byte address (RBA) of the commit record within the transaction log.

Line 3 contains the following tab-delimited commit record:

- The commit character C.
- A newline character.

Every record in a source transaction is contained between the begin and commit indicators. Each combination of commit timestamp and RBA is unique.

Custom Output

You can customize the output format with optional arguments.

Default

See "Default Output" for specific defaults.

Syntax

```
FORMATASCII [, option] [, ...]
```

`option` can be one of the following:

`BCP`
Formats the output for compatibility with SQL Server's BCP, DTS, or SQL Server Integration Services (SSIS) bulk-load utility.

`DATE | TIME | TS`
Outputs one of the following:

- `DATE` outputs the date (year to day).
- `TIME` outputs the time (year to second).
- `TS` outputs the transaction timestamp (year to fraction).

`CHARSET` ***`set`***
(Oracle SQL*Loader) Specifies the encoding of ASCII characters in Oracle `NCHAR` columns. Valid value is `UTF8`.
`CHARSET` allows the load to include character-length semantics when the source table contains `NCHAR` data and variable-length characters set to UTF-8.

> **Note:**
>
> If both `NCHAR` and `CHAR` columns contain 8-bit ASCII characters, the generated file will contain a mix of operating system-native 8-bit ASCII character coding and UTF-8 coding, and the load will not succeed.

`DELIMITER` ***`delimiter`***
An alternative delimiter character.
Valid values:

- `TAB` (delimit with tabs). This is the default.
- A character enclosed within single quotes, for example, `'/'`.

`EXTRACOLS` ***`number`***
Includes placeholders for additional columns at the end of each record. Use this option when a target table has more columns than the source table. The minimum is 0 and the maximum is 99.

`NAMES | NONAMES`
Includes or excludes column names as part of the output. For updates where only the changed values are present, column names are included unless you also specify the `PLACEHOLDERS` option.

`NOHDRFIELDS [IND], [OP]`
Suppresses output as follows:

NOHDRFIELDS
Without options, suppresses everything except the data values themselves.

IND
Suppresses everything except the before or after indicator (`B` or `A`) and the data values.

OP
Suppresses everything except the operation-type indicator (`I`, `D`, `U`, `V`) and the data values.

NOQUOTE
Excludes quotation marks from character data. Without `NOQUOTE`, characters are enclosed within single-quotes.

NOTRANSTMTS
Excludes transaction information.

NULLISSPACE
Outputs null columns as empty columns. Without `NULLISSPACE`, null columns are output as the word `NULL`.

PLACEHOLDERS
Outputs a placeholder for missing columns. For example, if the second and fourth columns are missing in a four-column table, the following output is possible:

```
'ABC',,123,,
```

SQLLOADER
Produces a fixed-length, ASCII-formatted file that is compatible with the Oracle SQL*Loader utility or the IBM Load Utility program.

Examples

The following examples are based on a source table named `test.customer` and a sample transaction. The examples show how various `FORMATASCII` options configure the output.

Table test.customer:

```
CUSTNAME    CHAR(10)   Primary key
LOCATION    CHAR(10)
BALANCE     INTEGER
```

Transaction:

```
INSERT INTO CUSTOMER VALUES ('Eric', 'San Fran', 550);
UPDATE CUSTOMER SET BALANCE = 100 WHERE CUSTNAME = 'Eric';
COMMIT;
```

Example 1

`FORMATASCII` without options produces the following:

```
B,2011-01-21:14:09:46.421335,8,1873474,
I,A,TEST.CUSTOMER,CUSTNAME,'Eric',LOCATION,
'San Fran',BALANCE,550,
V,A,TEST.CUSTOMER,CUSTNAME,'Eric',BALANCE,100,
C,
```

Example 2

`FORMATASCII, NONAMES, DELIMITER '|'` produces the following:

```
B|2011-01-21:14:09:46.421335|8|1873474|
I|A|CUSTOMER|'Eric'|'San Fran'|550|
V|A|CUSTOMER|CUSTNAME|'Eric'|BALANCE|100|
C|
```

The last record returns column names for the `CUSTNAME` and `BALANCE` columns because the record only contains values for columns that were updated, and `PLACEHOLDERS` was not used.

Example 3

`FORMATASCII, NOHDRFIELDS, OP, TS, NONAMES, NOQUOTE` produces the following:

```
I,CUSTOMER,2011-01-21:14:09:46.421335,Eric,San Fran,550,
V,CUSTOMER,2011-01-21:14:09:46.421335,Eric,,100,
```

The absence of a value for the second column is indicated by two consecutive commas.

3.75 FORMATSQL

Valid For

Extract

Description

Use the `FORMATSQL` parameter to output data in external SQL format, instead of the default Oracle GoldenGate canonical format. `FORMATSQL` generates SQL statements (`INSERT`, `UPDATE`, `DELETE`) that can be applied to both SQL and Enscribe tables by utilities other than Oracle GoldenGate Replicat.

Note:

Do not use `FORMATSQL` if the data will be processed by the Replicat process. Replicat expects the default canonical format. Do not use `FORMATSQL` if `FORMATASCII` or `FORMATXML` is being used. Do not use `FORMATASCII` if Oracle GoldenGate DDL support is active.

A `FORMATSQL` statement affects all extract files or trails defined after it.

Do not use `FORMATSQL` if Extract is connected to a multi-byte DB2 subsystem.

Limitations

- Do not use `FORMATSQL` if the data will be processed by the Replicat process. Replicat expects the default canonical format.
- Do not use `FORMATSQL` if `FORMATASCII` or `FORMATXML` is being used.
- Do not use `FORMATSQL` if Oracle GoldenGate DDL support is active.
- Do not use FORMATSQL in pass-through mode in a data pump because there is no table metadata available to generate trail output in the specified form.

Default Output

Database object names, such as table and column names, and `CHAR` and `VARCHAR` data are written in the default character set of the operating system.

Without options, `FORMATSQL` transactions are output as follows, in comma-delimited format:

- The begin-transaction indicator, `B`.
- The timestamp at which the transaction was committed.
- The sequence number of the transaction log in which the commit was found.
- The relative byte address (RBA) of the commit record within the transaction log.
- The SQL statements.
- The commit indicator, `C`.
- A newline indicator.

Every record in a transaction is contained between the begin and commit indicators. Each combination of commit timestamp and RBA is unique.

Customized Output

You can customize the output format with optional arguments.

Default

See "Default Output" for specific defaults.

Syntax

```
FORMATSQL [option] [, ...]
```

`option` can be one of the following:

`NONAMES`
Omits column names for insert operations, because inserts contain all column names. This option conserves file size.

`NOPKUPDATES`
Converts `UPDATE` operations that affect columns in the target primary key to a `DELETE` followed by an `INSERT`. By default (without `NOPKUPDATES`), the output is a standard `UPDATE` operation.

`ORACLE`
Formats records for compatibility with Oracle databases by converting date and time columns to a format accepted by SQL*Plus, for example:

```
TO_DATE('2011-01-01','YYYY-MM-DD')
```

Example

```
FORMATSQL ORACLE, NONAMES
```

3.76 FORMATXML

Valid For

Extract

Description

Use the `FORMATXML` parameter to output data in XML format, instead of the default Oracle GoldenGate canonical format. A `FORMATXML` statement affects all extract files or trails that are defined after it. By default, the XML is output in the character set of the local operating system.

By default, XML stored as CLOB or BLOB is output up to 4000 bytes. To include larger XML stored as BLOB or CLOB, use the `ENCODING` option.

XML stored as CLOB is always output in a `CDATA` section regardless of its size. This is to avoid the overhead of converting reserved characters such as `<`, `>` and `&` to the appropriate XML representation.

Binary data including BLOB are encoded as Base64, which represents binary data in an ASCII string format and allows output to XML.

The XML, the database object names, such as table and column names, and `CHAR` and `VARCHAR` data are written in the default character set of the operating system unless the `ENCODING` option is used to output in UTF-8.

Limitations

- Do not use `FORMATXML` if the data will be processed by the Replicat process. Replicat expects the default canonical format. Do not use `FORMATXML` if `FORMATASCII` or `FORMATSQL` is being used.
- Do not use `FORMATXML` if Extract is connected to a multi-byte DB2 subsystem.
- Do not use `FORMATXML` if Oracle GoldenGate DDL support is active.
- Do not use `FORMATXML` in pass-through mode in a data pump because there is no table metadata available to generate trail output in the specified form.

Default

None

Syntax

```
FORMATXML
[ENCODING character_set]
[INLINEPROPERTIES | NOINLINEPROPERTIES]
[TRANS | NOTRANS]
```

`ENCODING UTF-8`
Outputs the full sized XML to the XML file in UTF-8, but does not output headers. The XML header tag and root node are included in the XML output. The root node is output as *`OracleGoldenGateFormatXML`*.
Regardless of their size, XML stored as CLOB is output in a `CDATA` section and binary data including BLOB is output to Base64 encoding.

`INLINEPROPERTIES | NOINLINEPROPERTIES`
Controls whether or not properties are included within the XML tag or written separately. `INLINEPROPERTIES` is the default.

`TRANS | NOTRANS`
Controls whether or not transaction boundaries and commit timestamps should be included in the XML output. `TRANS` is the default.

Example

```
FORMATXML NOINLINEPROPERTIES, NOTRANS
```

3.77 FUNCTIONSTACKSIZE

Valid For

Extract and Replicat

Description

Use the `FUNCTIONSTACKSIZE` parameter to control the size of the memory stack that is used for processing Oracle GoldenGate column-conversion functions. The memory stack holds arguments supplied to and from an Oracle GoldenGate function. You should not need to use this parameter unless Oracle GoldenGate returns a message indicating that the size of the stack should be increased. The message is similar to:

```
Not enough stack space. Specify FUNCTIONSTACKSIZE greater than {0,number,0}
```

This could happen when you are using a very large number of functions or arguments.

The default without `FUNCTIONSTACKSIZE` is 200 arguments, which optimizes the performance of Oracle GoldenGate and its usage of system memory. Increasing this parameter can adversely affect performance and the use of system memory.

When setting `FUNCTIONSTACKSIZE` for a coordinated Replicat, take into account that the specified value is applied to each thread in the configuration, not as an aggregate threshold for Replicat as a whole. For example, if `FUNCTIONSTACKSIZE 400` is specified, it is possible for each thread to have 399 arguments without any warning or error from Replicat.

`FUNCTIONSTACKSIZE` must appear in the parameter file before any parameters that include functions are listed. `FUNCTIONSTACKSIZE` is a global parameter. It affects all clauses in a parameter file.

Default

200 arguments

Syntax

```
FUNCTIONSTACKSIZE number
```

`number`
A value between 0 and 5000 that denotes the number of function arguments to allow in a parameter clause.

Example

```
FUNCTIONSTACKSIZE 300
```

3.78 GENLOADFILES

Valid For

Replicat

Description

Use the `GENLOADFILES` parameter when using the *file-to-database-utility* initial load method to generate run and control files that are compatible with:

- Oracle's SQL*Loader utility
- Microsoft's BCP, DTS, or SQL Server Integration Services (SSIS) utility
- IBM's Load Utility (`LOADUTIL`).

A run file and a control file are generated for each `MAP` statement in the Replicat parameter file. Replicat stops after generating the control and run files and does not process data.

Use the run and control files with a data file that contains the data to be loaded into the target. To generate the data file, use the `FORMATASCII` parameter in the Extract parameter file. Use the `SQLLOADER` option of `FORMATASCII` for the Oracle and DB2 for z/OS utilities and use the `BCP` option for the Microsoft utility.

`FORMATASCII` outputs the table data to an Oracle GoldenGate trail or file in external ASCII format, which is compatible with the load utility. You can generate multiple data files by specifying multiple files.

> **Note:**
>
> For IBM's Load Utility, you will need to specify the `-E` and `-d` *`defs_file`* Collector parameters with the `PARAMS` option of the `RMTHOST` parameter. These parameters are necessary to convert ASCII to EBCDIC and to specify the source-definitions file.

By default, `GENLOADFILES` creates the following file names:

- The SQL*Loader run file is named *`source_table`*`.run`, and the control file is named *`source_table`*`.ctl`, where *`source_table`* is the name of a source table specified in the `MAP` statement.
- The BCP/DTS/SSIS run file is named *`target_table`*`.bat`, and the control file is named *`target_table`*`.fmt`, where *`target_table`* is the name of a target table specified in the `MAP` statement.
- The Load Utility run file is named *`target_table`*`.run`, and the control file is named *`target_table`*`.ctl`, where *`target_table`* is the name of a target table specified in the `MAP` statement.

Control Files

The control file contains load parameters that are generated based on a template. Oracle GoldenGate provides default templates for SQL*Loader, BCP/DTS/SSIS, and Load Utility. You can modify the templates as needed to change the load rules, or you can create new templates.

The following are examples of the Oracle GoldenGate templates, which contain placeholders for the target tables, the data file(s) produced by `FORMATASCII`, and other run parameters. Oracle GoldenGate replaces the placeholders with values based on parameters specified in the Replicat parameter file.

Example 3-1   SQL*Loader Template sqlldr.tpl

```
# File Names
controlfile ?target.ctl
runfile     ?target.run
#
# Run File Template
sqlldr userid=?pw control=?target log=?target direct=true
#
# Control File Template
unrecoverable
load data
infile ?source.dat
truncate
into table ?target
```

Example 3-2   BCP/DTS/SSIS Template bcpfmt.tpl

```
# Run File Template
# Substitute your database name for db
bcp db..?target in ?source.dat -U ?user -P ?pw -f ?target.fmt -e ?target.err
#
# Control File Template
# The value below must specify the BCP version, not the Sybase Adaptive
# Server or Microsoft SQL Server version. "bcp -v" can be used to
# determine the correct version number.
12.0
```

Example 3-3   Load Utility Template db2cntl.tpl

```
# File Names
controlfile ?target.ctl
runfile     ?target.run
#
# Run File Template
odb2 load
#
# Control File Template
LOAD REPLACE INTO TABLE ?target
```

Run Files

The run files contain the input parameters for starting the load. To execute the files, issue one of the following commands.

- Execute the SQL*Loader run file from the UNIX command shell.

  ```
  % table.run
  ```

- Execute the BCP run file from the DOS shell.

  ```
  > table.bat
  ```

- Execute the Load Utility run file with a JCL script to load the data to the DB2 for z/OS table. Add other environment-related parameters to the job script as needed.

> **Note:**
>
> A setting of `DYNAMIC` for the `WILDCARDRESOLVE` parameter is not compatible with the `GENLOADFILES` parameter. Oracle GoldenGate defaults to `IMMEDIATE` when `GENLOADFILES` is specified.

Note that Oracle GoldenGate does not support multi-byte characters when the operating system and database character set are different, or when fixed length output format is used.

For step-by-step instructions on configuring Oracle GoldenGate to output the load files and performing the initial load, see the *Administering Oracle GoldenGate for Windows and UNIX*.

Default

None

Syntax

```
GENLOADFILES [template_file]
[CHARSET value]
```

`template_file`
The fully qualified name of the template file. The default template file is `sqlldr.tpl` for SQL*Loader, `bcpfmt.tpl` for BCP, DTS, or SSIS, and `db2cntl.tpl` for DB2 on z/OS, all located in the Oracle GoldenGate home directory.

`CHARSET` ***`set`***
(Oracle SQL*Loader) Specifies the encoding of ASCII characters in Oracle `NCHAR` columns. Valid value is `UTF8`. Required if using `CHARSET` option of `FORMATASCII`. `CHARSET` allows the load to include character-length semantics when the source table contains `NCHAR` data and variable-length characters set to UTF-8. Currently, Oracle SQL*Loader uses byte-length semantics and is not compatible with character-length semantics.

> **Note:**
>
> If both `NCHAR` and `CHAR` columns contain 8-bit ASCII characters, the generated file will contain a mix of operating system-native 8-bit ASCII character coding and UTF-8 coding, and the load will not succeed.

Example

```
GENLOADFILES sqlldr.tpl
```

3.79 GETAPPLOPS | IGNOREAPPLOPS

Valid For

Extract (Not valid for Informix.)

Description

Use the `GETAPPLOPS` or `IGNOREAPPLOPS` parameter to capture or ignore DML operations produced by any application except the local Replicat. By default, application data is captured.

These parameters are useful in conjunction with the `GETREPLICATES` and `IGNOREREPLICATES` parameters for the following:

- To separate data operations performed by a local Replicat from those performed by the business applications configured for Oracle GoldenGate extraction. Use `IGNOREAPPLOPS` and `GETREPLICATES` for one trail or file to contain just the Replicat operations, and use `GETAPPLOPS` and `IGNOREREPLICATES` for another trail or file to contain just the operations of the business applications.
- As part of a cascading configuration, where changes applied by Replicat locally must be captured by a local Extract to be propagated to another system. In this case, `IGNOREAPPLOPS` and `GETREPLICATES` would be used.
- As part of a loop detection scheme when using bidirectional replication. The default combination of `GETAPPLOPS` and `IGNOREREPLICATES` causes Extract to capture application data while ignoring Replicat operations posted to the same database objects. In addition to using these parameters, Extract must be configured to identify Replicat transactions.

See "GETREPLICATES | IGNOREREPLICATES" for more information.

Using `GETAPPLOPS` for Oracle Sequences

`GETAPPLOPS` must be enabled to capture sequences that are replicated by Replicat. Replicat issues sequence updates in an autonomous transaction, so they are not reflected in the trace table. The sequence update appears as if it is an application operation.

Using GETAPPLEOPS for DDL Operations

See "DDLOPTIONS" for information on to use `GETAPPLOPS` or `IGNOREAPPLOPS` functionality for DDL operations.

For more information about configuring bidirectional replication, see the *Administering Oracle GoldenGate for Windows and UNIX*.

Default

```
GETAPPLOPS
```

Syntax

```
GETAPPLOPS | IGNOREAPPLOPS
```

3.80 GETDELETES | IGNOREDELETES

Valid For

Extract and Replicat

Description

Use the `GETDELETES` and `IGNOREDELETES` parameters to control whether or not Oracle GoldenGate processes `DELETE` operations. These parameters are table-specific. One parameter remains in effect for all subsequent `TABLE` or `MAP` statements, until the other parameter is encountered.

Because you can selectively enable or disable these parameters between `MAP` statements, you can enable or disable them for different threads of a coordinated Replicat. Specify the `GETDELETES` threads in one set of `MAP` statements, and specify the `IGNOREDELETES` threads in a different set of `MAP` statements.

Default

```
GETDELETES
```

Syntax

```
GETDELETES | IGNOREDELETES
```

Example

This example shows how you can apply `GETDELETES` and `IGNOREDELETES` selectively to different `MAP` statements, each of which represents a different thread of a coordinated Replicat.

```
GETDELETES
MAP sales.cust, TARGET sales.cust, THREAD (1);
MAP sales.ord, TARGET sales.ord, THREAD (2);
IGNOREDELETES
MAP sales.loc, TARGET sales.loc, THREAD (3);
```

3.81 GETENV

Use the `@GETENV` function to return information about the Oracle GoldenGate environment. You can use the information as input into the following:

- Stored procedures or queries (with `SQLEXEC`)
- Column maps (with the `COLMAP` option of `TABLE` or `MAP`)
- User tokens (defined with the `TOKENS` option of `TABLE` and mapped to target columns by means of the `@TOKEN` function)
- The `GET_ENV_VALUE` user exit function (see "GET_ENV_VALUE")

Note:

All syntax options must be enclosed within quotes as shown in the syntax descriptions.

Syntax

```
@GETENV (
'LAG' , 'unit' |
'LASTERR' , 'error_info' |
'JULIANTIMESTAMP' |
'JULIANTIMESTAMP_PRECISE' |
'RECSOUTPUT' |
{'STATS'|'DELTASTATS'}, ['TABLE', 'table'], 'statistic' |
'GGENVIRONMENT', 'environment_info' |
'GGFILEHEADER', 'header_info' |
'GGHEADER', 'header_info' |
'RECORD', 'location_info' |
'DBENVIRONMENT', 'database_info'
'TRANSACTION', 'transaction_info' |
'OSVARIABLE', 'variable' |
'TLFKEY', SYSKEY, unique_key
'RECORD_TIMESTAMP_PRECISE',
'TRANSACTION_TIMESTAMP_PRECISE',
'USERNAME',
'OSUSERNAME',
'MACHINENAME',
'PROGRAMNAME',
'CLIENTIDENTIFIER',
)
```

`'LAG' , 'unit'`

Valid for Extract and Replicat.

Use the `LAG` option of `@GETENV` to return lag information. Lag is the difference between the time that a record was processed by Extract or Replicat and the timestamp of that record in the data source.

Syntax

```
@GETENV ('LAG', {'SEC'|'MSEC'|'MIN'})
```

`'SEC'`
Returns the lag in seconds. This is the default when a unit is not explicitly provided for `LAG`.

`'MSEC'`
Returns the lag in milliseconds.

`'MIN'`
Returns the lag in minutes.

`'LASTERR' , 'error_info'`

Valid for Replicat.

Use the `LASTERR` option of `@GETENV` to return information about the last failed operation processed by Replicat.

Syntax

```
@GETENV ('LASTERR', {'DBERRNUM'|'DBERRMSG'|'OPTYPE'|'ERRTYPE'})
```

`'DBERRNUM'`
Returns the database error number associated with the failed operation.

`'DBERRMSG'`
Returns the database error message associated with the failed operation.

`'OPTYPE'`
Returns the operation type that was attempted. For a list of Oracle GoldenGate operation types, see *Administering Oracle GoldenGate for Windows and UNIX*.

`'ERRTYPE'`
Returns the type of error. Possible results are:

- `DB` (for database errors)
- `MAP` (for errors in mapping)

`'JULIANTIMESTAMP'` | `'JULIANTIMESTAMP_PRECISE'`

Valid for Extract and Replicat.

Use the `JULIANTIMESTAMP` option of `@GETENV` to return the current time in Julian format. The unit is microseconds (one millionth of a second). On a Windows machine, the value is padded with zeros (0) because the granularity of the Windows timestamp is milliseconds (one thousandth of a second). For example, the following is a typical column mapping:

```
MAP dbo.tab8451, Target targ.tabjts, COLMAP (USEDEFAULTS, &
JTSS = @GETENV ('JULIANTIMESTAMP')
JTSFFFFFF = @date ('yyyy-mm-dd hh:mi:ss.ffffff', 'JTS', &
@getenv ('JULIANTIMESTAMP') ) )
;
```

Possible values that the `JTSS` and `JTSFFFFFF` columns can have are:

```
212096320960773000 2010-12-17:16:42:40.773000
212096321536540000 2010-12-17:16:52:16.540000
212096322856385000 2010-12-17:17:14:16.385000
212096323062919000 2010-12-17:17:17:42.919000
212096380852787000 2010-12-18:09:20:52.787000
```

The last three digits (the microseconds) of the number all contain the padding of 0s .

Optionally, you can use the `'JULIANTIMESTAMP_PRECISE'` option to obtain a timestamp with high precision though this may effect performance.

Syntax

```
@GETENV ('JULIANTIMESTAMP')
@GETENV ('JULIANTIMESTAMP_PRECISE')
```

`'RECSOUTPUT'`

Valid for Extract.

Use the RECSOUTPUT option of @GETENV to retrieve a current count of the number of records that Extract has written to the trail file since the process started. The returned value is not unique to a table or transaction, but instead for the Extract session itself. The count resets to 1 whenever Extract stops and then is started again.

Syntax

```
@GETENV ('RECSOUTPUT')
```

{'STATS'|'DELTASTATS'}, ['TABLE', '*table*'], '*statistic*'

Valid for Extract and Replicat.

Use the STATS and DELTASTATS options of @GETENV to return the number of operations that were processed per table for any or all of the following:

- INSERT operations
- UPDATE operations
- DELETE operations
- TRUNCATE operations
- Total DML operations
- Total DDL operations
- Number of conflicts that occurred, if the Conflict Detection and Resolution (CDR) feature is used.
- Number of CDR resolutions that succeeded
- Number of CDR resolutions that failed

Any errors in the processing of this function, such as an unresolved table entry or incorrect syntax, returns a zero (0) for the requested statistics value.

Understanding How Recurring Table Specifications Affect Operation Counts

An Extract that is processing the same source table to multiple output trails returns statistics based on each localized output trail to which the table linked to @GETENV is written. For example, if Extract captures 100 inserts for table ABC and writes table ABC to three trails, the result for the @GETENV is 300

```
EXTRACT ABC
...
EXTTRAIL c:\ogg\dirdat\aa;
TABLE TEST.ABC;
EXTTRAIL c:\ogg\dirdat\bb;
TABLE TEST.ABC;
TABLE EMI, TOKENS (TOKEN-CNT = @GETENV ('STATS', 'TABLE', 'ABC', 'DML'));
EXTTRAIL c:\ogg\dirdat\cc;
TABLE TEST.ABC;
```

In the case of an Extract that writes a source table multiple times to a single output trail, or in the case of a Replicat that has multiple MAP statements for the same TARGET table, the statistics results are based on all matching TARGET entries. For example, if Replicat filters 20 rows for REGION 'WEST,' 10 rows for REGION 'EAST,' 5 rows for REGION 'NORTH,' and 2 rows for REGION 'SOUTH' (all for table ABC) the result of the @GETENV is 37.

```
REPLICAT ABC
...
```

```
MAP TEST.ABC, TARGET TEST.ABC, FILTER (@STREQ (REGION, 'WEST'));
MAP TEST.ABC, TARGET TEST.ABC, FILTER (@STREQ (REGION, 'EAST'));
MAP TEST.ABC, TARGET TEST.ABC, FILTER (@STREQ (REGION, 'NORTH'));
MAP TEST.ABC, TARGET TEST.ABC, FILTER (@STREQ (REGION, 'SOUTH'));
MAP TEST.EMI, TARGET TEST.EMI, &
    COLMAP (CNT = @GETENV ('STATS', 'TABLE', 'ABC', 'DML'));
```

Capturing Multiple Statistics

You can execute multiple instances of `@GETENV` to get counts for different operation types.

This example returns statistics only for `INSERT` and `UPDATE` operations:

```
REPLICAT TEST
..
..
MAP TEST.ABC, TARGET TEST.ABC, COLMAP (USEDEFAULTS, IU = @COMPUTE (@GETENV &
    ('STATS', 'TABLE', 'ABC', 'DML') - (@GETENV ('STATS', 'TABLE', &
    'ABC', 'DELETE'));
```

This example returns statistics for DDL and `TRUNCATE` operations:

```
REPLICAT TEST2
..
..
MAP TEST.ABC, TARGET TEST.ABC, COLMAP (USEDEFAULTS, DDL = @COMPUTE &
(@GETENV ('STATS', 'DDL') + (@GETENV ('STATS', 'TRUNCATE'));
```

Example Use Case

In the following use case, if all DML from the source is applied successfully to the target, Replicat suspends by means of `EVENTACTIONS` with `SUSPEND`, until resumed from GGSCI with `SEND REPLICAT` with `RESUME`.

`GETENV` used in Extract parameter file:

```
TABLE HR1.HR*;
TABLE HR1.STAT, TOKENS ('env_stats' = @GETENV ('STATS', 'TABLE', &
    'HR1.HR*', 'DML'));
```

`GETENV` used in Replicat parameter file:

```
MAP HR1.HR*, TARGET HR2.*;
MAP HR1.STAT, TARGET HR2.STAT, filter (
    @if (
    @token ('stats') =
    @getenv ('STATS', 'TABLE', 'TSSCAT.TCUSTORD', 'DML'), 1, 0 )
    ),
    eventactions (suspend);
```

Using Statistics in FILTER Clauses

Statistics returned by `STATS` and `DELTASTATS` are dynamic values and are incremented after mapping is performed. Therefore, when using CDR statistics in a `FILTER` clause in each of multiple `MAP` statements, you need to order the `MAP` statements in descending order of the statistics values. If the order is not correct, Oracle GoldenGate returns error OGG-01921. For detailed information about this requirement, see Document 1556241.1 in the Knowledge base of My Oracle Support at `http://support.oracle.com`.

Example 3-4 MAP statements containing statistics in FILTER clauses

In the following example, the `MAP` statements containing the filter for the `CDR_CONFLICTS` statistic are ordered in descending order of the statistic: `>3`, then `=3`, then `<3`.

```
MAP TEST.GG_HEARTBEAT_TABLE, TARGET TEST.GG_HEARTBEAT_TABLE COMPARECOLS (ON UPDATE
ALL),RESOLVECONFLICT(UPDATEROWEXISTS,(DEFAULT, OVERWRITE)),FILTER (@GETENV ("STATS",
"CDR_CONFLICTS") > 3),EVENTACTIONS (LOG INFO);MAP TEST.GG_HEARTBEAT_TABLE, TARGET
TEST.GG_HEARTBEAT_TABLE COMPARECOLS (ON UPDATE ALL),RESOLVECONFLICT(UPDATEROWEXISTS,
(DEFAULT, OVERWRITE)),FILTER (@GETENV ("STATS", "CDR_CONFLICTS") = 3),EVENTACTIONS
(LOG WARNING);MAP TEST.GG_HEARTBEAT_TABLE, TARGET TEST.GG_HEARTBEAT_TABLE
COMPARECOLS (ON UPDATE ALL),RESOLVECONFLICT(UPDATEROWEXISTS,(DEFAULT,
OVERWRITE)),FILTER (@GETENV ("STATS", "CDR_CONFLICTS") < 3),EVENTACTIONS (LOG
WARNING);
```

Syntax

`@GETENV ({'STATS' | 'DELTASTATS'}, ['TABLE', '`*`table`*`'], '`*`statistic`*`')`

`{'STATS' | 'DELTASTATS'}`
`STATS` returns counts since process startup, whereas `DELTASTATS` returns counts since the last execution of a `DELTASTATS`.
The execution logic is as follows:

- When Extract processes a transaction record that satisfies `@GETENV` with `STATS` or `DELTASTATS`, the table name is matched against resolved source tables in the `TABLE` statement.
- When Replicat processes a trail record that satisfies `@GETENV` with `STATS` or `DELTASTATS`, the table name is matched against resolved target tables in the `TARGET` clause of the `MAP` statement.

`'TABLE', '`*`table`*`'`
Executes the `STATS` or `DELTASTATS` only for the specified table or tables. Without this option, counts are returned for all tables that are specified in `TABLE` (Extract) or `MAP` (Replicat) parameters in the parameter file.
Valid *`table_name`* values are:

- '*`schema.table`*' specifies a table.
- *`'table'`* specifies a table of the default schema.
- '*`schema.`*`*`' specifies all tables of a schema.
- '`*`' specifies all tables of the default schema.

For example, the following counts DML operations only for tables in the `hr` schema:

```
MAP fin.*, TARGET fin.*;
MAP hr.*, TARGET hr.*;
MAP hq.rpt, TARGET hq.rpt, COLMAP (USEDEFAULTS, CNT = @GETENV ('STATS', 'TABLE',
'hr.*', 'DML'));
```

Likewise, the following counts DML operations only for the `emp` table in the `hr` schema:

```
MAP fin.*, TARGET fin.*;
MAP hr.*, TARGET hr.*;
MAP hq.rpt, TARGET hq.rpt, COLMAP (USEDEFAULTS, CNT = @GETENV ('STATS', 'TABLE',
'hr.emp', 'DML'));
```

By contrast, because there are no specific tables specified for `STATS` in the following example, the function counts all `INSERT`, `UPDATE`, and `DELETE` operations for all tables in all schemas that are represented in the `TARGET` clauses of `MAP` statements:

```
MAP fin.*, TARGET fin.*;
MAP hr.*, TARGET hr.*;
MAP hq.rpt, TARGET hq.rpt, COLMAP (USEDEFAULTS, CNT = &
@GETENV ('STATS', 'DML'));
```

'statistic'
The type of statistic to return. See Using Statistics in FILTER Clauses for important information when using statistics in `FILTER` clauses in multiple `TABLE` or `MAP` statements.

'INSERT'
Returns the number of `INSERT` operations that were processed.

'UPDATE'
Returns the number of `UPDATE` operations that were processed.

'DELETE'
Returns the number of `DELETE` operations that were processed.

'DML'
Returns the total of `INSERT`, `UPDATE`, and `DELETE` operations that were processed.

'TRUNCATE'
Returns the number of `TRUNCATE` operations that were processed. This variable returns a count only if Oracle GoldenGate DDL replication is not being used. If DDL replication is being used, this variable returns a zero.

'DDL'
Returns the number of DDL operations that were processed, including `TRUNCATEs` and DDL specified in `INCLUDE` and `EXCLUDE` clauses of the `DDL` parameter, all scopes (`MAPPED`, `UNMAPPED`, `OTHER`). This variable returns a count only if Oracle GoldenGate DDL replication is being used. This variable is not valid for `'DELTASTATS'`.

'CDR_CONFLICTS'
Returns the number of conflicts that Replicat detected when executing the Conflict Detection and Resolution (CDR) feature.
Example for a specific table:

```
@GETENV ('STATS','TABLE','HR.EMP','CDR_CONFLICTS')
```

Example for all tables processed by Replicat:

```
@GETENV ('STATS','CDR_CONFLICTS')
```

'CDR_RESOLUTIONS_SUCCEEDED'
Returns the number of conflicts that Replicat resolved when executing the Conflict Detection and Resolution (CDR) feature.
Example for a specific table:

```
@GETENV ('STATS','TABLE','HR.EMP', 'CDR_RESOLUTIONS_SUCCEEDED')
```

Example for all tables processed by Replicat:

```
@GETENV ('STATS','CDR_RESOLUTIONS_SUCCEEDED')
```

'CDR_RESOLUTIONS_FAILED'
Returns the number of conflicts that Replicat could not resolve when executing the Conflict Detection and Resolution (CDR) feature.
Example for a specific table:

```
@GETENV ('STATS','TABLE','HR.EMP', 'CDR_RESOLUTIONS_FAILED')
```

Example for all tables processed by Replicat:

```
@GETENV ('STATS','CDR_RESOLUTIONS_FAILED')
```

'GGENVIRONMENT' , '*environment_info*'

Valid for Extract and Replicat.

Use the `GGENVIRONMENT` option of `@GETENV` to return information about the Oracle GoldenGate environment.

Syntax

```
@GETENV ('GGENVIRONMENT', {'DOMAINNAME'|'GROUPDESCRIPTION'|'GROUPNAME'|

'GROUPTYPE'|'HOSTNAME'|'OSUSERNAME'|'PROCESSID'|'USERNAME'|'MACHINENAME'|'PROGRAMNAME
'|'CLIENTIDENTIFIER'})
```

'DOMAINNAME'
(Windows only) Returns the domain name associated with the user that started the process.

'GROUPDESCRIPTION'
Returns the description of the group, taken from the checkpoint file. Requires that a description was provided with the `DESCRIPTION` parameter when the group was created with the `ADD` command in GGSCI.

'GROUPNAME'
Returns the name of the process group.

'GROUPTYPE'
Returns the type of process, either `EXTRACT` or `REPLICAT`.

'HOSTNAME'
Returns the name of the system running the Extract or Replicat process.

'OSUSERNAME'
Returns the operating system user name that started the process.

'PROCESSID'
Returns the process ID that is assigned to the process by the operating system.

‘USERNAME’
Database login user name.

‘MACHINENAME’
Name of the host, machine, or server where database is running

‘PROGRAMNAME’
Name of the program or application that started the transaction or session.

'CLIENTIDENTIFIER'
Value set by using `DBMS_SESSION_.set_identifier()`.

'GGHEADER' , '*header_info*'

Valid for Extract and Replicat.

Use the `GGHEADER` option of `@GETENV` to return information from the header portion of an Oracle GoldenGate trail record. The header describes the transaction environment of the record. For more information on record headers and record types, see *Administering Oracle GoldenGate for Windows and UNIX*.

Syntax

```
@GETENV ('GGHEADER', {'BEFOREAFTERINDICATOR'|'COMMITTIMESTAMP'|'LOGPOSITION'|
   'LOGRBA'|'OBJECTNAME'|'TABLENAME'|'OPTYPE'|'RECORDLENGTH'|
   'TRANSACTIONINDICATOR'})
```

'BEFOREAFTERINDICATOR'
Returns the before or after indicator showing whether the record is a before image or an after image. Possible results are:

- `BEFORE` (before image)
- `AFTER` (after image)

'COMMITTIMESTAMP'
Returns the transaction timestamp (the time when the transaction committed) expressed in the format of `YYYY-MM-DD HH:MI:SS.FFFFFF`, for example:

```
2011-01-24 17:08:59.000000
```

'LOGPOSITION'
Returns the position of the Extract process in the data source. (See the `LOGRBA` option.)

'LOGRBA'
`LOGRBA` and `LOGPOSITION` store details of the position in the data source of the record. For transactional log-based products, `LOGRBA` is the sequence number and `LOGPOSITION` is the relative byte address. However, these values will vary depending on the capture method and database type.

'OBJECTNAME' | 'TABLENAME'
Returns the table name or object name (if a non-table object).

'OPTYPE'
Returns the type of operation. Possible results are:

```
INSERT
UPDATE
DELETE
ENSCRIBE COMPUPDATE
SQL COMPUPDATE
PK UPDATE
TRUNCATE
```

If the operation is not one of the above types, then the function returns the word `TYPE` with the number assigned to the type.

'RECORDLENGTH'
Returns the record length in bytes.

'TRANSACTIONINDICATOR'
Returns the transaction indicator. The value corresponds to the `TransInd` field of the record header, which can be viewed with the Logdump utility.
Possible results are:

- `BEGIN` (represents `TransInD` of 0, the first record of a transaction.)
- `MIDDLE` (represents `TransInD` of 1, a record in the middle of a transaction.)
- `END` (represents `TransInD` of 2, the last record of a transaction.)
- `WHOLE` (represents `TransInD` of 3, the only record in a transaction.)

'GGFILEHEADER' , **'*header_info*'**

Valid for Replicat.

Use the `GGFILEHEADER` option of `@GETENV` to return attributes of an Oracle GoldenGate extract file or trail file. These attributes are stored as tokens in the file header.

Note:

If a given database, operating system, or Oracle GoldenGate version does not provide information that relates to a given token, a `NULL` value will be returned.

Syntax

```
@GETENV ('GGFILEHEADER', {'COMPATIBILITY'|'CHARSET'|'CREATETIMESTAMP'|
   'FILENAME'|'FILETYPE'|'FILESEQNO'|'FILESIZE'|'FIRSTRECCSN'|
   'LASTRECCSN'|'FIRSTRECIOTIME'|'LASTRECIOTIME'|'URI'|'URIHISTORY'|
   'GROUPNAME'|'DATASOURCE'|'GGMAJORVERSION'|'GGMINORVERSION'|
   'GGVERSIONSTRING'|'GGMAINTENANCELEVEL'|'GGBUGFIXLEVEL'|'GGBUILDNUMBER'|
   'HOSTNAME'|'OSVERSION'|'OSRELEASE'|'OSTYPE'|'HARDWARETYPE'|
   'DBNAME'|'DBINSTANCE'|'DBTYPE'|'DBCHARSET'|'DBMAJORVERSION'|
   'DBMINORVERSION'|'DBVERSIONSTRING'|'DBCLIENTCHARSET'|'DBCLIENTVERSIONSTRING'|
   'LASTCOMPLETECSN'|'LASTCOMPLETEXIDS'|'LASTCSN'|'LASTXID'|
   'LASTCSNTS'})
```

'COMPATIBILITY'
Returns the Oracle GoldenGate compatibility level of the trail file. The compatibility level of the current Oracle GoldenGate version must be greater than, or equal to, the compatibility level of the trail file to be able to read the data records in that file. Current valid values are 0 or 1.

- 1 means that the trail file is of Oracle GoldenGate version 10.0 or later, which supports file headers that contain file versioning information.
- 0 means that the trail file is of an Oracle GoldenGate version that is older than 10.0. File headers are not supported in those releases. The 0 value is used for backward compatibility to those Oracle GoldenGate versions.

'CHARSET'
Returns the global character set of the trail file. For example:

`WCP1252-1`

`'CREATETIMESTAMP'`
Returns the time that the trail was created, in local GMT Julian time in INT64.

`'FILENAME'`
Returns the name of the trail file. Can be an absolute or relative path, with a forward or backward slash depending on the file system.

`'FILETYPE'`
Returns a numerical value indicating whether the trail file is a single file (such as one created for a batch run) or a sequentially numbered file that is part of a trail for online, continuous processing. The valid values are:

- 0 - EXTFILE
- 1 - EXTTRAIL
- 2 - UNIFIED and EXTFILE
- 3 - UNIFIED and EXTTRAIL

`'FILESEQNO'`
Returns the sequence number of the trail file, without any leading zeros. For example, if a file sequence number is `aa000026`, `FILESEQNO` returns `26`.

`'FILESIZE'`
Returns the size of the trail file. It returns `NULL` on an active file and returns a size value when the file is full and the trail rolls over.

`'FIRSTRECCSN'`
Returns the commit sequence number (CSN) of the first record in the trail file.Value is `NULL` until the trail file is completed. For more information about the CSN, see *Administering Oracle GoldenGate for Windows and UNIX*.

`'LASTRECCSN'`
Returns the commit sequence number (CSN) of the last record in the trail file.Value is `NULL` until the trail file is completed. For more information about the CSN, see *Administering Oracle GoldenGate for Windows and UNIX*.

`'FIRSTRECIOTIME'`
Returns the time that the first record was written to the trail file. Value is `NULL` until the trail file is completed.

`'LASTRECIOTIME'`
Returns the time that the last record was written to the trail file. Value is `NULL` until the trail file is completed.

`'URI'`
Returns the universal resource identifier of the process that created the trail file, in the following format:

```
host_name:dir:[:dir][:dir_n]group_name
```

Where:

- `host_name` is the name of the server that hosts the process

- `dir` is a subdirectory of the Oracle GoldenGate installation path.
- `group_name` is the name of the process group that is linked with the process.

The following example shows where the trail was processed and by which process. This includes a history of previous runs.

```
sys1:home:oracle:v9.5:extora
```

`'URIHISTORY'`
Returns a list of the URIs of processes that wrote to the trail file before the current process.

- For a primary Extract, this field is empty.
- For a data pump, this field is `URIHistory` + `URI` of the input trail file.

`'GROUPNAME'`
Returns the name of the group that is associated with the Extract process that created the trail. The group name is the one that was supplied when the `ADD EXTRACT` command was issued.

`'DATASOURCE'`
Returns the data source that was read by the process. The return value can be one of the following:

- `DS_EXTRACT_TRAILS: The source was an Oracle GoldenGate extract file, populated with change data.`
- `DS_DATABASE:` The source was a direct select from database table written to a trail, used for `SOURCEISTABLE`-driven initial load.
- `DS_TRAN_LOGS: The source was the database transaction log.`
- `DS_INITIAL_DATA_LOAD: The source was a direct select from database tables for an initial load.`
- `DS_VAM_EXTRACT:` The source was a vendor access module (VAM).
- `DS_VAM_TWO_PHASE_COMMIT:` The source was a VAM trail.

`'GGMAJORVERSION'`
Returns the major version of the Extract process that created the trail, expressed as an integer. For example, if a version is 1.2.3, it returns 1.

`'GGMINORVERSION'`
Returns the minor version of the Extract process that created the trail, expressed as an integer. For example, if a version is 1.2.3, it returns 2.

`'GGVERSIONSTRING'`
Returns the maintenance (or patch) level of the Extract process that created the trail, expressed as an integer. For example, if a version is 1.2.3, it returns 3.

`'GGMAINTENANCELEVEL'`
Returns the maintenance version of the process (`xx.xx.xx`).

`'GGBUGFIXLEVEL'`
Returns the patch version of the process (`xx.xx.xx.xx`).

`'GGBUILDNUMBER'`
Returns the build number of the process.

`'HOSTNAME'`
Returns the DNS name of the machine where the Extract that wrote the trail is running. For example:

- `sysa`
- `sysb`
- `paris`
- `hq25`

`'OSVERSION'`
Returns the major version of the operating system of the machine where the Extract that wrote the trail is running. For example:

- `Version s10_69`
- `#1 SMP Fri Feb 24 16:56:28 EST 2006`
- `5.00.2195 Service Pack 4`

`'OSRELEASE'`
Returns the release version of the operating system of the machine where the Extract that wrote the trail is running. For example, release versions of the examples given for `OSVERSION` could be:

- `5.10`
- `2.6.9-34.ELsmp`

`'OSTYPE'`
Returns the type of operating system of the machine where the Extract that wrote the trail is running. For example:

- `SunOS`
- `Linux`
- `Microsoft Windows`

`'HARDWARETYPE'`
Returns the type of hardware of the machine where the Extract that wrote the trail is running. For example:

- `sun4u`
- `x86_64`
- `x86`

`'DBNAME'`
Returns the name of the database, for example `findb`.

`'DBINSTANCE'`
Returns the name of the database instance, if applicable to the database type, for example `ORA1022A`.

`'DBTYPE'`
Returns the type of database that produced the data in the trail file. Can be one of:

```
DB2 UDB
DB2 ZOS
CTREE
MSSQL
MYSQL
ORACLE
SQLMX
SYBASE
TERADATA
NONSTOP
ENSCRIBE
ODBC
```

'DBCHARSET'
Returns the character set that is used by the database that produced the data in the trail file. (For some databases, this will be empty.)

'DBMAJORVERSION'
Returns the major version of the database that produced the data in the trail file.

'DBMINORVERSION'
Returns the minor version of the database that produced the data in the trail file.

'DBVERSIONSTRING'
Returns the maintenance (patch) level of the database that produced the data in the trail file.

'DBCLIENTCHARSET'
Returns the character set that is used by the database client.

'DBCLIENTVERSIONSTRING'
Returns the maintenance (patch) level of the database client. (For some databases, this will be empty.)

'LASTCOMPLETECSN'
Returns recovery information for internal Oracle GoldenGate use.

'LASTCOMPLETEXIDS'
Returns recovery information for internal Oracle GoldenGate use.

'LASTCSN'
Returns recovery information for internal Oracle GoldenGate use.

'LASTXID'
Returns recovery information for internal Oracle GoldenGate use.

'LASTCSNTS'
Returns recovery information for internal Oracle GoldenGate use.

'RECORD' , ***'location_info'***

Valid for a data-pump Extract or Replicat.

Use the RECORD option of @GETENV to return the location or Oracle rowid of a record in an Oracle GoldenGate trail file.

Syntax

```
@GETENV ('RECORD', {'FILESEQNO'|'FILERBA'|'ROWID'|'RSN'|'TIMESTAMP'})
```

'FILESEQNO'
Returns the sequence number of the trail file without any leading zeros.

'FILERBA'
Returns the relative byte address of the record within the `FILESEQNO` file.

'ROWID'
(Valid for Oracle) Returns the rowid of the record.

'RSN'
Returns the record sequence number within the transaction.

'TIMESTAMP'
Returns the timestamp of the record.

'RECORD_TIMESTAMP_PRECISE' , '*location_info*'

Valid for a data-pump Extract or Replicat.

Use the `RECORD_TIMESTAMP_PRECISE` option of `@GETENV` to return the location or Oracle rowid of a record in an Oracle GoldenGate trail file, with fraction precision.

This option returns the timestamp from YEAR to MICROSECONDS. However, depending on the database, the value can be in MILLISECONDS with zero MICROSECONDS.

Syntax

```
@GETENV ('RECORD_TIMESTAMP_PRECISE',
{'FILESEQNO'|'FILERBA'|'ROWID'|'RSN'|'TIMESTAMP'})
```

'FILESEQNO'
Returns the sequence number of the trail file without any leading zeros.

'FILERBA'
Returns the relative byte address of the record within the `FILESEQNO` file.

'ROWID'
(Valid for Oracle) Returns the rowid of the record.

'RSN'
Returns the record sequence number within the transaction.

'TIMESTAMP'
Returns the timestamp of the record in microseconds or milliseconds, depending on the database type.

'DBENVIRONMENT' , '*database_info*'

Valid for Extract and Replicat.

Use the `DBENVIRONMENT` option of `@GETENV` to return global environment information for a database.

Syntax

```
@GETENV ('DBENVIRONMENT', {'DBNAME'|'DBVERSION'|'DBUSER'|'SERVERNAME'})
```

'DBNAME'
Returns the database name.

'DBVERSION'
Returns the database version.

'DBUSER'
Returns the database login user. Note that SQL Server does not log the user ID.

'SERVERNAME'
Returns the name of the server.

'TRANSACTION' , '***transaction_info***

Valid for Extract.

Use the `TRANSACTION` option of `@GETENV` to return information about a source transaction. This option is valid for the Extract process.

Syntax

```
@GETENV ('TRANSACTION', {'TRANSACTIONID'|'XID'|'CSN'|'TIMESTAMP'|'NAME'|
   'USERID'|'USERNAME'|'PLANNAME' | 'LOGBSN' | 'REDOTHREAD')
```

'TRANSACTIONID' | 'XID'
Returns the transaction ID number. Either `TRANSACTIONID` or `XID` can be used. The transaction ID and the CSN are associated with the first record of every transaction and are stored as tokens in the trail record. For each transaction ID, there is an associated CSN. Transaction ID tokens have no zero-padding on any platform, because they never get evaluated as relative values. They only get evaluated for whether they match or do not match. Note that in the trail, the transaction ID token is shown as `TRANID`.

'CSN'
Returns the commit sequence number (CSN). The CSN is not zero-padded when returned for these databases: Oracle, DB2 LUW, and DB2 z/OS. For all other supported databases, the CSN is zero-padded. In the case of the Sybase CSN, each substring that is delimited by a dot (.) will be padded to a length that does not change for that substring.
Note that in the trail, the CSN token is shown as `LOGCSN`. See the `TRANSACTIONID | XID` environment value for additional information about the CSN token.
For more information about the CSN, see *Administering Oracle GoldenGate for Windows and UNIX*.

'TIMESTAMP'
Returns the commit timestamp of the transaction.

'NAME'
Returns the transaction name, if available.

'USERID'
(Oracle) Returns the Oracle user ID of the database user that committed the last transaction.

'USERNAME'
(Oracle) Returns the Oracle user name of the database user that committed the last transaction.

'PLANNAME'
(DB2 on z/OS) Returns the plan name under which the current transaction was originally executed. The plan name is included in the begin unit of recovery log record.

'LOGBSN'
Returns the begin sequence number (BSN) in the transaction log. The BSN is the native sequence number that identifies the beginning of the oldest uncommitted transaction that is held in Extract memory. For example, given an Oracle database, the BSN would be expressed as a system change number (SCN). The BSN corresponds to the current I/O checkpoint value of Extract. This value can be obtained from the trail by Replicat when `@GETENV ('TRANSACTION', 'LOGBSN')` is used. This value also can be obtained by using the `INFO REPLICAT` command with the `DETAIL` option. The purpose of obtaining the BSN from Replicat is to get a recovery point for Extract in the event that a system failure or file system corruption makes the Extract checkpoint file unusable. See *Administering Oracle GoldenGate for Windows and UNIX* for more information about recovering the Extract position.

'REDOTHREAD'
Returns the thread number of a RAC node extract; on non-RAC node extracts the value is always 1. For data pump and Replicat, the thread id used by Extract capture of a RAC node is returned; on non-RAC, `@GETENV()` returns an error. Logdump shows the token, `ORATHREADID`, in the token section if the transaction is captured by Extract on a RAC node.

`'TRANSACTION_TIMESTAMP_PRECISE' , 'transaction_info`

Valid for Extract.

Use the `TRANSACTION_TIMESTAMP_PRECISE` option of `@GETENV` to return information about a source transaction, but with fraction precision. It returns the timestamp from YEAR to MICROSECONDS. This option is valid for the Extract process.

Syntax

```
@GETENV ('TRANSACTION_TIMESTAMP_PRECISE',
{'TRANSACTIONID'|'XID'|'CSN'|'TIMESTAMP'|'NAME'|
   'USERID'|'USERNAME'|'PLANNAME' | 'LOGBSN' | 'REDOTHREAD')
```

'TRANSACTIONID' | 'XID'
Returns the transaction ID number. Either `TRANSACTIONID` or `XID` can be used. The transaction ID and the CSN are associated with the first record of every transaction and are stored as tokens in the trail record. For each transaction ID, there is an associated CSN. Transaction ID tokens have no zero-padding on any platform, because they never get evaluated as relative values. They only get evaluated for whether they match or do not match. Note that in the trail, the transaction ID token is shown as `TRANID`.

'CSN'
Returns the commit sequence number (CSN). The CSN is not zero-padded when returned for these databases: Oracle, DB2 LUW, and DB2 z/OS. For all other supported databases, the CSN is zero-padded. In the case of the Sybase CSN, each substring that is delimited by a dot (.) will be padded to a length that does not change for that substring.
Note that in the trail, the CSN token is shown as `LOGCSN`. See the `TRANSACTIONID | XID` environment value for additional information about the CSN token.

For more information about the CSN, see *Administering Oracle GoldenGate for Windows and UNIX*.

`'TIMESTAMP'`
Returns the commit timestamp of the transaction.

`'NAME'`
Returns the transaction name, if available.

`'USERID'`
(Oracle) Returns the Oracle user ID of the database user that committed the last transaction.

`'USERNAME'`
(Oracle) Returns the Oracle user name of the database user that committed the last transaction.

`'PLANNAME'`
(DB2 on z/OS) Returns the plan name under which the current transaction was originally executed. The plan name is included in the begin unit of recovery log record.

`'LOGBSN'`
Returns the begin sequence number (BSN) in the transaction log. The BSN is the native sequence number that identifies the beginning of the oldest uncommitted transaction that is held in Extract memory. For example, given an Oracle database, the BSN would be expressed as a system change number (SCN). The BSN corresponds to the current I/O checkpoint value of Extract. This value can be obtained from the trail by Replicat when `@GETENV ('TRANSACTION', 'LOGBSN')` is used. This value also can be obtained by using the `INFO REPLICAT` command with the `DETAIL` option. The purpose of obtaining the BSN from Replicat is to get a recovery point for Extract in the event that a system failure or file system corruption makes the Extract checkpoint file unusable. See *Administering Oracle GoldenGate for Windows and UNIX* for more information about recovering the Extract position.

`'REDOTHREAD'`
Returns the thread number of a RAC node extract; on non-RAC node extracts the value is always 1. For data pump and Replicat, the thread id used by Extract capture of a RAC node is returned; on non-RAC, `@GETENV()` returns an error. Logdump shows the token, `ORATHREADID`, in the token section if the transaction is captured by Extract on a RAC node.

`'OSVARIABLE' , '`*`variable`*`'`

Valid for Extract and Replicat.

Use the `OSVARIABLE` option of `@GETENV` to return the string value of a specified operating-system environment variable.

Syntax

```
@GETENV ('OSVARIABLE', 'variable')
```

`'variable'`
The name of the variable. The search is an exact match of the supplied variable name. For example, the UNIX `grep` command would return all of the following variables, but `@GETENV ('OSVARIABLE', 'HOME')` would only return the value for `HOME`:

```
ANT_HOME=/usr/local/ant
JAVA_HOME=/usr/java/j2sdk1.4.2_10
HOME=/home/judyd
ORACLE_HOME=/rdbms/oracle/ora1022i/64
```

The search is case-sensitive if the operating system supports case-sensitivity.

`'TLFKEY' , SYSKEY, '`*`unique_key`*`'`

Valid for Extract and Replicat.

Use the `TLFKEY` option of `@GETENV` to associate a unique key with TLF/PTLF records in ACI's Base24 application. The 64-bit key is composed of the following concatenated items:

- The number of seconds since 2000.
- The block number of the record in the TLF/PTLF block multiplied by ten.
- The node specified by the user (must be between 0 and 255).

Syntax

```
@GETENV ('TLFKEY', SYSKEY, unique_key)
```

`SYSKEY,` ***`unique_key`***
The NonStop node number of the source TLF/PTLF file. Do not enclose this syntax element in quotes.
Example:

```
GETENV ('TLFKEY', SYSKEY, 27)
```

`'USERNAME' ,`

Specifies the database login user name.

Syntax

```
@GETENV ('TLFKEY', SYSKEY, unique_key)
```

`SYSKEY,` ***`unique_key`***
The NonStop node number of the source TLF/PTLF file. Do not enclose this syntax element in quotes.
Example:

```
GETENV ('TLFKEY', SYSKEY, 27)
```

3.82 GETINSERTS | IGNOREINSERTS

Valid For

Extract and Replicat

Description

Use the `GETINSERTS` and `IGNOREINSERTS` parameters to control whether or not `INSERT` operations are processed by Oracle GoldenGate. These parameters are table-specific. One parameter remains in effect for all subsequent `TABLE` or `MAP` statements, until the other parameter is encountered.

Because you can selectively enable or disable these parameters between `MAP` statements, you can enable or disable them for different threads of a coordinated Replicat. Specify the `GETINSERTS` threads in one set of `MAP` statements, and specify the `IGNOREINSERTS` threads in a different set of `MAP` statements.

Default

`GETINSERTS`

Syntax

```
GETINSERTS | IGNOREINSERTS
```

Example

This example shows how you can apply `GETINSERTS` and `IGNOREINSERTS` selectively to different `MAP` statements, each of which represents a different thread of a coordinated Replicat.

```
GETINSERTS
MAP sales.cust, TARGET sales.cust, THREAD (1);
MAP sales.ord, TARGET sales.ord, THREAD (2);
IGNOREINSERTS
MAP sales.loc, TARGET sales.loc, THREAD (3);
```

3.83 GETREPLICATES | IGNOREREPLICATES

Valid For

Extract

Description

Use the `GETREPLICATES` and `IGNOREREPLICATES` parameters to control whether or not DML transactions issued by Replicat are captured or ignored by an Extract process that is processing the same tables on the same system.

These parameters are not valid for Informix.

Ignoring Replicat Transactions

By default, Extract uses a combination of `IGNOREREPLICATES` and `GETAPPLOPS` . In this configuration, Extract captures all application data that is configured for synchronization by Oracle GoldenGate, and it ignores all Replicat operations. In a bi-directional configuration, this prevents the data that Replicat applies from looping back to the original system, which would cause duplicate-record errors.

Capturing Replicat Transactions

Use `GETREPLICATES` with `IGNOREAPPLOPS` in a cascading configuration to enable replicated data to be captured again by Extract on an intermediary system so that it can be replicated to the final target. For example, if database A replicates to database B, and database B replicates to database C, you would use `GETREPLICATES` for the Extract on database B.

> **Note:**
>
> Even with `GETREPLICATES` in effect, however, you still can exclude specific replicated data from being captured by using a `WHERE` or `FILTER` clause in a `TABLE` or `MAP` statement.

Using GETREPLICATES and IGNOREREPLICATES with Oracle

The `GETREPLICATES` and `IGNOREREPLICATES` parameters should not be used if you are not using a trace table (the `TRACETABLE` parameter). By default, Extract captures *all* transactions including transactions committed by Replicat. If you want to ignore the Replicat transactions, you should use the `TRANLOGOPTIONS EXCLUDEUSER` parameter. You can also use this to ignore transactions by any specific user in addition to Replicat's user.

If you are using the `TRACETABLE` parameter or have the default trace table, `GGS_TRACE`, created without explicitly using `TRACETABLE`, then Extract automatically ignores any transaction that has a `TRACETABLE` update in it by default. If you want to capture the Replicat committed transactions, you have to specify `GETREPLICATES`. In this case, Oracle does not recommend that you use it with `TRANLOGOPTIONS EXCLUDUSER` because Replicat will have unpredictable behavior in transaction filtering.

Default

```
IGNOREREPLICATES
```

Syntax

```
GETREPLICATES | IGNOREREPLICATES
```

3.84 GETTRUNCATES | IGNORETRUNCATES

Valid For

Extract and Replicat

Description

Use the `GETTRUNCATES` and `IGNORETRUNCATES` parameters to control whether or not Oracle GoldenGate processes table truncate operations. By default, truncate operations are not captured from the source or replicated to the target.

`GETTRUNCATES` and `IGNORETRUNCATES` are table-specific. One parameter remains in effect for all subsequent `TABLE` or `MAP` statements, until the other parameter is encountered.

In a coordinated Replicat configuration, truncates are always processed by the thread that is responsible for barrier transactions.

Supported Databases

- `GETTRUNCATES` and `IGNORETRUNCATES` are not supported for Teradata.
- `GETTRUNCATES` and `IGNORETRUNCATES` are supported by Extract for Oracle Database, MySQL, DB2 LUW, and DB2 for i.

- `GETTRUNCATES` and `IGNORETRUNCATES` are supported by Extract and Replicat for DB2 for i.
- `GETTRUNCATES` and `IGNORETRUNCATES` are supported by Replicat for Oracle Database, SQL Server, DB2 LUW, DB2 z/OS, MySQL, and other ODBC targets that support the `TRUNCATE` command.
- `GETTRUNCATES` and `IGNORETRUNCATES` are supported by Extract for Sybase. However, if the same table name is present in the include list for two schemas then it is abended and an error occurs, stating " Found the same table name in multiple schemas and the table name could not be resolved to process truncate operation."
- Sybase AES 16 is supported from Oracle GoldenGate 12.2.0.2.0

Note:

It is not possible to ignore `TRUNCATE`s during capture from a DB2 z/OS database. By default, `TRUNCATE`s are always captured from a DB2 z/OS source, but they can be ignored by Replicat if `IGNORETRUNCATES` is used in the Replicat parameter file.

DB2 LUW Limitations

- DB2 LUW does not support a `TRUNCATE` command, so Replicat replicates a truncate operation by performing an `IMPORT REPLACE` from a `NULL` (blank) file.

Oracle Limitations

- Oracle GoldenGate supports the Oracle `TRUNCATE TABLE` command, but not `TRUNCATE PARTITION`. You can replicate `TRUNCATE PARTITION` as part of the full Oracle GoldenGate DDL replication support.
- The database does not log truncates against an empty table, so those operations are not captured by Oracle GoldenGate. The DDL support of Oracle GoldenGate can be used for this purpose.
- The database does not log truncates for empty partitions, so Oracle GoldenGate cannot reliably process `TRUNCATE TABLE` when the table contains any empty partitions. Do not use `GETTRUNCATES` on any partitioned table. Oracle GoldenGate DDL support can be used to capture truncates on tables that might include empty partitions.
-

Default

```
IGNORETRUNCATES
```

Syntax

```
GETTRUNCATES | IGNORETRUNCATES
```

3.85 GETUPDATEAFTERS | IGNOREUPDATEAFTERS

Valid For

Extract and Replicat

Description

Use the `GETUPDATEAFTERS` and `IGNOREUPDATEAFTERS` parameters to control whether or not the after images of columns in `UPDATE` operations are included in the records processed by Oracle GoldenGate. After images contain the results of the `UPDATE`.

These parameters are table-specific. One parameter remains in effect for all subsequent `TABLE` or `MAP` statements, until the other parameter is encountered.

Because you can selectively enable or disable these parameters between `MAP` statements, you can enable or disable them for different threads of a coordinated Replicat. Specify the `GETUPDATEAFTERS` threads in one set of `MAP` statements, and specify the `IGNOREUPDATEAFTERS` threads in a different set of `MAP` statements.

Default

```
GETUPDATEAFTERS
```

Syntax

```
GETUPDATEAFTERS | IGNOREUPDATEAFTERS
```

Example

This example shows how you can apply `GETUPDATEAFTERS` and `IGNOREUPDATEAFTERS` selectively to different `MAP` statements, each of which represents a different thread of a coordinated Replicat.

```
GETUPDATEAFTERS
MAP sales.cust, TARGET sales.cust, THREAD (1);
MAP sales.ord, TARGET sales.ord, THREAD (2);
IGNOREUPDATEAFTERS
MAP sales.loc, TARGET sales.loc, THREAD (3);
```

3.86 GETUPDATEBEFORES | IGNOREUPDATEBEFORES

Valid For

Extract and Replicat

Description

Use the `GETUPDATEBEFORES` and `IGNOREUPDATEBEFORES` parameters to control whether or not the before images of columns in `UPDATE` operations are included in the records that are processed by Oracle GoldenGate. Before images contain column details that existed before a row was updated.

Oracle GoldenGate 12c captures both the pre-change and post-change values for update operations in a single unified update record by default. In previous releases the default was to only capture the post-change value. Beginning in this release, custom

SQL statements (SQLEXEC) now only execute once per update operation with the new default update format. Prior to this release, custom SQL statements would execute twice, once when encountering the pre-change value and once when encountering the post-change value. If you are using the Oracle GoldenGate 12c (12.1.*x* or 12.2.*x*) with the new unified update format, you can explicitly pass the pre or post-value to the custom SQL statement using the @BEFORE, @AFTER, and @BEFOREAFTER functions. Though Oracle GoldenGate 12.2.x attempts to use this new update format by default, the old format cam be preserved if there are conflicting parameters that would have previously generated two separate pre and post change records. In these cases, an informational message is logged in the report file.

Use the GETUPDATEBEFORES parameter as follows:

- in the Extract parameter file to extract before images from the data source.
- in the Replicat parameter file to include before images in a Replicat operation.

You can compare before images with after images to identify the net results of a transaction or perform other delta calculations. For example, if a BALANCE field is $100 before an update and $120 afterward, a comparison would show the difference of $20. You can use the column-conversion functions of Oracle GoldenGate to perform the comparisons and calculations.

To reference before images in the parameter file, use the @BEFORE conversion function. For example:

```
COLMAP (previous = @BEFORE (balance))
```

GETUPDATEBEFORES is required when using the Conflict Detection and Resolution (CDR) feature for a Oracle database on any of the platforms that are supported by Oracle GoldenGate. See *Administering Oracle GoldenGate for Windows and UNIX* for more information about CDR.

The GETUPDATEBEFORES and IGNOREUPDATEBEFORES parameters are table-specific. One parameter remains in effect for all subsequent TABLE or MAP statements, until the other parameter is encountered.

Because you can selectively enable or disable these parameters between MAP statements, you can enable or disable them for different threads of a coordinated Replicat. Specify the GETUPDATEBEFORES threads in one set of MAP statements, and specify the IGNOREUPDATEBEFORES threads in a different set of MAP statements.

Default

IGNOREUPDATEBEFORES

Syntax

```
GETUPDATEBEFORES | IGNOREUPDATEBEFORES
```

Example

This example shows how you can apply GETUPDATEBEFORES and IGNOREUPDATEBEFORES selectively to different MAP statements, each of which represents a different thread of a coordinated Replicat.

```
GETUPDATEBEFORES
MAP sales.cust, TARGET sales.cust, THREAD (1);
MAP sales.ord, TARGET sales.ord, THREAD (2);
```

```
IGNOREUPDATEBEFORES
MAP sales.loc, TARGET sales.loc, THREAD (3);
```

3.87 GETUPDATES | IGNOREUPDATES

Valid For

Extract and Replicat

Description

Use the `GETUPDATES` and `IGNOREUPDATES` parameters to control whether or not Oracle GoldenGate processes `UPDATE` operations. These parameters are table-specific. One parameter remains in effect for all subsequent `TABLE` or `MAP` statements, until the other parameter is encountered.

Because you can selectively enable or disable these parameters between `MAP` statements, you can enable or disable them for different threads of a coordinated Replicat. Specify the `GETUPDATES` threads in one set of `MAP` statements, and specify the `IGNOREUPDATES` threads in a different set of `MAP` statements.

Default

```
GETUPDATES
```

Syntax

```
GETUPDATES | IGNOREUPDATES
```

Example

This example shows how you can apply `GETUPDATES` and `IGNOREUPDATES` selectively to different `MAP` statements, each of which represents a different thread of a coordinated Replicat.

```
GETUPDATES
MAP sales.cust, TARGET sales.cust, THREAD (1);
MAP sales.ord, TARGET sales.ord, THREAD (2);
IGNOREUPDATES
MAP sales.loc, TARGET sales.loc, THREAD (3);
```

3.88 GGSCHEMA

Valid For

GLOBALS

Description

Use the `GGSCHEMA` parameter to specify the name of the schema that contains the database objects that are owned by Oracle GoldenGate, such as those that support DDL replication for trigger based replication and those that are part of the heartbeat table implementation.The schema name specified with `GGSCHEMA` will be considered an excluded schema. Tables in this schema can only be captured if explicitly specified with a non-wildcarded inclusion specification.

See Installing and Configuring Oracle GoldenGate for Oracle Database for more information about the Oracle GoldenGate database objects.

Default

None

Syntax

```
GGSCHEMA [container.]schema_name
```

`[container.]schema_name`
The fully qualified name of the DDL schema. Use the full three-part name if the schema is within an Oracle container database.

3.89 GROUPTRANSOPS

Valid For

Replicat

Description

Use the `GROUPTRANSOPS` parameter to control the number of SQL operations that are contained in a Replicat transaction when operating in its normal mode (non-`BATCHSQL`). Increasing the number of operations in a Replicat transaction improves the performance of Oracle GoldenGate by:

- Reducing the number of transactions executed by Replicat.
- Reducing I/O activity to the checkpoint file and the checkpoint table, if used. Replicat issues a checkpoint whenever it applies a transaction to the target, in addition to its scheduled checkpoints.

Replicat accumulates operations from source transactions, in transaction order, and applies them as a group within one transaction on the target. `GROUPTRANSOPS` sets a minimum value rather than an absolute value, to avoid splitting apart source transactions. Replicat waits until it receives all operations from the last source transaction in the group before applying the target transaction.

For example, if transaction 1 contains 200 operations, and transaction 2 contains 400 operations, and transaction 3 contains 500 operations, the Replicat transaction contains all 1,100 operations even though `GROUPTRANSOPS` is set to the default of 1,000. Conversely, Replicat might apply a transaction before reaching the value set by `GROUPTRANSOPS` if there is no more data in the trail to process.

Table 3-33 Replicat GROUPTRANSOPS

Source Transactions (assumes same table and column list)	Replicat transaction in normal (GROUPTRANSOPS) mode
Transaction 1:	**Transaction:**
`INSERT`	`INSERT`
`DELETE`	`DELETE`
Transaction 2:	`INSERT`
`INSERT`	`DELETE`
`DELETE`	`INSERT`
Transaction 3:	`DELETE`
`INSERT`	
`DELETE`	

Avoid setting `GROUPTRANSOPS` to an arbitrarily high number because the difference between source and target transaction boundaries can increase the latency of the target data.

(Oracle only) For an integrated Replicat, `GROUPTRANSOPS` is effective only when the integrated Replicat parameter `PARALLELISM` is set to 1.

Default

Nonintegrated Replicat: 1000 operations, Integrated Replicat: 50 operations

Syntax

```
GROUPTRANSOPS number
```

`number`
The minimum number of operations to be applied in a Replicat transaction. A value of 1 executes the operations within the same transaction boundaries as the source transaction. The value must be at least 1.

Example

```
GROUPTRANSOPS 2000
```

3.90 HANDLECOLLISIONS | NOHANDLECOLLISIONS

Valid For

Replicat

Description

Use the `HANDLECOLLISIONS` and `NOHANDLECOLLISIONS` parameters to control whether or not Replicat tries to resolve duplicate-record and missing-record errors when applying SQL on the target. These errors, called *collisions*, occur during an initial load, when data from source tables is being loaded to target tables while Oracle GoldenGate is replicating transactional changes that are being made to those tables. When Oracle GoldenGate applies the replicated changes after the load is finished, `HANDLECOLLISIONS` provides Replicat with error-handling logic for these collisions.

You can use `HANDLECOLLISIONS` and `NOHANDLECOLLISIONS` in the following ways:

- You can enable `HANDLECOLLISIONS` and `NOHANDLECOLLISIONS` in a global manner by specifying them at the root level of the parameter file. One parameter remains enabled for all subsequent `MAP` statements in the parameter file, until the opposing parameter is encountered.
- You can enable `HANDLECOLLISIONS` or `NOHANDLECOLLISIONS` within a specific `MAP` parameter to enable or disable error handling only for that source-target mapping.

The preceding methods can be combined. You can specify a global collisions-handling rule and then override that rule with different collisions-handling rules in the `MAP` statements. A `MAP` specification always overrides the global specification.

How `HANDLECOLLISIONS` Works

The following example explains how `HANDLECOLLISIONS` works:

- When Replicat encounters an update to a column that Oracle GoldenGate is using as a key, the handling is as follows:
  - If the row with the old key is not found in the target, the change record in the trail is converted to an insert.
  - If a row with the new key exists in the target, Replicat deletes the row that has the old key (it would not exist if the update had executed successfully), and then the row with the new key is updated as an overlay where the trail values replace the current values.

  This logic requires all of the columns in the table (not just the ones that changed) to be logged to the transaction log, either by default or by force, such as by using the `COLS` option of `ADD TRANDATA` for an Oracle database. See Possible Solutions to Avoid Missing Column Values.
- When Replicat encounters a duplicate-record error, the static record that was applied by the initial load is overwritten by the change record in the trail. Overlaying the change is safer from an operational standpoint than ignoring the duplicate-record error.
- Replicat with `HANDLECOLLISIONS` doesn't discard the change record in the trail even if update or delete operation doesn’t affect a key column in the source and Replicat encounters a missing-record error in the target. These errors happen when a record is changed on the source system and then the record is deleted before the table data is extracted by the initial-load process. For example:
  1. The application updates record A in source table1.
  2. Extract extracts the update.
  3. The application deletes record A in source table1.
  4. Extract extracts the delete.
  5. Oracle GoldenGate extracts initial-load data from source table1, without record A.
  6. Oracle GoldenGate applies the initial load, without record A.
  7. Replicat attempts to apply the update of record A.
  8. The database returns a "record missing" error.
  9. Replicat attempts to apply the delete of record A.

10. The database returns a "record missing" error.

Disable HANDLECOLLLIONS after the transactional changes captured during the initial load are applied to the target tables, so that Replicat does not automatically handle subsequent errors. Errors generated after initial synchronization indicate an abnormal condition and should be evaluated by someone who can determine how to resolve them. For example, a missing-record error could indicate that a record which exists on the source system was inadvertently deleted from the target system.

You can turn off HANDLECOLLISIONS in the following ways:

- Stop Replicat and remove HANDLECOLLISIONS from the Replicat parameter file (can cause target latency). Alternatively, you can edit the parameter file to add NOHANDLECOLLISIONS before the MAP statements for which you want to disable the error handling.
- While Replicat is running, run GGSCI and then use the SEND REPLICAT command with the NOHANDLECOLLISIONS option for the tables that you want to affect.

> **Note:**
>
> If using SEND REPLICAT, make certain to remove HANDLECOLLISIONS from the parameter file or add a NOHANDLECOLLISIONS parameter before starting another Replicat run, so that HANDLECOLLISIONS does not activate again.

Possible Solutions to Avoid Missing Column Values

When a database does not log all of the column values of a source table by default, there can be errors if the target table has NOT NULL constraints when Replicat attempts to convert a primary-key update to an insert. You can work around this scenario in the following ways:

- Use the NOCOMPRESSUPDATES parameter in the Extract parameter file to send all of the columns of the table to the trail, and configure the database to log all column values. By default, Extract only writes the primary key and the columns that changed to the trail. This is the safest method, because it writes the current values at the time when the operation is performed and eliminates the need for fetching.
- Use the FETCHOPTIONS parameter with the FETCHPKUPDATECOLS option in the Extract parameter file. This configuration causes Extract to fetch unavailable columns when a key column is updated on the source. A fetch is the *current* value, not necessarily the value at the time of a particular update, so there can be data integrity issues. See "FETCHOPTIONS" for more information and additional fetch options to handle unsuccessful fetches.
- To avoid fetches, use HANDLECOLLISIONS with _ALLOWPKMISSINGROWCOLLISIONS to skip the update instead of converting it to an INSERT. This configuration can also cause data integrity issues under certain conditions. See "Preventing Conversion of Key Updates to Inserts" for more information.

Preventing Conversion of Key Updates to Inserts

In some cases, it is not appropriate to convert an operation that updates a key column to an INSERT if the target row does not exist. In these cases, you can use the _ALLOWPKMISSINGROWCOLLISIONS option to force Replicat to *skip* the operation, instead of applying it as an insert.

The following example illustrates such a case. This scenario performs an instantiation of Oracle GoldenGate replication, using the default `HANDLECOLLISIONS` logic, to show what happens if column values are missing when Replicat tries to convert the update to an insert.

Source and Target tables:

Both tables are named *sample*.

```
f1  f2                   f3  f4
1   10-01-2011 11:30:45  1   1
2   10-02-2011 14:15:20  2   2
3   10-03-2011 15:12:55  3   3
```

- All columns are `NOT NULL`.
- `f1` is the primary key.
- `f2` is a date field that automatically updates whenever the record is changed.
- `KEYCOLS` is used in the parameter files to instruct Oracle GoldenGate to use `f1` and `f2` as the key.
- `ADD TRANDATA` was issued accordingly, to log column `f2`. Column `f1` is automatically logged because it is a primary key.

DML sequence of events:

1. Start Extract to capture ongoing transactions.
2. `UPDATE` the table as follows:

   ```
   update sample set f3=3 where f1=2;
   ```

   In this operation, column `f2` updates automatically with the current date and time. Oracle GoldenGate considers this to be a key update.

   The row now looks like this:

   ```
   2   10-20-2011 08:01:32  3   3
   ```

3. `DELETE` the same row.

   ```
   delete sample where f1=2;
   ```

   Now the table contains the following rows:

   ```
   f1  f2                   f3  f4
   1   10-01-2011 11:30:45  1   1
   3   10-03-2011 15:12:55  3   3
   ```

4. Perform an export/import of the source data to the target, using `HANDLECOLLISIONS` to handle missing or duplicate rows.
5. The replicated update (`update sample, set f3=3 where f1=2`) is the first operation to be applied from the trail by Replicat. It fails because the row was deleted from the source before the import/export was performed.
6. Replicat converts the `UPDATE` to an `INSERT` according to `HANDLECOLLISIONS` logic for operations that update a key column (the `f2` date-time column).
7. In a case where all of the column values are available in the trail, the new `INSERT` succeeds. Moreover, it does not cause inconsistency, even though the row was deleted on the source, because the replicated delete (`delete sample where f1=2`) removes it again. However, in this example, there are two problems:

- Only columns `f1` and `f2`, plus the changed value of `f3`, are logged. The value for `f4` is not logged and the value is not available for the insert operation.
- All columns have a `NOT NULL` constraint.

The missing `f4` value causes the `INSERT` to fail. By using `_ALLOWPKMISSINGROWCOLLISIONS`, Replicat skips the `UPDATE` instead of converting it to an `INSERT`. This causes the subsequent `DELETE` to fail because the row does not exist, so Replicat skips the `DELETE` record as part of the default `HANDLECOLLISIONS` logic. The data now is consistent with that of the source.

Messages from `_ALLOWPKMISSINGROWCOLLISIONS`

Because of the risk of data loss associated with `_ALLOWPKMISSINGROWCOLLISIONS`, a warning is issued when it is used. The warning is similar to the following text:

```
Using _ALLOWPKMISSINGROWCOLLISIONS may cause data corruption under certain
conditions.
```

A warning message also is issued for when an `UPDATE` to a key does not contain a full after image for conversion to an insert:

```
A complete after image is not available in SOURCE.x, at RBA 123, in file .\dirdat
\aa00000000, while inserting a row into TARGET.x due to a missing target row for a
key update operation. NOCOMPRESSUPDATES or FETCHOPTIONS FETCHPKUPDATECOLS may be
specified in the EXTRACT parameter file to include a complete image for key update
operations.
```

Getting More Information about Initial Loads

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about Oracle GoldenGate initial load methods.

Default

```
NOHANDLECOLLISIONS
```

Syntax

```
HANDLECOLLISIONS | NOHANDLECOLLISIONS [_ALLOWPKMISSINGROWCOLLISIONS]
[THREADS (threadID[, threadID][, ...][, thread_range[, thread_range][, ...])]
```

`HANDLECOLLISIONS`
Enables collision handling.

`_ALLOWPKMISSINGROWCOLLISIONS`
Use `HANDLECOLLISIONS` with `_ALLOWPKMISSINGROWCOLLISIONS` to skip primary-key `UPDATE` operations if the corresponding target row does not exist.

> **Note:**
>
> Skipping operations can cause data corruption. See the Description in this topic.

`NOHANDLECOLLISIONS`
Turns off collision handling.

`THREADS (`*`threadID`*`[, `*`threadID`*`][, ...][, `*`thread_range`*`[, `*`thread_range`*`][, ...])`
Enables `HANDLECOLLISIONS` for the specified threads. When used in a global `HANDLECOLLISIONS` statement at the root level of the parameter file, `HANDLECOLLISIONS` is enabled for the specified threads wherever they are in all `MAP` statements where . When used in a `HANDLECOLLISIONS` clause of a `MAP` statement, `HANDLECOLLISIONS` is enabled only for that `MAP` statement.

`threadID[, threadID][, ...]`
Specifies a thread ID or a comma-delimited list of threads in the format of `threadID, threadID, threadID`.

`thread_range[, thread_range][, ...]`
Specifies a range of threads in the form of `threadIDlow-threadIDhigh` or a comma-delimted list of ranges in the format of `threadIDlow-threadIDhigh`, `threadIDlow-threadIDhigh`.

A combination of these formats is permitted, such as `threadID`, `threadID`, `threadIDlow-threadIDhigh`.

Examples

Example 1

This example enables `HANDLECOLLISIONS` for all `MAP` statements in the parameter file.

```
HANDLECOLLISIONS
MAP hr.emp, TARGET hr.emp;
MAP hr.job_hist, TARGET hr.job_hist;
MAP hr.dep, TARGET hr.dep;
MAP hr.country, TARGET hr.country;
```

Example 2

This example enables `HANDLECOLLISIONS` for some `MAP` statements while disabling it for others.

```
HANDLECOLLISIONS
MAP hr.emp, TARGET hr.emp;
MAP hr.job_hist, TARGET hr.job_hist;
NOHANDLECOLLISIONS
MAP hr.dep, TARGET hr.dep;
MAP hr.country, TARGET hr.country;
```

Example 3

This example shows the basic use of `HANDLECOLLISIONS` within a `MAP` statement.

```
MAP dbo.tcust, TARGET dbo.tcust, HANDLECOLLISIONS;
```

Example 4

This example shows a combination of global and `MAP`-level use. The `MAP` specification overrides the global specification for the specified tables.

```
HANDLECOLLISIONS
MAP hr.emp, TARGET hr.emp;
MAP hr.job_hist, TARGET hr.job_hist;
MAP hr.dep, TARGET hr.dep, NOHANDLECOLLISIONS;
MAP hr.country, TARGET hr.country, NOHANDLECOLLISIONS;
```

Example 5

In the following example, `HANDLECOLLISIONS` is enabled globally for all `MAP` statements, except for default thread 0 in the first `MAP` statement and for thread 3 in the second `MAP` statement.

```
HANDLECOLLISIONS
MAP fin.*, TARGET fin.*;
MAP sales.*, TARGET sales.*;
MAP orders.*, TARGET orders.*;
MAP scott.cust, TARGET scott.cust, NOHANDLECOLLISIONS;
MAP amy.cust, TARGET amy.cust, THREAD(3), NOHANDLECOLLISIONS;
```

Example 6

In this example, `HANDLECOLLISIONS` is enabled globally, but turned off for thread 3. The remaining threads 1, 2, and 4 will handle collisions.

```
HANDLECOLLISIONS
NOHANDLECOLLISIONS THREAD(3)
MAP scott.emplyees, TARGET scott.employees, THREADRANGE(1,4, OID);
MAP scott.inventory, TARGET scott.inventory, THREADRANGE(1,4, OID);
MAP scott.cust, TARGET scott.cust, THREADRANGE(1,4, OID);
```

Example 7

In this example, `HANDLECOLLISIONS` is enabled globally, then disabled globally for threads 5 through 7. In the first map statement, all threads will handle collisions, since the `HANDLECOLLISIONS` parameter does not specify a thread or a range. In the second map statement, only threads 4, 8, and 9 will handle collisions, because the global `NOHANDLECOLLISIONS` applies to threads 5-7.

```
HANDLECOLLISIONS
NOHANDLECOLLISIONS THREADRANGE(5-7)
MAP scott.cust, TARGET scott.cust, THREADRANGE(4,9,OID), HANDLECOLLISIONS;
MAP scott.offices, TARGET scott.offices, THREADRANGE(4,9,OID);
MAP scott.emp, TARGET scott.emp, THREADRANGE(4,9,OID);
MAP scott.ord, TARGET scott.ord, THREADRANGE(4,9,OID);
MAP acct.*, TARGET acct.*;
MAP admin.*, TARGET admin.*;
```

3.91 HANDLETPKUPDATE

Valid For

Replicat (nonintegrated mode)

Description

Use the `HANDLETPKUPDATE` parameter to prevent constraint errors when an update to a primary key results in a transient duplicate. This is an Oracle parameter for nonintegrated Replicat and is required if the target database is any version earlier than Oracle version 11.2.0.2. For target Oracle databases that are version 11.2.0.2 or later, transient primary-key duplicates are handled automatically without requiring `HANDLETPKUPDATE`. Integrated Replicat handles this issue automatically so it is not necessary to set this parameter

A transient primary-key duplicate occurs when an update affects the primary keys of multiple rows in a transaction. This kind of statement typically uses a `SET x = x+`*`n`* formula or other manipulation that shifts the values so that a new value is the same as an existing one.

The following example illustrates a sequence of value changes that can cause this condition. The example assumes table ITEM where the primary key column is named CODE and the current key values for the rows in the table are 1, 2, and 3.

```
update item set code = 2 where code = 1;
update item set code = 3 where code = 2;
update item set code = 4 where code = 3;
```

In this example, when the first UPDATE is applied to the target, there is an error because the primary key value of 2 already exists in the target. The target transaction returns constraint violation errors. By default, Replicat does not detect or handle these violations and abends.

When using HANDLETPKUPDATE, create the constraints as DEFERRABLE INITIALLY IMMEDIATE on the target tables. If the target constraints cannot be DEFERRABLE, Replicat handles the errors according to existing rules specified with the HANDLECOLLISIONS and REPERROR parameters, or else it abends.

This parameter can be used in a parameter file, and it can be used within a MAP statement as follows:

```
MAP ggs.equip_account, TARGET ggs.equip_account, HANDLETPKUPDATE;
```

Default

Abend on transient primary key updates

Syntax

```
HANDLETPKUPDATE
```

3.92 HAVEUDTWITHNCHAR

Valid For

Replicat (Oracle only)

Description

Use the HAVEUDTWITHNCHAR parameter when the source data contains user-defined types that have an NCHAR, NVARCHAR2, or NCLOB attribute. When this data is encountered in the trail, HAVEUDTWITHNCHAR causes Replicat to connect to the Oracle target in AL32UTF8, which is required when a user-defined data type contains one of those attributes.

HAVEUDTWITHNCHAR is not required if the character set of the target is AL32UTF8. However, it is required if only NLS_LANG is set to AL32UTF8 on the target. By default Replicat ignores NLS_LANG and connects to an Oracle database in the native character set of the database. Replicat uses the OCIString object of the Oracle Call Interface, which does not support NCHAR, NVARCHAR2, or NCLOB attributes, so Replicat must bind them as CHAR. Connecting to the target in AL32UTF8 prevents data loss in this situation.

HAVEUDTWITHNCHAR must be specified before the USERID or USERIDALIAS parameter in the parameter file.

Default

None

Syntax

```
HAVEUDTWITHNCHAR
```

3.93 HEARTBEATTABLE

Valid For

GLOBALS

Description

Use `HEARTBEATTABLE` to specify a non-default name of the heartbeat table. The table name `GG_HEARTBEAT` is the default. This name used to denote the heartbeat table is used to create a seed and history table, `GG_HEARTBEAT_SEED` and `GG_HEARTBEAT_HISTORY` respectively. Specifying one name reserves all names used by the heartbeat infrastructure. If the schema name is not specified, the value in `GGSCHEMA` is used for schema name.

For SQL/MX, `GGSCHEMA` is not used so you must use a two or three part heartbeat table name.

Default

None

Syntax

```
    HEARTBEATTABLE schema_name heartbeat_table_name
```

`schema_name`
The name of the schema you want to use with the heartbeat table. This is not needed if you have specified the schema using the `GGSCHEMA` parameter in your `GLOBALS` file.

`heartbeat_table_name`
The heartbeat table name you want to use. The default table name is `GG_HEARTBEAT`.

3.94 INCLUDE

Valid For

Extract and Replicat

Description

Use the `INCLUDE` parameter to include a macro library in a parameter file. See *Administering Oracle GoldenGate for Windows and UNIX* for more information about using macros.

Default

None

Syntax

```
INCLUDE library
```

`library`
The relative or full path to library file.

Example

The following example includes macro library `mdatelib.mac`.

```
INCLUDE /ggs/dirprm/mdatelib.mac
```

3.95 INSERTALLRECORDS

Valid For

Replicat

Description

Use the `INSERTALLRECORDS` parameter to keep a record of all operations made to a target record, instead of maintaining just the current version. `INSERTALLRECORDS` causes Replicat to insert every change that is made to a record as a new record in the database. The initial insert and subsequent updates and deletes are maintained as point-in-time snapshots.

Some cases for using `INSERTALLRECORDS` are the following:

- To work within an exceptions `MAP` statement. In an exceptions `MAP` statement, `INSERTALLRECORDS` causes the values of operations that generated errors to be inserted as new records in an exceptions table as part of an error-handling strategy.
- To maintain a transaction history. By inserting every change to a specific row as a new record in the database, you can maintain a history of all changes made to that row, instead of maintaining just the current version. Each insert is a point-in-time snapshot that can be queried as needed for auditing purposes. Combining historical data with special transaction information provides a way to create a more useful target reporting database.

`INSERTALLRECORDS` can be used at the root level of the parameter file to affect all subsequent `MAP` statements, and it can be used within a `MAP` statement to affect a specific table or multiple tables specified with a wildcard.

Getting More Information about INSERTALLRECORDS

See *Administering Oracle GoldenGate for Windows and UNIX* for information about creating a transaction history table.

See *Administering Oracle GoldenGate for Windows and UNIX* for information about using an exceptions `MAP` statement.

See "TABLE | MAP" for `MAP` syntax.

Default

None

Syntax

```
INSERTALLRECORDS
```

Examples

Example 1

This example shows `INSERTALLRECORDS` at the root level of the parameter file as part of an exceptions handling configuration.

```
REPLICAT deliv
USERIDALIAS tiger1
ASSUMETARGETDEFS
REPERROR (DEFAULT, EXCEPTION)
MAP ggs.equip_account, TARGET ggs.equip_account2,
COLMAP (USEDEFAULTS);
MAP ggs.equip_account, TARGET ggs.equip_account_exception,
EXCEPTIONSONLY,
INSERTALLRECORDS
COLMAP (USEDEFAULTS,
DML_DATE = @DATENOW(),
OPTYPE = @GETENV('LASTERR', 'OPTYPE'),
DBERRNUM = @GETENV('LASTERR', 'DBERRNUM'),
DBERRMSG = @GETENV('LASTERR', 'DBERRMSG'));
```

Example 2

This example shows `INSERTALLRECORDS` in a `MAP` statement.

```
REPLICAT deliv
USERIDALIAS tiger1
SOURCEDEFS /ggs/dirdef/defs
REPERROR DEFAULT, ABEND
MAP fin.accTAB, TARGET fin.custTAB, INSERTALLRECORDS;
```

3.96 INSERTAPPEND | NOINSERTAPPEND

Valid For

Replicat (Oracle Nonintegrated mode)

Description

Use the `INSERTAPPEND` and `NOINSERTAPPEND` parameters to control whether or not a Replicat operating in nonintegrated mode uses an `APPEND` hint when it applies `INSERT` operations (used for array binding) to Oracle target tables. These parameters are valid only for Oracle databases and are only compatible with `BATCHSQL` mode.

`INSERTAPPEND` causes Replicat to use the `APPEND_VALUES` hint when it applies `INSERT` operations to Oracle target tables. It is appropriate for use as a performance improvement when the replicated transactions are large and contain multiple inserts into the same table. If the transactions are small, using `INSERTAPPEND` can cause a performance decrease. For more information about when `APPEND` hints should be used, consult the Oracle documentation.

The `BATCHSQL` parameter must be used when using `INSERTAPPEND`. Replicat will abend if `BATCHSQL` is not used.

These parameters can be used in two ways: When used as standalone parameters at the root of the parameter file, one remains in effect for all subsequent `TABLE` or `MAP` statements, until the other is encountered. When used within a `MAP` statement, they override any standalone `INSERTAPPEND` or `NOINSERTAPPEND` entry that precedes the `MAP` statement.

See "TABLE | MAP" for more information about the `MAP` parameter.

Default

`NOINSERTAPPEND`

Syntax

```
INSERTAPPEND | NOINSERTAPPEND
```

Examples

Example 1

The following is part of a Replicat parameter file that shows how `INSERTAPPEND` is used for all of the tables in the `fin` schema, except for the `inventory` table.

```
BATCHSQL
INSERTAPPEND
MAP fin.*, TARGET fin2.*;
MAPEXCLUDE fin.inventory;
NOINSERTAPPEND
MAP fin.inventory, TARGET fin2.inventory;
```

Example 2

The following is part of a Replicat parameter file that shows how `INSERTAPPEND` is used for all of the tables in the `MAP` statements, except for the `inventory` table.

```
BATCHSQL
MAP fin.orders, TARGET fin.orders;
MAP fin.customers, TARGET fin.customers;
MAP fin.inventory, TARGET fin.inventory, NOINSERTAPPEND;
```

3.97 INSERTDELETES | NOINSERTDELETES

Valid For

Replicat

Description

Use the `INSERTDELETES` and `NOINSERTDELETES` parameters to control whether or not Oracle GoldenGate converts source delete operations to insert operations on the target database. The parameters are table-specific. One parameter remains in effect for all subsequent `MAP` statements, until the other parameter is encountered.

When using `INSERTDELETES`, use the `NOCOMPRESSDELETES` parameter so that Extract does not compress deletes.

Because you can selectively enable or disable these parameters between `MAP` statements, you can enable or disable them for different threads of a coordinated Replicat. Specify the `INSERTDELETES` threads in one set of `MAP` statements, and specify the `NOINSERTDELETES` threads in a different set of `MAP` statements.

Default

`NOINSERTDELETES`

Syntax

```
INSERTDELETES | NOINSERTDELETES
```

Example

This example shows how you can apply `INSERTDELETES` and `NOINSERTDELETES` selectively to different `MAP` statements, each of which represents a different thread of a coordinated Replicat.

```
INSERTDELETES
MAP sales.cust, TARGET sales.cust, THREAD (1);
MAP sales.ord, TARGET sales.ord, THREAD (2);
NOINSERTDELETES
MAP sales.loc, TARGET sales.loc, THREAD (3);
```

3.98 INSERTMISSINGUPDATES | NOINSERTMISSINGUPDATES

Valid For

Replicat

Description

Use the `INSERTMISSINGUPDATES` and `NOINSERTMISSINGUPDATES` parameters to control whether or not Oracle GoldenGate inserts a record based on the source record when the target record does not exist.

`INSERTMISSINGUPDATES` inserts the missing update but should only be used when the source database logs all column values, whether or not they changed). It can work with a database that uses a compressed form of updates (where only the changed values are logged) if the target database allows `NULL` to be used for the missing column values.

When the default of `NOINSERTMISSINGUPDATES` is in effect, a missing record causes an error, and the transaction may abend depending on `REPERROR` settings.

The `INSERTMISSINGUPDATES` and `NOINSERTMISSINGUPDATES` parameters are table-specific. One parameter remains in effect for all subsequent `MAP` statements, until the other parameter is encountered.

Default

```
NOINSERTMISSINGUPDATES
```

Syntax

```
INSERTMISSINGUPDATES | NOINSERTMISSINGUPDATES
```

3.99 INSERTUPDATES | NOINSERTUPDATES

Valid For

Replicat

Description

Use the `INSERTUPDATES` and `NOINSERTUPDATES` parameters to control whether or not Oracle GoldenGate converts update operations to insert operations. For updates to be converted to inserts, the database must log all column values either by default or by means of supplemental logging.

The parameters are table-specific. One parameter remains in effect for all subsequent `MAP` statements, until the other parameter is encountered.

To ensure that updates are not compressed by Extract when using `INSERTUPDATES`, use the `NOCOMPRESSUPDATES` parameter.

Because you can selectively enable or disable these parameters between `MAP` statements, you can enable or disable them for different threads of a coordinated Replicat. Specify the `INSERTUPDATES` threads in one set of `MAP` statements, and specify the `NOINSERTUPDATES` threads in a different set of `MAP` statements.

Default

`NOINSERTUPDATES`

Syntax

```
INSERTUPDATES | NOINSERTUPDATES
```

Example

This example shows how you can apply `INSERTUPDATES` and `NOINSERTUPDATES` selectively to different `MAP` statements, each of which represents a different thread of a coordinated Replicat.

```
INSERTUPDATES
MAP sales.cust, TARGET sales.cust, THREAD (1);
MAP sales.ord, TARGET sales.ord, THREAD (2);
NOINSERTUPDATES
MAP sales.loc, TARGET sales.loc, THREAD (3);
```

3.100 LAGCRITICAL

Valid For

Manager

Description

Use the `LAGCRITICALSECONDS`, `LAGCRITICALMINUTES`, or `LAGCRITICALHOURS` parameter to specify a lag threshold that is considered critical, and to force a warning message to the error log when the threshold is reached. This parameter affects Extract and Replicat processes on the local system.

Default

Do not report lag information

Syntax

```
LAGCRITICALSECONDS seconds | LAGCRITICALMINUTES minutes | LAGCRITICALHOURS hours
```

`LAGCRITICALSECONDS` ***`seconds`***
Sets the critical lag threshold in seconds. The minimum is 0.

`LAGCRITICALMINUTES` ***`minutes`***
Sets the critical lag threshold in minutes. The minimum is 0.

`LAGCRITICALHOURS` ***`hours`***
Sets the critical lag threshold in hours. The minimum is 0.

Example

```
LAGCRITICALSECONDS 60
```

3.101 LAGINFO

Valid For

Manager

Description

Use the `LAGINFOSECONDS`, `LAGINFOMINUTES`, or `LAGINFOHOURS` parameter to specify a basic lag threshold; if lag exceeds the specified value, Oracle GoldenGate reports lag information to the error log. If the lag exceeds the value specified with the `LAGCRITICAL` parameter, Manager reports the lag as critical; otherwise, it reports the lag as an informational message. A value of zero (0) forces a message at the frequency specified with the `LAGREPORTMINUTES` or `LAGREPORTHOURS` parameter.

Default

Do not report lag information

Syntax

```
LAGINFOSECONDS seconds | LAGINFOMINUTES minutes | LAGINFOHOURS hours
```

`LAGINFOSECONDS` ***`seconds`***
Sets a basic lag threshold in seconds. The minimum is 0.

`LAGINFOMINUTES` ***`minutes`***
Sets a basic lag threshold in minutes. The minimum is 0.

`LAGINFOHOURS` ***`hours`***
Sets a basic lag threshold in hours. The minimum is 0.

Example

In this example, Oracle GoldenGate reports lag when it exceeds one hour.

```
LAGINFOHOURS 1
```

3.102 LAGREPORT

Valid For

Manager

Description

Use the `LAGREPORTMINUTES` or `LAGREPORTHOURS` parameter to specify the interval at which Manager checks for Extract and Replicat lag. Use of this parameter also requires the use of the `LAGINFO` and `LAGCRITICAL` parameters. If `LAGREPORT` is not specified, lag is not reported.

If `LAGREPORT` is used and the value of the `CHECKMINUTES` parameter is greater than `LAGREPORT`, then `CHECKMINUTES` will acquire the value of `LAGREPORT`.

Default

None

Syntax

```
LAGREPORTMINUTES minutes | LAGREPORTHOURS hours
```

`LAGREPORTMINUTES` ***`minutes`***
The frequency, in minutes, to check for lag. The minimum is 0.

`LAGREPORTHOURS` ***`hours`***
The frequency, in hours, to check for lag. The minimum is 0.

Example

```
LAGREPORTHOURS 1
```

3.103 LIST | NOLIST

Valid For

Extract and Replicat

Description

Use the `LIST` and `NOLIST` parameters to control whether or not the macros of a macro library are listed in the report file. Listing can be turned on and off by placing the `LIST` and `NOLIST` parameters within the parameter file or within the macro library file. Using `NOLIST` reduces the size of the report file. For more information about using macros, see the *Administering Oracle GoldenGate for Windows and UNIX*.

Default

`LIST`

Syntax

```
LIST | NOLIST
```

Example

In the following example, `NOLIST` excludes the macros in the `hugelib` macro library from being listed in the report. Using `LIST` after the `INCLUDE` statement restores normal listing for subsequent macros.

```
NOLIST
INCLUDE /ggs/hugelib.mac
LIST
```

3.104 LOBMEMORY

Valid For

Extract and Replicat for DB2 on z/OS and NonStop SQL/MX

Description

Use the `LOBMEMORY` parameter to control the amount of memory and temporary disk space available for caching transactions that contain `LOB`s. Because Oracle GoldenGate applies only committed transactions to the target database, it requires sufficient system memory to store `LOB` data until either a commit or rollback indicator is received.

This parameter is for use with a DB2 database on z/OS and for a NonStop SQL/MX database. For all other databases, use the `CACHEMGR` parameter.

About Memory Management with LOBMEMORY

`LOBMEMORY` enables you to tune the cache size of Oracle GoldenGate for `LOB` transactions and define a temporary location on disk for storing data that exceeds the size of the cache. Options are available for defining the total cache size, the per-transaction memory size, the initial and incremental memory allocation, and disk storage space.

`LOB` transactions are added to the memory pool specified by `RAM`, and each is flushed to disk when `TRANSRAM` is reached. An initial amount of memory is allocated to each transaction based on `INITTRANSRAM` and is increased by the amount specified by `RAMINCREMENT` as needed, up to the maximum set with `TRANSRAM`. Consequently, the value for `TRANSRAM` should be evenly divisible by the sum of (`INITTRANSRAM + RAMINCREMENT`).

Default

See option defaults

Syntax

```
LOBMEMORY
[RAM size]
[TRANSRAM size]
[TRANSALLSOURCES size]
[INITTRANSRAM size]
[RAMINCREMENT size]
[DIRECTORY (directory, max_directory_size, max_file_size)]
```

`RAM` *`size`*
Specifies the total amount of memory to use for all cached `LOB` transactions. The default is 200 megabytes. The value can be specified in bytes or in terms of gigabytes, megabytes, or kilobytes in any of the following forms:
`GB | MB | KB | G | M | K | gb | mb | kb | g | m | k`

`TRANSRAM` ***`size`***
Specifies the total amount of memory to use for a single `LOB` transaction. The default is 50 megabytes. The value can be specified in bytes or in terms of gigabytes, megabytes, or kilobytes in any of the following forms:
`GB | MB | KB | G | M | K | gb | mb | kb | g | m | k`
`TRANSRAM` should be evenly divisible by both `INITTRANSRAM` and `RAMINCREMENT` for optimal results.

`TRANSALLSOURCES` ***`size`***
Specifies the total amount of memory and disk space to use for a single `LOB` transaction. The default is 50% of total available memory (memory and disk). The value can be specified in bytes or in terms of gigabytes, megabytes, or kilobytes in any of the following forms:
`GB | MB | KB | G | M | K | gb | mb | kb | g | m | k`

`INITTRANSRAM` ***`size`***
Specifies the initial amount of memory to allocate for a `LOB` transaction. The default is 500 kilobytes. The value can be specified in bytes or in terms of gigabytes, megabytes, or kilobytes in any of the following forms:
`GB | MB | KB | G | M | K | gb | mb | kb | g | m | k`

`RAMINCREMENT` ***`size`***
Specifies the amount of memory to increment when a `LOB` transaction requires more memory. The default is 500 kilobytes. The value can be specified in bytes or in terms of gigabytes, megabytes, or kilobytes in any of the following forms:
`GB | MB | KB | G | M | K | gb | mb | kb | g | m |`

`DIRECTORY (`*`directory, max_directory_size, max_file_size`*`)`
Specifies temporary disk storage for `LOB` transaction data when its size exceeds the maximum specified with `TRANSRAM`. You can specify `DIRECTORY` more than once.

- *`directory`* is the fully qualified name of a directory. The default is the `dirtmp` sub-directory of the Oracle GoldenGate directory.
- *`max_directory_size`* is the maximum size of all files in the directory. The default is 2 gigabytes. If the space specified is not available, then 75% of available disk space is used.
- *`max_file_size`* is the maximum size of each file in the directory. The default is 200 megabytes.

Values can be specified in bytes or in terms of gigabytes, megabytes, or kilobytes in any of the following forms:
`GB | MB | KB | G | M | K | gb | mb | kb | g | m | k`
The directory size and file size must be greater than the size of the memory specified with `RAM`.
The file names use the following format.
`group``_blob_00001.mem`
or...
`PID``_blob_00001.mem`
A group name is used for online processes. A system process ID number (PID) is used for one-time runs specified with the `SPECIALRUN` parameter.
The format for a threaded Extract is similar to the following, depending on the database.
`group_thread`` #_00001.mem`

Examples

Example 1
The following example allows per-transaction memory to be incremented ten times before data is flushed to disk, once for the initial allocation specified with `INITTRANSRAM` and then nine more times as permitted by `RAMINCREMENT`.

```
LOBMEMORY DIRECTORY (c:\test\dirtmp, 3000000000, 300000000), &
RAM 8000K, TRANSRAM 1000K, INITTRANSRAM 100K, RAMINCREMENT 100K
```

Example 2
The following is the same as the preceding example, but with the addition of a second directory.

```
LOBMEMORY DIRECTORY (c:\test\dirtmp, 3000000000, 300000000), &
DIRECTORY (c:\test\dirtmp2, 1000000000, 5000000), &
RAM 8000K, TRANSRAM 1000K, INITTRANSRAM 100K, RAMINCREMENT 100K
```

3.105 LOGALLSUPCOLS

Valid For

Extract

Description

Use the `LOGALLSUPCOLS` parameter to control the writing of supplementally logged columns specified with `ADD TRANDATA` or `ADD SCHEMATRANDATA` to the trail.

`LOGALLSUPCOLS` supports integrated Replicat (for Oracle database) and the Oracle GoldenGateConflict Detection and Resolution feature (CDR). The supplementally logged columns are a union of the scheduling columns that are required to ensure data integrity across parallel Replicat threads and the conflict detection and resolution (CDR) columns. Scheduling columns are primary key, unique index, and foreign key columns. Including all of these supplementally logged columns satisfies the requirements of both CDR and dependency computation in parallel Replicat processing.

`LOGALLSUPCOLS` causes Extract to do the following with these supplementally logged columns:

- Automatically includes in the trail record the before image for `UPDATE` operations.
- Automatically includes in the trail record the before image of all supplementally logged columns for both `UPDATE` and `DELETE` operations.

For Extract versions older than 12c, you can use `GETUPDATEBEFORES` and `NOCOMPRESSDELETES` parameters to satisfy the same requirement. See GETUPDATEBEFORES | IGNOREUPDATEBEFORES and COMPRESSUPDATES | NOCOMPRESSUPDATES for more information.

`LOGALLSUPCOLS | NOLOGALLSUPCOLS` takes precedence over the following parameters, if used:

- `GETUPDATEBEFORES | IGNOREUPDATEBEFORES`
- `COMPRESSDELETES | NOCOMPRESSDELETES`

- `COMPRESSUPDATES | NOCOMPRESSUPDATES` for before images, but `COMPRESSUPDATES | NOCOMPRESSUPDATES` takes precedence over `LOGALLSUPCOLS` on after images.

Default

`LOGALLSUPCOLS`

Syntax

`LOGALLSUPCOLS`

3.106 MACRO

Valid For

Extract and Replicat

Description

Use the `MACRO` parameter to create an Oracle GoldenGate macro. See *Administering Oracle GoldenGate for Windows and UNIX* for more information about using macros, including how to invoke them properly.

Default

None

Syntax

The following must be used in the order shown:

```
MACRO #macro_name
PARAMS (#param_name [, ...])
BEGIN
macro_body
END;
```

`MACRO`
Starts the macro specification.

#
The macro character. Macro and parameter names must begin with a macro character. Anything in the parameter file that begins with the macro character is assumed to be either a macro or a macro parameter.
The default macro character is the pound (#) character, as in the following examples:

```
MACRO #macro1
PARAMS (#param1, #param2)
```

You can change the macro character with the `MACROCHAR` parameter.

`macro_name`
The name of the macro. Macro names must be one word with alphanumeric characters (underscores are allowed) and are not case-sensitive. Each macro name in a parameter file must be unique. Do not use quotes, or else the macro name will be treated as text and ignored.

`PARAMS`
Starts a parameter clause. A parameters clause is optional. The maximum size and number of parameters is unlimited, assuming sufficient memory is available.

`param_name`
Describes a parameter to the macro. Parameter names are not case-sensitive. Do not use quotes, or else the parameter name will be treated as text and ignored.
Every parameter used in a macro must be declared in the `PARAMS` statement, and when the macro is invoked, the invocation must include a value for each parameter.

`BEGIN`
Begins the macro body. Must be specified before the macro body.

`macro_body`
The body of the macro. The size of the macro body is unlimited, assuming sufficient available memory. A macro body can include any of the following types of statements:

- Simple parameter statements, as in:

  ```
  COL1 = COL2
  ```

- Complex statements, as in:

  ```
  COL1 = #val2
  ```

- Invocations of other macros, as in:

  ```
  #colmap(COL1, #sourcecol)
  ```

`END;`
Concludes the macro definition. The semicolon is required to complete the definition.

Examples

Example 1
The following example defines a macro that takes parameters.

```
MACRO #make_date
PARAMS (#year, #month, #day)
BEGIN
@DATE('YYYY-MM-DD', 'CC', @IF(#year < 50, 20, 19),
'YY', #year, 'MM', #month, 'DD', #day)
END;
```

Example 2
The following example defines a macro that does not require parameters.

```
MACRO #option_defaults
BEGIN
GETINSERTS
GETUPDATES
GETDELETES
INSERTDELETES
END;
```

Example 3
The following example defines a macro named `#assign_date` that calls another macro named `#make_date`.

```
MACRO #assign_date
PARAMS (#target_col, #year, #month, #day)
BEGIN
#target_col = #make_date (#year, #month, #day)
END;
```

3.107 MACROCHAR

Valid For

Extract and Replicat

Description

Use the `MACROCHAR` parameter to change the macro character of a macro definition to something other than the # character. You might need to change the macro character when, for example, table names include the # character.

The `MACROCHAR` parameter can only be used once in the parameter file. Place the `MACROCHAR` parameter before the first `MACRO` parameter in the parameter file. Anything in the parameter file that begins with the specified macro character is assumed to be either a macro or a macro parameter. All macro definitions in the parameter file must use the specified character.

`MACROCHAR` cannot be used with query parameters.

See also "MACRO".

See the *Administering Oracle GoldenGate for Windows and UNIX* for more information about using macros.

Default

`#` (pound symbol)

Syntax

```
MACROCHAR character
```

`character`
The character to be used as the macro character. Valid user-defined macro characters are letters, numbers, and special characters such as the ampersand (`&`) or the underscore (_).

Example

In the following example, `$` is defined as the macro character.

```
MACROCHAR $
MACRO $mymac
PARAMS ($p1)
BEGIN
col = $p1
END;
```

3.108 MAP for Extract

Valid For

Extract

Description

Use the `MAP` parameter for Extract when Extract is operating in classic capture mode and you need to use the `ALTID` component of this parameter to map an object ID to an object name. `ALTID` specifies the correct object ID if Extract is capturing from Oracle transaction logs that were generated by a database other than the one to which Extract is connected. This configuration is required when Extract is not permitted to connect directly to the production (source) database to capture production transactions.

When Extract cannot connect directly to a source database, it connects to a live standby or other facsimile database, but it reads transaction logs that are sent from the source database. By querying the catalog of the alternate database, Extract can get the metadata that it needs to expand the transaction data into valid SQL statements, but it cannot use the object ID from this query. The local object ID for a table is different from the object ID of that table in the source database (and, thus, in the transaction log). You must manually map each table name to the source object ID by using a `MAP` statement with `ALTID`.

To Use MAP with ALTID

- Create one `MAP` statement with `ALTID` for each table that you want to capture. Wildcarded table names are not allowed for a `MAP` parameter that contains `ALTID`.
- To specify other processing for the same table (or tables), such as data filtering or manipulation, you must also create a `TABLE` statement for each of those tables. Wildcarding can be used to specify multiple tables with one `TABLE` statement, if appropriate.
- Use a regular Replicat `MAP` statement in the Replicat parameter file, as usual. `MAP` for Extract does not substitute for `MAP` for Replicat, which is required to map source tables to target tables.
- DDL capture and replication is not supported when using `ALTID`.

Default

None

Syntax

```
MAP [container.]schema.table, ALTID object_ID [, object_ID]
```

`[container.]schema.table`
The fully qualified name of the source table.

`object_ID`
The object ID of the table as it exists in the production (source) database.
If a table is partitioned, you can list the object IDs of the partitions that you want to replicate, separating each with a comma.

Examples

Example 1
This example maps a non-partitioned table or just one partition of a partitioned table.

```
MAP QASOURCE.T2, ALTID 75740;
```

Example 2
This example maps partitions of a partitioned table.

```
MAP QASOURCE.T_P1, ALTID 75257,75258;
```

3.109 MAP

See "TABLE | MAP".

3.110 MAPEXCLUDE

Valid For

Replicat

Description

Use the `MAPEXCLUDE` parameter with the `MAP` parameter to explicitly exclude source tables and sequences from a wildcard specification. `MAPEXCLUDE` must precede all `MAP` statements that contain the source objects that are being excluded. You can use multiple `MAPEXCLUDE` statements for specific `MAP` statements.

`MAPEXCLUDE` is evaluated before evaluating the associated `MAP` parameters. Thus, the order in which they appear does not make a difference.

When using wildcards, be careful not to place them such that all objects are excluded, leaving nothing to process. For example, the following example captures nothing:

```
MAP cat1.schema*.tab*, TARGET schema*.tab*;
MAPEXCLUDE cat1.*.*
```

See also the EXCLUDEWILDCARDOBJECTSONLY parameter.

The default for resolving wildcards is `WILDCARDRESOLVE DYNAMIC`. Therefore, if a table that is excluded with `MAPEXCLUDE` is renamed to a name that satisfies a wildcard, the data will be captured. The `DYNAMIC` setting enables new table names that satisfy a wildcard to be resolved as soon as they are encountered and included in the Oracle GoldenGate configuration immediately. For more information, see WILDCARDRESOLVE.

Default

None

Syntax

```
MAPEXCLUDE [container. | catalog.]owner.{table | sequence}
```

`container.`* | *`catalog.`
If the source database requires three-part names, specifies the name or wildcard specification of the Oracle container or SQL/MX catalog that contains the object to exclude.

`owner`
Specifies the name or wildcard specification of the owner, such as the schema, of the object to exclude.

`table`* | *`sequence`
The name or wildcard specification of the source object to exclude. To specify object names and wildcards correctly, see *Administering Oracle GoldenGate for Windows and UNIX*.

Example

In this example, `test.tab*` specifies that all tables beginning with `tab` in schema `test` are to be excluded from all trail files. Table `fin.acct` is excluded from trail `ee`. Table `fin.sales` is excluded from trail `ff`.

```
MAPEXCLUDE  pdb1.test.tab*
MAP pdb1.*.*, TARGET *.*;
MAPEXCLUDE pdb2.fin.acct
MAP pdb2.*.*, TARGET *.*;
```

3.111 MAPINVISIBLECOLUMNS | NOMAPINVISIBLECOLUMNS

Valid For

Replicat on Oracle. Valid as a standalone parameter or as an option to `MAP`.

Description

Use `MAPINVISIBLECOLUMNS` and `NOMAPINVISIBLECOLUMNS` to control whether or not Replicat includes invisible columns in Oracle target tables for default column mapping. For invisible columns in Oracle target tables that use explicit column mapping, they are always mapped so do not require this option.

`MAPINVISIBLECOLUMNS` and `NOMAPINVISIBLECOLUMNS` can be used in two different ways. When specified at a global level, one parameter remains in effect for all subsequent MAP statements, until the other parameter is specified. When used within a `MAP` statement, they override the global specifications

Default

```
NOMAPINVISIBLECOLUMNS
```

Syntax

```
MAPINVISIBLECOLUMNS | NOMAPINVISIBLECOLUMNS
[, THREAD (threadID[, threadID][, ...][, thread_range[, thread_range][, ...])]
```

THREADS (*threadID*[, *threadID*][, ...][, *thread_range*[, *thread_range*][, ...])
Specifies `MAPINVISIBLECOLUMNS | NOMAPINVISIBLECOLUMNS` only for the specified thread or threads of a coordinated Replicat.

> ***threadID*[, *threadID*][, ...]**
> Specifies a thread ID or a comma-delimited list of threads in the format of `threadID, threadID, threadID`.
>
> **[, *thread_range*[, *thread_range*][, ...]**
> Specifies a range of threads in the form of `threadIDlow-threadIDhigh` or a comma-delimted list of ranges in the format of `threadIDlow-threadIDhigh`, `threadIDlow-threadIDhigh`.

A combination of these formats is permitted, such as threadID, threadID, `threadIDlow-threadIDhigh`.

Examples

Example 1

This example enables `MAPINVISIBLECOLUMNS` for some `MAP` statements while disabling it for others.

```
MAPINVISIBLECOLUMNS
MAP hr.emp, TARGET hr.emp2;
NOMAPINVISIBLECOLUMNS
MAP hr.dep, TARGET hr.dep2;
```

Example 2

This example shows a combination of global and `MAP`-level use of `MAPINVISIBLECOLUMNS`. The `MAP` specification overrides the global specification for the specified table.

```
NOMAPINVISIBLECOLUMNS
MAP hr.dep, TARGET hr.dep2;
MAP hr.emp, TARGET hr.emp2, MAPINVISIBLECOLUMNS;
```

Example 3

In this example, `MAPINVISIBLECOLUMNS` is enabled globally, but turned off for thread 3. The remaining threads 1, 2, and 4 will include invisible target columns in default column mapping.

```
MAPINVISIBLECOLUMNS
NOMAPINVISIBLECOLUMNS THREAD(3)
MAP hr.dep, TARGET hr.dep2, THREADRANGE(1, 4);
MAP hr.emp, TARGET hr.emp2, THREADRANGE(1, 4);
```

3.112 MARKERTABLE

Valid For

GLOBALS

Description

Use the `MARKERTABLE` parameter to specify the name of the DDL marker table, if other than the default of `GGS_MARKER`. The marker table stores information about DDL operations.

The name of the marker table must also be specified with the `marker_table_name` parameter in the `params.sql` script. This script resides in the root Oracle GoldenGate installation directory.

This parameter is only valid for an Oracle database in which the capture configuration uses the Oracle GoldenGate DDL trigger to support DDL replication. For more information about the Oracle GoldenGate DDL objects, see *Installing and Configuring Oracle GoldenGate for Oracle Database*.

Default

```
GGS_MARKER
```

Syntax

```
MARKERTABLE [container.]table_name
```

`[container.]table_name`
The fully qualified three-part or two-part name of the marker table. To specify object names and wildcards correctly, see *Administering Oracle GoldenGate for Windows and UNIX*.

3.113 MAXDISCARDRECS

Valid For

Extract and Replicat

Description

Use the `MAXDISCARDRECS` parameter to limit the number of errors that are reported to the discard file per `MAP` statement.

Use this parameter for the following reasons:

- When you expect a large number of errors but do not want them reported.
- To manage the size of the discard file.

More than one instance of `MAXDISCARDRECS` can be used in a parameter file to specify different maximums for different sets of `MAP` statements. An instance of `MAXDISCARDRECS` applies to all subsequent `MAP` statements until the next instance of `MAXDISCARDRECS` is encountered. The minimum is 0.

Default

None

Syntax

```
MAXDISCARDRECS number
```

`number`
The maximum number of errors to report.

Example

```
MAXDISCARDRECS 1000
```

3.114 MAXGROUPS

Valid For

GLOBALS

Description

Use the `MAXGROUPS` parameter to specify the maximum number of process groups that can run in an instance of Oracle GoldenGate. The Manager process checks this parameter to determine its resource allocations. The GGSCI process checks this parameter to control the maximum number of groups that it allows to be created.

Each Replicat thread in a coordinated Replicat group is considered to be a *group* in the context of `MAXGROUPS`. Therefore, the value of the `MAXTHREADS` option of `COORDINATED` in the `ADD REPLICAT` command (default is 25), plus the number of other Replicat and Extract groups in the Oracle GoldenGate instance, cannot exceed the `MAXGROUPS` value, or `ADD REPLICAT` returns an error.

The actual number of processes that can run on a given system depends on the system resources that are available. If those resources are exceeded, Oracle GoldenGate returns errors regardless of the setting of `MAXGROUPS`.

Default

1000 groups

Syntax

```
MAXGROUPS number
```

`number`
The number of groups allowed in one instance of Oracle GoldenGate. Valid values are from 1000 to 5000.

Example

```
MAXGROUPS 1500
```

3.115 MAXSQLSTATEMENTS

Valid For

Replicat

Description

Use the `MAXSQLSTATEMENTS` parameter to control the number of prepared SQL statements that can be used by Replicat both in regular processing mode and in `BATCHSQL` mode. The value for `MAXSQLSTATEMENTS` determines the number of open cursors that Replicat maintains. Make certain that the database can support the specified number of cursors, plus the cursors that other applications and processes use. Before changing `MAXSQLSTATEMENTS`, contact Oracle Support.

When setting `MAXSQLSTATEMENTS` for a coordinated Replicat, take into account that the specified maximum number of cursors is applied to each thread in the configuration, not as an aggregate threshold for Replicat as a whole. For example, if `MAXSQLSTATEMENTS 100` is specified, it is possible for each thread to have 99 open cursors without any warning or error from Replicat.

See "BATCHSQL" for more information about `BATCHSQL` mode.

Default

250 cursors

Syntax

```
MAXSQLSTATEMENTS number
```

number
The maximum number of cursors that Replicat (or each thread in a coordinated Replicat) can use. Valid values are from 1 to 250.

Example

```
MAXSQLSTATEMENTS 200
```

3.116 MAXTRANSOPS

Valid For

Replicat (Not supported in integrated Replicat mode)

Description

Use the `MAXTRANSOPS` parameter to split large source transactions into smaller ones on the target system. This parameter can be used when the target database is not configured to accommodate large transactions. For example, if the Oracle rollback segments are not large enough on the target to reproduce a source transaction that performs one million deletes, you could specify `MAXTRANSOPS 10000`, which forces Replicat to issue a commit after each group of 10,000 deletes.

To use `MAXTRANSOPS` is to alter the transactional boundaries that are imposed by the source application, even though Replicat applies the operations in the correct order. This can cause errors if Extract fails during that transaction. Extract rewrites the transaction to the end of the trail, instead of overwriting the old one. Because the trail is sequential, Replicat starts processing the old transaction and must roll it back when it receives the recovery marker and the new transaction, and then start applying the new transaction. If `MAXTRANSOPS` caused Replicat to split the original transaction into multiple smaller transactions, Replicat may only be able to roll back the portion that was not committed to the target. When Replicat processes the committed operations again, they will result in duplicate-row errors or missing-row errors, depending on the SQL operation type. The minimum is 1.

Note:

When troubleshooting Replicat abend errors, Oracle Support may request `GROUPTRANSOPS` to be set to 1 and `MAXTRANSOPS` to be set to 1. This is only a temporary configuration for troubleshooting purposes and should not be used permanently in production, or it will cause data integrity errors.

Default

10,000,000

Syntax

```
MAXTRANSOPS number
```

number
The number of operations to portion into a single transaction group.

Example

```
MAXTRANSOPS 10000
```

3.117 MGRSERVNAME

Valid For

GLOBALS

Description

Use the `MGRSERVNAME` parameter in a `GLOBALS` parameter file to specify the name of the Manager process when it is installed as a Windows service. This parameter is only required when installing multiple instances of Manager as a service on the same system, for example when installing multiple Oracle GoldenGate instances or when also installing the Oracle GoldenGate Veridata Agent, which uses a Manager process.

There must be a `GLOBALS` file containing `MGRSERVNAME` for each Manager service that is installed with the INSTALL utility. The files must be created before the services are installed, because the installation program refers to `MGRSERVNAME` when registering the service name on the system.

Default

None

Syntax

```
MGRSERVNAME name
```

name
A one-word name for the Manager service.

Example

```
MGRSERVNAME Goldengate
```

3.118 MONITORING_HEARTBEAT_TIMEOUT

Valid For

Manager

Description

Use `MONITORING_HEARTBEAT_TIMEOUT` to set a process as non-responsive in a specified number of seconds.

Default

10 seconds.

Syntax

```
MONITORING_HEARTBEAT_TIMEOUT seconds
```

seconds
Specifies the time interval, in seconds, for Manager to set processes as non-responsive. The minimum is 10 seconds and the maximum is 60.

Examples

```
MONITORING_HEARTBEAT_TIMEOUT 20
```

3.119 NAMECCSID

Valid for

GLOBALS, Extract, Replicat, DEFGEN for DB2 on IBM i

Description

Use the `NAMECCSID` parameter to specify the CCSID (coded character set identifier) of the database object names stored in the SQL catalog tables. The SQL catalog tables are created with the CCSID of the system, but the actual database object names could be represented in the catalog with characters from a different CCSID. The catalog does not indicate this difference when queried, and therefore Oracle GoldenGate could retrieve the name incorrectly unless `NAMECCSID` is present to supply the correct CCSID value.

To set the CCSID for a GGSCI session, use the `SET NAMECCSID` command.

To view the current CCSID, use the `SHOW` command. If the CCSID is not set through the GGSCI session or through the parameter `NAMECCSID`, the `SHOW` value will be `DEFAULT`.

Default

```
DEFAULT
```

Syntax

```
NAMECCSID {CCSID | DEFAULT}
```

`CCSID`
A valid DB2 for i coded character set identifier that is to be used for object names in catalog queries.

`DEFAULT`
Indicates that the system CCSID is to be used for object names in catalog queries.

Example

```
NAMECCSID 1141
```

3.120 NAMEMATCH parameters

Valid For

GLOBALS

Description

Use the `NAMEMATCH` parameters to control the behavior of fallback name mapping. Fallback name mapping is enabled by default when the source database is case-sensitive and the target database supports both case-sensitive and case-insensitive object names, such as Oracle, DB2 and SQL/MX.

By default (`NAMEMATCHIGNORECASE`) fallback name matching works as follows: When a source table name is case-sensitive, Oracle GoldenGate applies case-sensitive wildcard mapping on the target database to find an exact match. If the target database does not contain the exact target table name, including case, fallback name mapping performs a case-insensitive target table mapping to find a name match.

Default

```
NAMEMATCHIGNORECASE
```

Syntax

```
NAMEMATCHIGNORECASE | NAMEMATCHNOWARNING | NAMEMATCHEXACT
```

`NAMEMATCHIGNORECASE`
Performs a case-insensitive target table mapping to find a name match when the target database does not contain the exact target table name, including case.

`NAMEMATCHNOWARNING`
Outputs a warning message to the report file when fallback name matching is used.

`NAMEMATCHEXACT`
Disables fallback name mapping. If an exact, case-sensitive match is not found, Oracle GoldenGate returns an error and abends.

3.121 NOCATALOG

Valid For

DEFGEN

Description

Use `NOCATALOG` in the DEFGEN parameter file to remove the container name (Oracle) or the catalog name (SQL/MX) from table names before their definitions are written to the definitions file. This parameter is valid if the database supports container names or catalog names and the `DEFSFILE` parameter includes the `FORMAT RELEASE` option set to 12.1. Use this parameter if the definitions file is to be used for mapping to a database that only supports two-part names (*`owner.object`*).

DEFGEN abends with an error if duplicate *`schema.table`* names are encountered once the container or catalog names are removed. This prevents the possibility of processing errors caused by different sets of metadata having the same *`schema.table`* name when there is no catalog name to differentiate them.

Default

None

Syntax

```
NOCATALOG
```

3.122 NODUPMSGSUPPRESSION

Valid For

GLOBALS

Description

Use `NODUPMSGSUPPRESSION` to prevent the automatic suppression of duplicate informational and warning messages in the report file, the error log, and the system log files. A message is issued to indicate how many times a message was repeated.

Default

Automatically suppress duplicate messages.

Syntax

```
NODUPMSGSUPPRESSION
```

3.123 NUMFILES

Valid For

Extract and Replicat

Description

Use the `NUMFILES` parameter to control the initial number of memory structures that are allocated to contain information about tables specified in `TABLE` or `MAP` statements. `NUMFILES` must occur before any `TABLE` or `MAP` entries, and before the `SOURCEDEFS` or `TARGETDEFS` parameter, to have any effect.

When setting `NUMFILES` for a coordinated Replicat, take into account that the specified value is applied to each thread in the configuration, not as an aggregate threshold for Replicat as a whole. For example, if `NUMFILES 500` is specified, it is possible for each thread to have 499 initial memory structures without any warning or error from Replicat.

To control the number of additional memory structures that are allocated dynamically once the `NUMFILES` value is reached, use the `ALLOCFILES` parameter. See "ALLOCFILES" for more information. The default values should be sufficient for both `NUMFILES` and `ALLOCFILES`, because memory is allocated by the process as needed, system resources permitting. The minimum is 1 and the maximum is 20000.

Default

1000

Syntax

```
NUMFILES number
```

number
The initial number of memory structures to be allocated. Do not set `NUMFILES` to an arbitrarily high number, or memory will be consumed unnecessarily. The memory of Oracle GoldenGate supports up to two million tables.

Example

```
NUMFILES 4000
```

3.124 OBEY

Valid For

Extract and Replicat

Description

Use the `OBEY` parameter to retrieve parameter settings from a file other than the current parameter file.

To use `OBEY`, create and save a parameter file that contains the parameters that you want to retrieve. This is known as an `OBEY` file. You can create a library of `OBEY` files that contain different, frequently used parameter settings. Then, use the `OBEY` parameter in the active parameter file to invoke the parameters in the `OBEY` file.

Upon encountering an `OBEY` parameter in the active parameter file, Oracle GoldenGate processes the parameters from the `OBEY` file and then returns to the active parameter file to process any remaining parameters.

`OBEY` statements cannot be nested within other `OBEY` statements.

Instead of using `OBEY`, or in addition to it, you can use Oracle GoldenGate macros to retrieve frequently used parameters. For more information about using macros, see the *Administering Oracle GoldenGate for Windows and UNIX*.

Default

None

Syntax

```
OBEY file
```

file
The relative or fully qualified name of the file from which to retrieve parameters or commands.

Example

```
OBEY /home/ogg/myparams
```

3.125 OUTPUTFILEUMASK

Valid For

GLOBALS

Description

Use the `OUTPUTFILEUMASK` parameter to specify an octal umask for Oracle GoldenGate processes to use when creating all files. `OUTPUTFILEUMASK` is not valid for Windows systems.

Default

Umask of 027 (all privileges)

Syntax

```
OUTPUTFILEUMASK umask
```

umask
The umask value. Must be between 0 and 077; otherwise there will be an error: `Missing or invalid option for OUTPUTFILEUMASK.`

Example

```
OUTPUTFILEUMASK 066
```

3.126 OVERRIDEDUPS | NOOVERRIDEDUPS

Valid For

Replicat

Description

Use the `OVERRIDEDUPS` and `NOOVERRIDEDUPS` parameters to control whether or not Replicat overwrites an existing record in the target database with a replicated one if both records have the same key.

- `OVERRIDEDUPS` overwrites the existing record. It can be used for initial loads where you do not want to truncate target tables prior to the load, or for the resynchronization of a target table with a trusted source. Use the `SQLDUPERR` parameter with `OVERRIDEUPS` to specify the numeric error code that is returned by the database for duplicate INSERT operations. See "SQLDUPERR" for more information.

- NOOVERRIDEDUPS, the default, generates a duplicate-record error instead of overwriting the existing record. You can use an exceptions MAP statement with a SQLEXEC clause to initiate a response to the error. Otherwise, the transaction may abend. For more information about exceptions maps, see *Administering Oracle GoldenGate for Windows and UNIX*.

  To bypass duplicate records without causing Replicat to abend when an exceptions map is not available, specify a REPERROR parameter statement similar to the following, where *error* is the database error number for primary key constraint errors.

  ```
  REPERROR (error, IGNORE)
  ```

  For example, the statement for an Oracle database would be:

  ```
  REPERROR (1, IGNORE)
  ```

  Replicat writes ignored duplicate records to the discard file.

Place OVERRIDEDUPS or NOOVERRIDEDUPS before the TABLE or MAP statements that you want it to affect. You can create different rules for different groups of TABLE or MAP statements. The parameters act as toggles: one remains in effect for subsequent TABLE or MAP statements until the other is encountered.

OVERRIDEDUPS is enabled automatically when HANDLECOLLISIONS is used. See "HANDLECOLLISIONS | NOHANDLECOLLISIONS" for more information.

WARNING:

When OVERRIDEDUPS is in effect, records might not be processed in chronological order across multiple Replicat processes.

Default

```
NOOVERRIDEDUPS
```

Syntax

```
OVERRIDEDUPS | NOOVERRIDEDUPS
```

3.127 PTKCAPTUREPROCSTATS

Valid For

Extract, Replicat, and Manager

Description

Use PTKCAPTUREPROCSTATS enables the capture of process and thread statistics for the PTK Monitoring.

Default

`true`

Syntax

```
PTKCAPTUREPROCSTATS seconds
```

`capture`
Controls whether or not PTK Monitoring statistics are captured with either `true` or `false`.

Examples

```
PTKCAPTUREPROCSTATS false
```

3.128 PTKMONITORFREQUENCY

Valid For

Extract, Replicat, and Manager

Description

Use `PTKMONITORFREQUENCY` to set the monitoring collection frequency interval.

Default

One second.

Syntax

```
PTKMONITORFREQUENCY seconds
```

`seconds`
Specifies the time interval, in seconds, for monitoring collection to occur. The minimum is 1 seconds and the maximum is 60 seconds.

Examples

```
PTKMONITORFREQUENCY 10
```

3.129 PORT

Valid For

Manager

Description

Use the `PORT` parameter to specify a TCP/IP port number for the Manager process on which to interact with remote processes that request dynamic services, typically either an initial-load Replicat or the Collector process. Use the default port number when possible. The minimum is 1 and the maximum is 65535.

Default

Port 7809

Syntax

```
PORT number
```

number
An available port number.

Example

```
PORT 7809
```

3.130 PRESERVETARGETTIMEZONE

Valid For

Replicat

Description

Use the `PRESERVETARGETTIMEZONE` parameter to override the default Replicat session time zone. By default, Replicat sets its session to the time zone of the source database, as written to the trail by Extract. `PRESERVETARGETTIMEZONE` causes Replicat to set its session to the time zone of the target database.

Default

None

Syntax

```
PRESERVETARGETTIMEZONE
```

3.131 PROCEDURE

This is an option that can be specified as a stand-alone statement in extract and replicat parameter file. It indicates which feature group of procedural calls will be replicated.

Syntax

```
PROCEDURE [ INCLUDE | EXCLUDE ]  FEATURE [ALL_SUPPORTED | feature_list]
```

Examples

Example 1
Include all system supplied packages:

```
PROCEDURE INCLUDE FEATURE ALL_SUPPORTED
```

Example 2
Include specific packages

```
PROCEDURE INCLUDE FEATURE AQ, FGA, DBFS
```

Example 3
Exclude a specific packages

```
PROCEDURE INCLUDE FEATURE ALL_SUPPORTED
PROCEDURE EXCLUDE FEATURE REDFINITION
```

3.132 PURGEDDLHISTORY | PURGEDDLHISTORYALT

Valid For

Manager

Description

Use the `PURGEDDLHISTORY` and `PURGEDDLHISTORYALT` parameters to control the size of the DDL history tables that support DDL capture. These tables are created in an Oracle database to support trigger-based DDL capture.

These parameters cause Manager to purge rows that are not needed any more. You can specify the maximum and minimum amount of time to keep a row, based on the last modification date. Both maximum and minimum rules must be specified; otherwise Manager does not have a complete criteria for when to delete the row. For example, `MINKEEPHOURS 3` used with `MAXKEEPHOURS 5` specifies to keep rows that have not been modified in the past three hours, but to delete them when they have not been modified for at least five hours.

These parameters require a logon to be specified with the `USERID` or `USERIDALIAS` parameter.

WARNING:

Use caution when purging the history tables. They are critical to the integrity of the DDL synchronization processes. Premature purges are non-recoverable through Oracle GoldenGate. To prevent any possibility of permanent DDL data loss, make regular backups of the Oracle GoldenGate DDL schema.

Default

Purge every hour

Syntax

```
PURGEDDLHISTORY | PURGEDDLHISTORYALT
{, max_rule}
[, min_rule]
[, frequency]
```

`PURGEDDLHISTORY`
Purges the DDL history table. This table tracks DDL operations. To determine the name of the history table to purge, Oracle GoldenGate first looks for a name specified

with the `DDLTABLE` parameter in the `GLOBALS` file. If that parameter does not exist, Oracle GoldenGate uses the default name of `GGS_DDL_HIST`.

`PURGEDDLHISTORYALT`
Purges the internal DDL history table. This table tracks partitioned object IDs that are associated with the object ID of a table. To determine the name of the internal history table to purge, Oracle GoldenGate first looks for a name specified with the `DDLTABLE` parameter in the `GLOBALS` file and appends `_ALT` to it. If that parameter does not exist, Oracle GoldenGate uses the default name of `GGS_DDL_HIST_ALT`.

`max_rule`
Required. Can be one of the following to set the maximum amount of time to keep rows.

`MAXKEEPHOURS` ***`n`***
Purges if the row has not been modified for *`n`* number of hours. The minimum is 1 and the maximum is 1000.

`MAXKEEPDAYS n`
Purges if the row has not been modified for *`n`* number of days. The minimum is 1 and the maximum is 365.

`min_rule`
Can be one of the following to set the minimum amount of time to keep rows.

`MINKEEPHOURS` ***`n`***
Keeps an unmodified row for at least the specified number of hours. The minimum is 1 and the maximum is 1000.

`MINKEEPDAYS` ***`n`***
Keeps an unmodified row for at least the specified number of days. The minimum is 1 and the maximum is 365.

`frequency`
Sets the frequency with which to purge DDL history. The default interval at which Manager evaluates potential maintenance tasks is 10 minutes, as specified with the `CHECKMINUTES` parameter. At that interval, Manager evaluates the `PURGEDDLHISTORY` or `PURGEDDLHISTORYALT` frequency and conducts the purge at the specified *`frequency`*. *`frequency`* can be one of the following:

`FREQUENCYMINUTES` ***`n`***
Sets the frequency, in minutes, with which to purge DDL history. The default purge frequency is 60 minutes. The minimum is 1 and the maximum is 360.

`FREQUENCYHOURS` ***`n`***
Sets the frequency, in hours, at which to purge DDL history.
See "CHECKMINUTES" for more information about controlling the interval between Manager maintenance checks. The minimum is 1 and the maximum is 24.

Example

The following example keeps all rows that have not been modified in the past three days and deletes them when they have not been modified for at least five days. The purge frequency is 30 minutes.

```
PURGEDDLHISTORY MINKEEPDAYS 3, MAXKEEPDAYS 5, FREQUENCYMINUTES 30
```

3.133 PURGEMARKERHISTORY

Valid For

Manager

Description

Use the `PURGEMARKERHISTORY` parameter to control the size of the Oracle GoldenGate marker table. This parameter purges rows that are not needed any more. You can purge the marker table at any time. This parameter is only valid for an Oracle database in which the capture configuration uses the Oracle GoldenGate DDL trigger to support DDL replication. For more information about the Oracle GoldenGate DDL objects, see *Installing and Configuring Oracle GoldenGate for Oracle Database*.

To determine the name of the marker table, Oracle GoldenGate first looks for a name specified with the `MARKERTABLE` parameter in the `GLOBALS` file. If that parameter does not exist, Oracle GoldenGate uses the default name of `GGS_MARKER`.

You can specify maximum and minimum lengths of time to keep a row, based on the last modification date. Both maximum and minimum rules must be specified; otherwise Manager does not have complete criteria for when to delete the row. For example, `MINKEEPHOURS 3` used with `MAXKEEPHOURS 5` specifies to keep rows that have not been modified in the past three hours, but delete them when they have not been modified for at least five hours.

`PURGEMARKERHISTORY` requires a logon to be specified with the `USERID` or `USERIDALIAS` parameter and, depending on the type of database, the `SOURCEDB` parameter.

Default

Purge every hour

Syntax

```
PURGEMARKERHISTORY
{, max_rule}
[, min_rule]
[, frequency]
```

`max_rule`
Required. Can be one of the following to set the maximum amount of time to keep rows.

> **`MAXKEEPHOURS n`**
> Purges if the row has not been modified for *n* number of hours. The minimum is 1 and the maximum is 1000.
>
> **`MAXKEEPDAYS n`**
> Purges if the row has not been modified for *n* number of days. The minimum is 1 and the maximum is 365.

`min_rule`
Can be one of the following to set the minimum amount of time to keep rows.

`MINKEEPHOURS` *`n`*
Keeps an unmodified row for at least the specified number of hours. The minimum is 1 and the maximum is 1000.

`MINKEEPDAYS` *`n`*
Keeps an unmodified row for at least the specified number of days. The minimum is 1 and the maximum is 365.

`frequency`
Sets the frequency with which to purge marker history. The default interval at which Manager evaluates potential maintenance tasks is 10 minutes, as specified with the `CHECKMINUTES` parameter. At that interval, Manager evaluates the `PURGEMARKERHISTORY` frequency and conducts the purge at the specified *`frequency`*.
`frequency` can be one of the following:

`FREQUENCYMINUTES` *`n`*
Sets the frequency, in minutes, with which to purge marker history. The default purge frequency is 60 minutes. The minimum is 1 and the maximum is 360.

`FREQUENCYHOURS` *`n`*
Sets the frequency, in hours, at which to purge marker history.
See "CHECKMINUTES" for more information about controlling the interval between Manager maintenance checks. The minimum is 1 and the maximum is 24.

Example

The following example keeps all rows that have not been modified in the past three days and deletes them when they have not been modified for at least five days. The purge frequency is 30 minutes.

```
PURGEMARKERHISTORY MINKEEPDAYS 3, MAXKEEPDAYS 5, FREQUENCYMINUTES 30
```

3.134 PURGEOLDEXTRACTS for Extract and Replicat

Valid For

Extract and Replicat

Description

Use the `PURGEOLDEXTRACTS` parameter in an Extract or Replicat parameter file to delete old trail files whenever Oracle GoldenGate starts processing from a new one. Preventing the accumulation of trail files conserves disk space. Purges are conducted after the process is done with the file as indicated by checkpoints.

Purging by Extract is appropriate if the process is a data pump. After the data is sent to the target system, the files can be purged. Otherwise, purging would ordinarily be done by Replicat.

`PURGEOLDEXTRACTS` should only be used in an Extract or Replicat parameter file if there is only one instance of the process. If multiple groups are reading the same set of trail files, one process could purge a file before another is finished with it. Instead, use the Manager version of `PURGEOLDEXTRACTS`, which is the preferred use of the parameter in all Oracle GoldenGate configurations because it allows you to manage trail files in a centralized fashion.

Default

Purge the trail file when moving to the next file in the sequence.

Syntax

```
PURGEOLDEXTRACTS
```

3.135 PURGEOLDEXTRACTS for Manager

Valid For

Manager

Description

Use the `PURGEOLDEXTRACTS` parameter in a Manager parameter file to purge trail files when Oracle GoldenGate has finished processing them. Without using `PURGEOLDEXTRACTS`, no purging is performed, and trail files can consume significant disk space.

Using `PURGEOLDEXTRACTS` as a Manager parameter is recommended rather than using the Extract or Replicat version of `PURGEOLDEXTRACTS`. As a Manager parameter, `PURGEOLDEXTRACTS` allows you to manage trail files in a centralized fashion and take into account multiple processes.

How to Use PURGEOLDEXTRACTS for Manager

To control the purging, follow these rules:

- `USECHECKPOINTS` triggers a purge when all processes are finished with a file as indicated by their checkpoints. Basing the purges on checkpoints ensures that Manager does not delete any data until all processes are finished with it. This is essential in a production environment to ensure data integrity. `USECHECKPOINTS` considers the checkpoints of both Extract and Replicat before purging. Because `USECHECKPOINTS` is the default, it need not be specified in the `PURGEOLDEXTRACTS` statement. Manager obeys `USECHECKPOINTS` unless there is an explicit `NOUSECHECKPOINTS` entry.
- Use the `MINKEEP` rules to set a minimum amount of time to keep data:
  - Use `MINKEEPHOURS` or `MINKEEPDAYS` to keep data for *n* hours or days.
  - Use `MINKEEPFILES` to keep at least *n* trail files including the active file. The default number of files to keep is `1`.

  Use only one of the `MINKEEP` options. If more than one is used, Oracle GoldenGate selects one of them based on the following:

  - If both `MINKEEPHOURS` and `MINKEEPDAYS` are specified, only the last one is accepted, and the other is ignored.
  - If either `MINKEEPHOURS` or `MINKEEPDAYS` is used with `MINKEEPFILES`, then `MINKEEPHOURS` or `MINKEEPDAYS` is accepted, and `MINKEEPFILES` is ignored.

Manager evaluates potential maintenance tasks based on the value set for the `CHECKMINUTES` parameter. When that value is reached, Manager determines which files to purge based on the Extract and Replicat processes configured on the local system. If at least one process reads a trail file, Manager applies the specified rules; otherwise, the rules do not take effect. The following are possible `PURGEOLDEXTRACT` rule combinations and the actions that Manager takes for them:

- `USECHECKPOINTS` without `MINKEEP` rules: If checkpoints indicate that a file has been processed completely, it will be purged unless doing so would violate the default rule to keep at least one file.
- `USECHECKPOINTS` with `MINKEEP` rules: If checkpoints indicate that a file has been processed completely, it will be purged unless doing so would violate the `MINKEEP` rules.
- `NOUSECHECKPOINTS` without `MINKEEP` rules: The checkpoints are not considered, and the file will be purged unless doing so would violate the default rule to keep at least one file.
- `NOUSECHECKPOINTS` with `MINKEEP` rules: A file will be purged unless doing so would violate the `MINKEEP` rules.

Additional Guidelines for PURGEOLDEXTRACTS for Manager

- Do not use more than 500 `PURGEOLDEXTRACTS` parameter statements in the same Manager parameter file.
- When using this parameter, do not permit trail files to be deleted by any user or program other than Oracle GoldenGate. It will cause `PURGEOLDEXTRACTS` to function improperly.
- When trails are stored on NFS, there is a difference in system time between the NFS drive and the local system where Manager is running. The trail is created with the NFS time, but the timestamps of the records in the trail are compared with the local system time to determine whether to purge them or not. Take into account any time differences when you create your `MINKEEP` rules.

Default

`USECHECKPOINTS`

Syntax

```
PURGEOLDEXTRACTS trail
[, USECHECKPOINTS | NOUSECHECKPOINTS]
[, MINKEEP_rule]
[, frequency]
```

`trail`
The trail to purge. Use a relative or fully qualified name.

`USECHECKPOINTS`
Allows purging according to any `MINKEEP` rules after all Extract and Replicat processes are done with the data as indicated by checkpoints. When using `USECHECKPOINTS`, you can use the `USERID` or `USERIDALIAS` parameters in the Manager parameter file, so that Manager can query the Replicat checkpoint table to get checkpoint information though it is not required.

`NOUSECHECKPOINTS`
Allows purging without considering checkpoints, based either on the default rule to keep a minimum of one file (if no `MINKEEP` rule is used) or the number of files specified with a `MINKEEP` rule.

`MINKEEP_rule`
Can be one of the following to set rules for the minimum amount of time to keep an inactive file.

`MINKEEPHOURS` ***`n`***
Keeps an inactive file for at least the specified number of hours. The minimum is 1 and the maximum is 1000.

`MINKEEPDAYS` ***`n`***
Keeps an inactive file for at least the specified number of days. The minimum is 1 and the maximum is 365.

`MINKEEPFILES` ***`n`***
Keeps at least *`n`* trail files, including the active file. The minimum is 1 and the maximum is 100. The default is 1.

`frequency`
Sets the frequency with which to purge inactive trail files. The default time for Manager to evaluate potential maintenance tasks is 10 minutes, as specified with the `CHECKMINUTES` parameter. At that interval, Manager evaluates the `PURGEOLDEXTRACTS` frequency and conducts the purge after the specified *`frequency`*.
`frequency` can be one of the following:

`FREQUENCYMINUTES` ***`n`***
Sets the frequency in minutes. The default purge frequency is 60 minutes. The minimum is 1 and the maximum is 360.

`FREQUENCYHOURS` ***`n`***
Sets the frequency in hours. The minimum is 1 and the maximum is 24.

See "CHECKMINUTES" for more information about controlling the Manager maintenance check interval.

Examples

Example 1

`Status:` Trail files `AA000000`, `AA000001`, and `AA000002` exist. Replicat has been stopped for four hours and is not finished processing any of the files. The Manager parameters include:

```
PURGEOLDEXTRACTS /ggs/dirdat/AA*, USECHECKPOINTS, MINKEEPHOURS 2
```

`Result:` The amount of time that files must be retained was exceeded, but no files will be purged because checkpoints indicate that Replicat is not finished processing them.

Example 2

`Status:` Trail files `AA000000`, `AA000001`, and `AA000002` exist. Replicat has been stopped for four hours and is not finished processing any of the files. The Manager parameters include:

```
PURGEOLDEXTRACTS /ggs/dirdat/AA*, NOUSECHECKPOINTS, MINKEEPHOURS 2
```

`Result:` All of the trail files will be purged because the minimum time to keep them was satisfied, and checkpoints are not considered before purging.

Example 3

`Status:` Replicat and Extract are finished processing data. There has been no access to the trail files for the last five hours. Trail files `AA000000`, `AA000001`, and `AA000002` exist. The Manager parameters include:

```
PURGEOLDEXTRACTS /ggs/dirdat/AA*, USECHECKPOINTS, MINKEEPHOURS 4, &
MINKEEPFILES 4
```

`Result:` This is an example of why only one of the `MINKEEP` options should be set. `USECHECKPOINTS` requirements were satisfied, so the `MINKEEP` rules are considered when determining whether to purge `AA000002`. Only two files will remain if `AA000002` is purged, and that violates the `MINKEEPFILES` rule. Because both `MINKEEPFILES` and `MINKEEPHOURS` are specified, however, `MINKEEPFILES` is ignored. The file will be purged because it has not been accessed for five hours, and that satisfies the `MINKEEPHOURS` requirement of four hours.

3.136 PURGEOLDTASKS

Valid For

Manager

Description

Use the `PURGEOLDTASKS` parameter to purge Extract and Replicat tasks after a specific amount of time or after they have stopped gracefully. You can indicate when to delete a task according to the following rules:

- The task was last started a specific number of days or hours ago. If the task never was started, its creation time is used as the basis for applying the rules.
- The task stopped gracefully or never was started. This rule takes precedence over the time the task was last started. Use this rule to prevent abnormally terminated tasks from being purged.

No more than 300 `PURGEOLDTASKS` parameter statements may be used in the same Manager parameter file.

Default

None

Syntax

```
PURGEOLDTASKS {EXTRACT | REPLICAT | ER} group
{AFTER number {DAYS | HOURS} | USESTOPSTATUS}
```

`EXTRACT | REPLICAT | ER`
The process for which you want to purge tasks. Use the `ER` option to specify both Extract and Replicat process types.

`group`
The group name or a wildcard to specify multiple groups.

`AFTER` ***`number`*** **`{DAYS | HOURS}`**
Purges if the task has not been updated for a specified number of days or hours.

USESTOPSTATUS
Purges if the task was stopped gracefully or never was started.

Example

The following example deletes all Extract tasks that have not been updated for at least three days, and it deletes the `test_rep` Replicat task if it stopped gracefully and has not been updated for at least two hours.

```
PURGEOLDTASKS EXTRACT *, AFTER 3 DAYS
PURGEOLDTASKS REP test_rep, AFTER 2 HOURS, USESTOPSTATUS
```

3.137 RECOVERYOPTIONS

Valid For

Extract

Description

Use the `RECOVERYOPTIONS` parameter to control how Extract handles the re-writing of data to the trail after it fails while in the process of writing transaction data.

Parameter Dependencies

There is a dependency between the `RECOVERYOPTIONS` parameter and the `FORMAT` option of `EXTFILE`, `EXTTRAIL`, `RMTFILE`, and `RMTTRAIL`.

Default

None

Syntax

```
RECOVERYOPTIONS
```

Example

```
RECOVERYOPTIONS
```

3.138 REPERROR

Valid For

Replicat

Description

Use the `REPERROR` parameter to control how Replicat responds to errors. The default response of Replicat to any error is to abend.

You can use one `REPERROR` statement to handle most errors in a default manner, while using one or more other `REPERROR` statements to handle specific errors differently. For example, you can ignore duplicate-record errors but abend processing in all other cases.

You can use REPERROR globally (at the root of the parameter file) to affect all MAP statements that follow it, or you can use it within a MAP statement to affect the tables specified in that statement. Using REPERROR within a MAP statement gives you the ability to handle errors in a particular way for each thread of a coordinated Replicat.

Using Record-level Error Handling

All REPERROR options except TRANSDISCARD and TRANSEXCEPTION apply an error-handling action in response to an individual SQL operation on an individual record. Other, error-free records in the same transaction are processed as configured in the MAP statements and other parameters in the parameter file, as applicable.

Using Transaction-level Error Handling

The TRANSDISCARD, TRANSEXCEPTION, and ABEND options apply an error-handling action to an entire transaction. The triggering error can occur on an individual record in the transaction or on the commit operation. (Commit errors do not have a particular record associated with them.) These options can be used to:

- prevent an entire source transaction from being replicated to the target when any error is associated with it.
- respond to a commit error when deferred constraint checking is enabled on the target.

TRANSDISCARD and TRANSEXCEPTION are mutually exclusive.

Effect of Other Parameters on Transaction-level Options

TRANSDISCARD and TRANSEXCEPTION honor the boundaries of the source transaction; however, the presence of BATCHSQL, GROUPTRANSOPS, or MAXTRANSOPS in the parameter file may affect the error-handling logic or outcome, because they alter transaction boundaries.

Effect of BATCHSQL and GROUPTRANSOPS

BATCHSQL or GROUPTRANSOPS (the default) both group SQL operations from different transactions into larger transactions to improve performance, while maintaining transactional order. When these parameters are in effect and any error occurs, Replicat first tries to resolve it by entering an alternate processing mode (see the documentation for those parameters). If the error persists, TRANSDISCARD or TRANSEXCEPTION comes into effect, and Replicat reverts to source-processing mode as follows:

1. It rolls back the grouped or arrayed transaction.
2. It replays the offending transaction one SQL operation at a time, using the same transaction boundaries as the source transaction.
3. It performs the discard logic (TRANSDISCARD) or exceptions-mapping (TRANSEXCEPTION). (See those option descriptions for more detail.)
4. It resumes BATCHSQL or GROUPTRANSOPS mode after the TRANSDISCARD error handling is completed.

Effect of MAXTRANSOPS

The integrity of TRANSDISCARD and TRANSEXCEPTION transaction-level error handling can be adversely affected by the setting of the MAXTRANSOPS parameter. MAXTRANSOPS causes

Replicat to split very large replicated source transactions into smaller transactions when it applies them on the target.

The TRANSDISCARD and TRANSEXCEPTION logic cause Replicat to roll back to the first record after the last successful commit. This may or may not be the actual beginning of the offending transaction. It depends on whether that transaction was split up and parts of it are in the previously committed transactions. If that is the case, Replicat cannot apply the TRANSDISCARD or TRANSEXCEPTION action to the whole transaction as it was issued on the source, but only to the part that was rolled back from the target.

If you use MAXTRANSOPS, make certain that it is set to a value that is larger than the largest transaction that you expect to be handled by TRANSDISCARD and TRANSEXCEPTION. This will ensure that transactions are not be split apart into smaller ones on the target.

Effect of Transaction-level Options on Statistics

The output of informational commands in GGSCI, such as STATS REPLICAT, will show the total number of records in the transaction that was processed by TRANSDISCARD or TRANSEXCEPTION logic. This number may reflect the following:

- Replicat writes all records of the transaction to the discard file, including any records that were excluded from Oracle GoldenGate processing by means of a FILTER or WHERE clause in a MAP statement.
- If a source table in the transaction has multiple targets, the discarded transaction will contain multiple copies of each record, one for each target.
- Replicat ignores any exceptions mapping statements (as specified with EXCEPTIONSONLY or MAPEXCEPTION in a MAP statement) when discarding the transaction.

Replicat abends on errors that are caused by the discard processing (TRANSDISCARD) or exceptions mapping (TRANSEXCEPTION).

Getting More Information about Error Handling

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about configuring error handling.

See "TABLE | MAP" for more information about the MAP parameter.

Default

TRANSABORT for deadlocks; ABEND for all others

Syntax

```
REPERROR {
(
{DEFAULT | DEFAULT2 | SQL_error | user_defined_error},
{ABEND |
DISCARD |
EXCEPTION |
IGNORE |
RETRYOP [MAXRETRIES n] |
TRANSABORT [, MAXRETRIES] [, DELAYSECS n | DELAYCSECS n] |
TRANSDISCARD |
TRANSEXCEPTION
}
) |
RESET }
```

Error Specification Options

DEFAULT
Sets a global response to all errors except those for which explicit REPERROR statements are specified.

DEFAULT2
Provides a backup default action when the response for DEFAULT is set to EXCEPTION. Use DEFAULT2 when an exceptions MAP statement is not specified for a MAP statement for which errors are anticipated.

SQL_error
A SQL error number. This can be a record-level error or a commit-level error if using TRANSDISCARD and TRANSEXCEPTION.

user_defined_error
A user-defined error that is specified with the RAISEERROR option of a FILTER clause within a MAP statement.

Error Response Options

ABEND
Rolls back the transaction and terminates processing abnormally. ABEND is the default.

DISCARD
Logs the offending operation to the discard file but continue processing the transaction and subsequent transactions.

EXCEPTION
Handles the operation that causes an error as an exception, but processes error-free operations in the transaction normally. Use this option in conjunction with an exceptions MAP statement or to work with the MAPEXCEPTION option of MAP. For example, you can map columns from failed update statements into a "missing updates" table. In the parameter file, specify the exceptions MAP statement after the MAP statement for which the error is anticipated.
EXCEPTION applies exception handling only to an individual SQL operation on an individual record. To apply exception handling to the entire transaction, use the TRANSEXCEPTION option.

> **Note:**
>
> When the Conflict Detection and Resolution (CDR) feature is active, CDR automatically treats all operations that cause errors as exceptions if an exceptions MAP statement exists for the affected table. In this case, REPERROR with EXCEPTION is not necessary, but you should use REPERROR with other options to handle conflicts that CDR cannot resolve, or for conflicts that you do not want CDR to handle.

IGNORE
Ignores the error.

`RETRYOP [MAXRETRIES n]`
Retries the offending operation. Use the `MAXRETRIES` option to control the number of retries. For example, if a table is out of extents, `RETRYOP` with `MAXRETRIES` gives you time to add extents so the transaction does not fail. Replicat abends after the specified number of `MAXRETRIES`.

`TRANSABORT [, MAXRETRIES n] [, DELAYSECS n | DELAYCSECS n]`
Aborts the transaction and repositions to the beginning of the transaction. This sequence continues either until the record(s) are processed successfully or `MAXRETRIES` expires. If `MAXRETRIES` is not set, the `TRANSABORT` action will loop continuously.
Use one of the `DELAY` options to delay the retry. `DELAYSECS` *n* sets the delay in seconds and the default is 60 seconds. `DELAYCSECS` *n* sets the delay in centiseconds.
The `TRANSABORT` option is useful for handling timeouts and deadlocks on databases that support those conditions.

`TRANSDISCARD`
Discards the entire source transaction if any operation within that transaction, including the commit operation, causes a Replicat error that is listed in the `REPERROR` error specification. Replicat aborts the transaction and, if the error occurred on a record, writes that record to the discard file. Replicat then replays the transaction and writes all of the records to the discard file, including the commit record. Replicat abends on errors that are caused by the discard processing.
If the discarded record has already been data-mapped to a target record, Replicat writes it to the discard file in the target format; otherwise, it will be written in source format. The replayed transaction itself is always written in source format.
`TRANSDISCARD` supports record-level errors as well as commit errors.
Additional information is at the beginning of this topic.

`TRANSEXCEPTION`
If an error specified with `REPERROR` occurs on any record in a transaction, performs exceptions mapping for every record in the transaction according to its corresponding exceptions-mapping specification, as defined by a `MAPEXCEPTION` or `EXCEPTIONSONLY` clause in an exceptions `MAP` statement. If any record does not have a corresponding exceptions mapping specification, or if there is an error writing to the exceptions table, Replicat abends with an error message.
When an error is encountered and `TRANSEXCEPTION` is being used, Replicat aborts the transaction and, if the error occurred on a record, writes that record to the discard file. Replicat replays the transaction and examines the source records to find the exceptions-mapping specifications, and then executes them.
`TRANSEXCEPTION` supports record-level errors as well as commit errors. To handle errors at the record level (for individual SQL operations), without affecting error-free operations in the same transaction, use the `EXCEPTION` option in a `MAP` statement.

`RESET`
Use a `REPERROR RESET` statement to remove error-handling rules specified in previous `REPERROR` parameters and apply default error handling to all `MAP` statements that follow.

Examples of Using REPERROR Globally

These examples show `REPERROR` as used at the root of the parameter file to set global error-handling rules. You can override any or all of these rules for any given table or tables by using `REPERROR` in a `MAP` statement. See "Examples of Using REPERROR Globally and in a MAP Statement".

Example 1
The following example demonstrates how to stop processing for most errors, but ignore duplicate-record errors.

```
REPERROR (DEFAULT, ABEND)
REPERROR (-1, IGNORE)
```

Example 2
The following example invokes an exceptions MAP statement created to handle errors on the account table. Errors on the product table cause Replicat to end abnormally because an exceptions `MAP` statement was not defined.

```
REPERROR (DEFAULT, EXCEPTION)
REPERROR (DEFAULT2, ABEND)
MAP sales.product, TARGET sales.product;
MAP sales.account, TARGET sales.account;
INSERTALLRECORDS
MAP sales.account, TARGET sales.account_exception,
EXCEPTIONSONLY,
COLMAP (account_no = account_no,
optype = @GETENV ('lasterr', 'optype'),
dberr = @GETENV ('lasterr', 'dberrnum'),
dberrmsg = @GETENV ('lasterr', 'dberrmsg'));
```

Example 3
The following applies error rules for the first `MAP` statement and then restores the default of `ABEND` to the second one.

```
REPERROR (-1, IGNORE)
MAP sales.product, TARGET sales.product;
REPERROR RESET
MAP sales.account, TARGET sales.account;
```

Example 4
The following discards the offending record and then replays the entire transaction if any operation on a record within it generates an error 1403. Other error types cause Replicat to abend.

```
REPERROR DEFAULT ABEND
REPERROR 1403 TRANSDISCARD
```

Example 5
The following discards the offending record and then replays the entire transaction to search for an exceptions-mapping specification that writes to the exceptions table that is named `tgtexception`. Other errors cause Replicat to discard the offending record (if applicable) and then abend.

```
REPERROR DEFAULT ABEND
REPERROR 1403 TRANSEXCEPTION
MAP src, TARGET tgt, &
MAPEXCEPTION (TARGET tgtexception, INSERTALLRECORDS, COLMAP (…) );
```

Examples of Using REPERROR Globally and in a MAP Statement

The following examples show different ways that `REPERROR` can be used in a `MAP` statement in conjunction with a global `REPERROR` statement.

Example 1

```
REPLICAT group_name
REPERROR (error1 , response1)
MAP src1, TARGET tgt1, REPERROR (error1, response2);
MAP src2, TARGET tgt2, REPERROR (error2, response3);
```

In the preceding example, when `error1` occurs for the first `MAP` statement, the action should be `response2`, not `response1`, because an override was specified. However, if an `error1` occurs for the second `MAP` statement, the response should be `response1`, the global response. The response for `error2` would be `response3`, which is `MAP`-specific.

Example 2

```
REPLICAT group_name
REPERROR (error1 , response1)
MAP src1, TARGET tgt1, REPERROR (error2, response2),
REPERROR (error3, response3);
```

In the preceding example, when replicating from `src1` to `src2`, all errors and actions (1-3) should apply, because all `REPERROR` statements address different errors (there are no `MAP`-specific overrides).

Example 3

```
REPLICAT group_name
REPERROR (error1 , response1)
MAP src1, TARGET tgt1, REPERROR (error1, response2);
MAP src2, TARGET tgt2, REPERROR (error2, response3);
REPERROR (error1 , response4)
MAP src2, TARGET tgt2, REPERROR (error3, response3);
```

In the preceding example, if `error1` occurs for the first `MAP` statement, the action should be `response2`. For the second one it would be `response1` (the global response), and for the third one it would be `response4` (because of the second `REPERROR` statement). A global `REPERROR` statement applies to all `MAP` statements that follow it in the parameter file until another `REPERROR` statement starts new rules.

Example 4

```
REPERROR DEFAULT ABEND
REPERROR 1403 TRANSDISCARD.
MAP src, TARGET tgt, REPERROR(600 TRANSDISCARD);
```

In the preceding example, if error 600 is encountered while applying source table `src` to target table `tgt`, the whole transaction is written to discard file. Encountering error 1403 also results in the same action based on the global `REPERROR` specification. On the other errors, the process simply discards only the offending record and then abends.

3.139 REPFETCHEDCOLOPTIONS

Valid For

Replicat

Description

Use the `REPFETCHEDCOLOPTIONS` parameter to determine how Replicat responds to operations for which a fetch from the source database was required. The Extract process fetches column data when the transaction record does not contain enough information to construct a SQL statement or when a `FETCHCOLS` clause is used. See "`{FETCHCOLS | FETCHCOLSEXCEPT} (`*`column_list`*`)`" for more information.

Default

None

Syntax

```
REPFETCHEDCOLOPTIONS
[, INCONSISTENTROW ALLOW|IGNORE|REPORT|DISCARD|ABEND]
[, LATESTROWVERSION ALLOW|IGNORE|REPORT|DISCARD|ABEND]
[, MISSINGROW ALLOW|IGNORE|REPORT|DISCARD|ABEND]
[, NOFETCH ALLOW|IGNORE|REPORT|DISCARD|ABEND]
[, REDUNDANTROW ALLOW|IGNORE|REPORT|DISCARD|ABEND]
[, SNAPSHOTROW ALLOW|IGNORE|REPORT|DISCARD|ABEND]
[, SETIFMISSING string]
```

`INCONSISTENTROW`
Determines the action to perform when column data was successfully fetched by row ID, but the key did not match. Either the row ID was recycled or a primary key update occurred after this operation (and prior to the fetch). Valid values are

> **`ALLOW`**
> Process the operation unless the record length is zero (0).
>
> **`IGNORE`**
> Ignore the condition and continue processing.
>
> **`REPORT`**
> Write the record to the discard file and process the operation.
>
> **`DISCARD`**
> Discard the data and do not process the row.
>
> **`ABEND`**
> Discard the data and quit processing.

`LATESTROWVERSION` ***`action`***
Provides a response when column data was fetched from the current row in the table. Valid values are:

> **`ALLOW`**
> Process the operation unless the record length is zero (0).
>
> **`IGNORE`**
> Ignore the condition and continue processing.
>
> **`REPORT`**
> Write the record to the discard file and process the operation.

`DISCARD`
Discard the data and do not process the row.

`ABEND`
Discard the data and quit processing.

`NOFETCH` ***`action`***
Prevents fetching. One use for this option is when the database is a standby and Oracle GoldenGate does not have a database connection. In this case, an attempt to fetch from the database would result an error. Other scenarios may warrant the use of this parameter as well.
When Oracle GoldenGate cannot fetch data it normally would fetch, it probably will cause data integrity issues on the target.
The following are valid actions that can be taken when a `NOFETCH` is encountered:

`ABEND`
Write the operation to the discard file and abend the Replicat process. This is the default.

`ALLOW`
Process the operation unless the record length is zero (0).

`IGNORE`
Ignore the operation. If fetch statistics are being reported in the process report (based on `STATOPTIONS` settings) they will be updated with this result.

`REPORT`
Write the record to the discard file and process the operation.

`DISCARD`
Write the record to the discard file, but do not process the operation. If fetch statistics are being reported in the process report (based on `STATOPTIONS` settings) they will be updated with this result.

`MISSINGROW` ***`action`***
Provides a response when only part of a row (the changed values) is available to Replicat for processing. The column data that is missing from the trail typically could not be fetched because the row was deleted between the time the change record was created and when the fetch was triggered, or because the row image required was older than the undo retention specification.
Valid values are:

`ALLOW`
Process the operation unless the record length is zero (0).

`IGNORE`
Ignore the condition and continue processing.

`REPORT`
Write the record to the discard file and process the operation.

`DISCARD`
Discard the data and do not process the partial row.

`ABEND`
Discard the data and quit processing.

REDUNDANTROW
Indicates that column data was not fetched because column data was previously fetched for this record.

SETIFMISSING [*string*]
Provides a value when a fetch was unsuccessful (and the value is missing from the trail record) but the target column has a not-null constraint. It takes an optional ASCII string as a value for CHAR and BINARY data types or defaults to the following.
CHAR, VARCHAR: Single space
BINARY, VARBINARY: A NULL byte
TIMESTAMP: Current date/time
FLOAT, INTEGER: Zero
Besides SETIFMISSING, you can use the COLMAP clause of the MAP statement to map a value for the target column. See "COLMAP *(column_mapping)*" for more information.

SNAPSHOTROW
Indicates that column data was fetched from a snapshot. Generally, this option would only be used for reporting or discarding operations. Valid values are:

ALLOW
Process the operation unless the record length is zero (0).

IGNORE
Ignore the condition and continue processing.

REPORT
Write the record to the discard file and process the operation.

DISCARD
Discard the data and do not process the row.

ABEND
Discard the data and quit processing.

3.140 REPLACEBADCHAR

Valid For

Extract and Replicat

Description

Use the REPLACEBADCHAR parameter to control the response of the process when a valid code point does not exist for either the source or target character set when mapping character-type columns. By default, the check for invalid code points is only performed when the source and target databases have different character sets, and the default response is to abend. You can use the FORCECHECK option to force the process to check for invalid code points when the source and target databases have the same character set. REPLACEBADCHAR applies globally.

Default

ABORT

Syntax

```
REPLACEBADCHAR {ABORT | SKIP | ESCAPE | SUBSTITUTE string | NULL | SPACE}
[FORCECHECK] [NOWARNING]
```

`ABORT`
The process abends on an invalid code point. This is the default.

`SKIP`
The process skips the record that has the invalid code point. Use this option with caution, because skipping a record can cause data discrepancies on the target.

`ESCAPE`
The process replaces the data value with an escaped version of the data value. Depending on the character set of the source database, the value is output as one of the following:

- If the source data is not `UTF-16` (`NCHAR`/`NVARCHAR`), the output is hexadecimal (`\xXX`).
- If the source data is `UTF-16`, the output is Unicode (`\uXXXX`).

`SUBSTITUTE` *`string`*
The process replaces the data with a specified string, either Unicode notation or up to four characters. By default the default substitution character of the target character set is used for replacement.

`NULL`
The process replaces an invalid character with the value of `NULL` if the target column is nullable or, otherwise, assigns a white space (U+0020).

`SPACE`
The process replaces an invalid character with a white space (U+0020).

`FORCECHECK`
The process checks for invalid code points when the source and target databases have identical character sets. This overrides the default, where the validation is skipped when the source and target character sets are identical.

`NOWARNING`
The process suppresses warning messages related to conversion and validation errors.

Examples

Example 1

The following example replaces invalid code points with the value of `NULL`.

```
REPLACEBADCHAR NULL
```

Example 2

Because `ESCAPE` is specified, Oracle GoldenGate will replace the Euro symbol in a source `NCHAR` column with the escaped version of `u20AC`, because the target is ISO-8859-1, which does not support the Euro code point.

```
REPLACEBADCHAR ESCAPE
```

Example 3
The following substitutes a control character for invalid characters.

```
REPLACEBADCHAR SUBSTITUTE \u001A
```

3.141 REPLACEBADNUM

Valid For

Replicat

Description

Use the `REPLACEBADNUM` parameter to specify a substitution value for invalid numeric data encountered when mapping number columns. `REPLACEBADNUM` applies globally.

Default

Replace invalid numbers with `NULL`.

Syntax

```
REPLACEBADNUM {number | NULL | UNPRINTABLE}
```

`number`
Replace with the specified number.

`NULL`
Replace with `NULL` if the target column accepts `NULL` values; otherwise replace with zero.

`UNPRINTABLE`
Reject any column with unprintable data. The process stops and reports the bad value.

Examples

Example 1

```
REPLACEBADNUM 1
```

Example 2

```
REPLACEBADNUM NULL
```

3.142 REPLICAT

Valid For

Replicat

Description

Use the `REPLICAT` parameter to specify a Replicat group for online change synchronization. This parameter links the current run with previous runs, so that data changes are continually processed to maintain synchronization between source and target tables. Replicat will run continuously and maintain checkpoints in the data source and trail to ensure data integrity and fault tolerance throughout planned or unplanned process termination, system outages, or network failure.

Either `REPLICAT` or `SPECIALRUN` is required in the Replicat parameter file and must be the first entry. See "SPECIALRUN" for more information.

Default

None

Syntax

```
REPLICAT group_name
```

group_name
The group name as defined with the `ADD REPLICAT` command. To view the names of existing Replicat groups, use the `INFO REPLICAT *` command.

Example

```
REPLICAT finance
```

3.143 REPORT

Valid For

Extract and Replicat

Description

Use the `REPORT` parameter to specify the interval at which Extract or Replicat generates interim runtime statistics in a process report. The statistics are added to the existing report. By default, runtime statistics are displayed at the end of a run unless the process is intentionally killed.

The statistics for `REPORT` are carried over from the previous report. For example, if the process performed 10 million inserts one day and 20 million the next, and a report is generated at 3:00 each day, then the first report would show the first 10 million inserts, and the second report would show those plus the current day's 20 million inserts, totalling 30 million. To reset the statistics when a new report is generated, use the `STATOPTIONS` parameter with the `RESETREPORTSTATS` option. See "STATOPTIONS" for more information.

For more information about the process reports, see *Administering Oracle GoldenGate for Windows and UNIX*.

Default

Generate runtime statistics at the end of each run.

Syntax

```
REPORT
{AT hh:mi |
ON day |
AT hh:mi ON day}
```

`AT` *`hh:mi`*
Generates the report at a specific time of the day. Using `AT` without `ON` generates a report at the specified time every day.

`ON` *`day`*
Generates the report on a specific day of the week. Valid values are:

```
SUNDAY
MONDAY
TUESDAY
WEDNESDAY
THURSDAY
FRIDAY
SATURDAY
```

The values are not case-sensitive.

Examples

Example 1

```
REPORT AT 17:00
```

Example 2

```
REPORT ON SUNDAY AT 1:00
```

3.144 REPORTCOUNT

Valid For

Extract and Replicat

Description

Use the `REPORTCOUNT` parameter to report a count of transaction records that Extract or Replicat processed since startup. Each transaction record represents a logical database operation that was performed within a transaction that was captured by Oracle GoldenGate. The record count is printed to the report file and to the screen.

> **Note:**
>
> This count might differ from the number of records that are contained in the Oracle GoldenGate trail. If an operation affects data that is larger than 4K, it must be stored in more than one trail record. Hence, a report count might show 1,000 records (the database operations) but a trail count might show many more records than that. To obtain a count of the records in a trail, use the Logdump utility.

You can schedule record counts at regular intervals or after a specific number of records. Record counts are carried over from one report to the other.

`REPORTCOUNT` can be used only once in a parameter file. If there are multiple instances of `REPORTCOUNT`, Oracle GoldenGate uses the last one.

Default

None

Syntax

```
REPORTCOUNT [EVERY] count
{RECORD | RECORDS | SECOND | SECONDS | MINUTE | MINUTES | HOUR |HOURS} [, RATE]
```

`count`
The interval after which to output a count.

`RECORD | RECORDS | SECOND | SECONDS | MINUTE | MINUTES | HOUR |HOURS`
The unit of measure for *`count`*, in terms of records, seconds, minutes, or hours.

`RATE`
Reports the number of operations per second and the change in rate, as a measurement of performance. The `Rate` statistic is the total number of records divided by the total time elapsed since the process started. The `Delta` statistic is the number of records since the last report divided by the time since the last report.

> **Note:**
>
> The calculations are done using microsecond time granularity. The time intervals are shown without fractional seconds, and the rate values are shown as whole numbers.

Examples

Example 1
This example generates a record count every 5,000 records.

```
REPORTCOUNT EVERY 5000 RECORDS
```

Example 2
This example generates a record count every ten minutes and also reports processing statistics.

```
REPORTCOUNT EVERY 10 MINUTES, RATE
```

The processing statistics are similar to this:

```
12000 records processed as of 2011-01-01 12:27:40 (rate 203,delta 308)
```

3.145 REPORTROLLOVER

Valid For

Extract and Replicat

Description

Use the `REPORTROLLOVER` parameter to force report files to age on a regular schedule, instead of when a process starts. For long or continuous runs, setting an aging schedule controls the size of the active report file and provides a more predictable set of archives that can be included in your archiving routine.

Note:

Report statistics are carried over from one report to the other. To reset the statistics in the new report, use the `STATOPTIONS` parameter with the `RESETREPORTSTATS` option.

You can specify a time of day, a day of the week, or both. Specifying just a time of day (`AT` option) without a day of the week (`ON` option) generates a report at the specified time every day.

Rollovers caused by this parameter do not generate runtime statistics in the process report:

- To control when runtime statistics are generated to report files, use the `REPORT` parameter.
- To generate new runtime statistics on demand, use the `SEND EXTRACT` or `SEND REPLICAT` command with the `REPORT` option.

Default

Roll reports at startup

Syntax

```
REPORTROLLOVER
{AT hh:mi |
ON day |
AT hh:mi ON day}
```

`AT` *`hh:mi`*
The time of day to age the file.
Valid values:

- `hh` is based on a 24-hour clock and accepts values of 1 through 23.
- `mi` accepts values from 00 through 59.

`ON` *`day`*
The day of the week to age the file. Valid values are:

```
SUNDAY
MONDAY
TUESDAY
WEDNESDAY
THURSDAY
FRIDAY
SATURDAY
```

The values are not case-sensitive.

Examples

Example 1

```
REPORTROLLOVER AT 05:30
```

Example 2

```
REPORTROLLOVER ON friday
```

Example 3

```
REPORTROLLOVER AT 05:30 ON friday
```

3.146 RESTARTCOLLISIONS | NORESTARTCOLLISIONS

Valid For

Replicat

Description

Use the `RESTARTCOLLISIONS` and `NORESTARTCOLLISIONS` parameters to control whether or not Replicat applies `HANDLECOLLISIONS` logic after Oracle GoldenGate has stopped because of a conflict. By default, `NORESTARTCOLLISIONS` applies. However, there might be circumstances when you would want Oracle GoldenGate to apply `HANDLECOLLISIONS` logic for the first transaction after startup. For example, if the server is forcibly shut down, the database might have committed the last Replicat transaction, but Oracle GoldenGate might not have received the acknowledgement. Consequently, Replicat will retry the transaction upon startup. `HANDLECOLLISIONS` automatically handles the resultant errors that occur.

`RESTARTCOLLISIONS` enables `HANDLECOLLISIONS` functionality until the first Replicat checkpoint (transaction) is complete. You need not specify the `HANDLECOLLISIONS` parameter in the parameter file. After the first checkpoint, `HANDLECOLLISIONS` is automatically turned off.

See "HANDLECOLLISIONS | NOHANDLECOLLISIONS" for more information about handling collisions.

Default

```
NORESTARTCOLLISIONS
```

Syntax

```
RESTARTCOLLISIONS | NORESTARTCOLLISIONS
```

3.147 RMTFILE

Valid For

Extract

Description

Use the `RMTFILE` parameter to define the name of an extract file on a remote system to which extracted data will be written. Use this parameter for initial-load configurations. For online change synchronization, use the `RMTTRAIL` parameter.

The size of an extract file cannot exceed 2GB .

`RMTFILE` must be preceded by a `RMTHOST` statement, and it must precede any `TABLE` statements.

You can encrypt the data in this file by using the `ENCRYPTTRAIL` parameter. See "ENCRYPTTRAIL | NOENCRYPTTRAIL" for more information.

Default

None

Syntax

```
RMTFILE file_name
[, APPEND]
[, PURGE]
[, MEGABYTES megabytes]
[, FORMAT RELEASE major.minor]
[, OBJECTDEFS | NO_OBJECTDEFS]
[, TRAILBYTEORDER {BIGENDIAN | LITTLEENDIAN | NATIVEENDIAN}]
```

`file_name`
The relative or fully qualified name of the file.

`APPEND`
Adds the current data to existing data in the file. If you use `APPEND`, do not use `PURGE`.

`PURGE`
Deletes an existing file before creating a new one. If you use `PURGE`, do not use `APPEND`.

`MEGABYTES` ***`megabytes`***
Valid for Extract. The maximum size, in megabytes, of a file in the trail. The default is 2000.

`FORMAT RELEASE` ***`major.minor`***
Specifies the metadata format of the data that is sent by Extract to the file. The metadata tells the reader process whether the data records are of a version that it supports. The metadata format depends on the version of the Oracle GoldenGate process. Older Oracle GoldenGate versions contain different metadata than newer ones.

- `FORMAT` is a required keyword.
- `RELEASE` specifies an Oracle GoldenGate release version. *`major`* is the major version number, and *`minor`* is the minor version number. The `X.x` must reflect a current or earlier, generally available (GA) release of Oracle GoldenGate. Valid values are 9.0 through the current Oracle GoldenGate `X.x` version number, for example 11.2 or 12.1. (If you use an Oracle GoldenGate version that is earlier than 9.0, specify either 9.0 or 9.5.)

The release version is programmatically mapped back to an appropriate internal compatibility level. The default is the current version of the process that writes to this trail. Note that `RELEASE` versions earlier than 12.1 do not support three-part object names.

There is a dependency between `FORMAT` and the `RECOVERYOPTIONS` parameter. When `RECOVERYOPTIONS` is set to `APPENDMODE`, `FORMAT` must be set to `RELEASE 10.0` or greater. When `RECOVERYOPTIONS` is set to `OVERWRITEMODE`, `FORMAT` must be set to `RELEASE 9.5` or less.

`OBJECTDEFS | NO_OBJECTDEFS`
Use the `OBJECTDEFS` and `NO_OBJECTDEFS` options to control whether or not to include the object definitions in the trail. These two options are applicable only when the output trail is formatted in Oracle GoldenGate canonical format and the trail format release is greater than 12.1. Otherwise, both options are ignored because no metadata record will be added to the trail.
When replicating from an Open Systems database to NonStop, specify format version below 12.2 to avoid including the object definitions in the trail since NonStop does not support processing object definitions from the trail.

`TRAILBYTEORDER {BIGENDIAN | LITTLEENDIAN | NATIVEENDIAN}`
Sets the byte format of the metadata in the file records. This parameter does not affect the column data. Valid only for files that have a `FORMAT RELEASE` version of at least 12.1. Valid values are `BIGENDIAN` (big endian), `LITTLEENDIAN` (little endian), and `NATIVEENDIAN` (default of the local system). The default is `BIGENDIAN`. See the `GLOBALS` version of TRAILBYTEORDER for additional usage instructions.

Examples

Example 1

```
RMTFILE /ggs/dirdat/salesny, MEGABYTES 2, PURGE
```

Example 2

```
RMTFILE /ggs/dirdat/salesny, MEGABYTES 2, FORMAT RELEASE 10.4
```

3.148 RMTHOST

Valid For

Extract

Description

Use the `RMTHOST` parameter to:

- Identify a remote system to which the local Extract process connects
- Specify the TCP/IP port number on that system where the Manager process is running
- Control various attributes of the TCP/IP connections

This parameter controls compression, data encryption, buffer attributes, TCP/IP streaming, connection timeout threshold, and the wait period for a connection request. It also can be used to set Collector parameters.

To identify multiple remote systems in a parameter file, use one `RMTHOST` statement for each one, followed by the associated trails and table maps, for example:

```
EXTRACT sales
USERIDALIAS tiger1
RMTHOST ny, MGRPORT 7888, ENCRYPT AES192 KEYNAME mykey
RMTTRAIL /ggs/dirdat/aa
TABLE ora.orders;
RMTHOST la, MGRPORT 7888, ENCRYPT AES192 KEYNAME mykey2
RMTTRAIL /ggs/dirdat/bb
TABLE ora.orders;
```

Do not use `RMTHOST` for an Extract created in `PASSIVE` mode. .

Oracle GoldenGate supports IPv4 and IPv6 protocols. See USEIPV4 for more information about the selection of internet protocol.

The `RMTHOST` and `RMTHOSTOPTIONS` parameters can be specified together; the `RMTHOST` parameter is *not* required for `RMTHOSTOPTIONS` if the dynamic IP assignment is properly configured. When `RMTHOSTOPTIONS` is used, the `MGRPORT` option is ignored.

Default

None

Syntax

```
RMTHOST
{ host name | IP address}
[, COMPRESS]
[, COMPRESSTHRESHOLD]
[, ENCRYPT {BLOWFISH KEYNAME key_name | algorithm [KEYNAME key_name]} ]
{, MGRPORT port | PORT port}
[, PARAMS collector_parameters]
[, SOCKSPROXY {host_name | IP address} [:port] [PROXYCSALIAS credential_
store_alias [PROXYCSDOMAIN credential_store_domain]]
[, STREAMING | NOSTREAMING]
[, TCPBUFSIZE bytes]
[, TCPFLUSHBYTES bytes]
[, TIMEOUT seconds]
[, DGST SHA1|SHA2]
```

{host_name | IP_address}
The DNS host name or IP address of the target system. You can use either one to define the host. If using an IP address, use either an IPv6 or IPv4-mapped address, depending on the stack of the destination system.

COMPRESS
This option is valid for online or batch Extract processes and any Oracle GoldenGate initial-load method that uses trails. Compresses outgoing blocks of records to reduce bandwidth requirements. Oracle GoldenGate decompresses the data before writing it to the trail. `COMPRESS` typically results in compression ratios of at least 4:1 and sometimes better. However, compressing data can consume CPU resources.

COMPRESSTHRESHOLD
This option is valid for online or batch Extract processes and any Oracle GoldenGate initial-load method that uses trails. Sets the minimum block size for which compression is to occur. Valid values are from 0 and through 28000. The default is 1,000 bytes.

`ENCRYPT` *`algorithm`* `[KEYNAME` *`key_name`*`]`
This option is valid for online or batch Extract processes and all Oracle GoldenGate initial-load methods. Encrypts the data stream sent over TCP/IP to the target system. This option supports the following encryption options:

- **Master key and wallet method**: Generate a session key based on the active master key and algorithm specified. Not valid for BLOWFISH algorithm. Not valid for DB2 on z/OS, and DB2 for i.
- **ENCKEYS method**: Generate an AES encryption key, store it under a given name in an `ENCKEYS` file, and configure Oracle GoldenGate to use that key to encrypt the data.

  `algorithm`
  Specifies the encryption algorithm to use:

  - `AES128` uses the AES-128 cipher, which has a key size of 128 bits. AES128 is the default if no algorithm is specified.
  - `AES192` uses the AES-192 cipher, which has a key size of 192 bits.
  - `AES256` uses the AES-256 cipher, which has a key size of 256 bits.
  - `BLOWFISH` uses Blowfish encryption with a 64-bit block size and a variable-length key size from 32 bits to 128 bits. Use `BLOWFISH` for backward compatibility with earlier Oracle GoldenGate versions and for Oracle GoldenGate installations for DB2 z/OS and DB2 for i. On those platforms, `BLOWFISH` is the only supported encryption method. Use AES where supported, because it is more secure than `BLOWFISH` for those platforms.

  `KEYNAME` *`key_name`*
  Specifies that the `ENCKEYS` method of encryption will be used. Not valid for the master key and wallet method. For *`key_name`*, specify the logical name of the user-defined encryption key. Oracle GoldenGate uses the key name to look up the actual key in the `ENCKEYS` lookup file. To use the `ENCKEYS` method, you must:

  - Generate the encryption key.
  - Store it in an `ENCKEYS` lookup file.
  - Copy `ENCKEYS` to every system where encryption or decryption (or both) are performed.

To use AES encryption for any database other than Oracle on a 32-bit platform, the path of the `lib` sub-directory of the Oracle GoldenGate installation directory must be specified as an environment variable before starting any processes. This is not required on 64-bit platforms. Set the path as follows:

- UNIX: Specify the path as an entry to the `LD_LIBRARY_PATH` or `SHLIB_PATH` variable. For example:

  ```
  setenv LD_LIBRARY_PATH ./lib:$LD_LIBRARY_PATH
  ```

- Windows: Add the path to the `PATH` variable.

You can use the `SETENV` parameter to set the library as a session variable for the process.
For more information about using encryption, see *Administering Oracle GoldenGate for Windows and UNIX*.

MGRPORT *port* | PORT *port*
Either MGRPORT or PORT is required. MGRPORT is the port on the remote system where Manager runs. PORT is the port number of a static Collector process. Either a Manager port (if using a dynamic Collector) or a static Collector port must be specified. See "Collector Parameters" for more information about a static Collector. The minimum is 1025 and the maximum is 65535.

SOCKSPROXY {*host_name* | *IP address*} *[:port]* [PROXYCSALIAS *credential_store_alias* [PROXYCSDOMAIN *credential_store_domain*]]
Use the SOCKSPROXY parameter to replicate information using a SOCKS5 proxy server creating a tunnel for TCP communication between a source Extract and a target process. The connection is initiated in the source side. You must specify the proxy address. Optionally you can specify the port or the default for SOCKS protocol will be used. If a credential store alias is specified, Oracle GoldenGate will use that information to authenticate with the proxy server. This is an option for RMTHOST parameter.
If there is no credential store information, no authentication with the proxy is performed.

host_name | IP_address
Use for an alias Extract. Specifies the DNS host name or IP address of the proxy server. You can use either one to define the host though you must use the IP address if your DNS server is unreachable. If you are using an IP address, use either an IPv6 or IPv4 mapped address, depending on the stack of the destination system.

port
(Optional) Specifies the port on the remote system where the proxy server accepts connections. The default value for port is 1080.

PROXYCSALIAS *credential_store_alias*
Specifies the credential store alias that resolves to the username and password used to authenticate with the proxy server.

PROXYCSDOMAIN *credential_store_domain*
(Optional) Specifies the credential store domain used together with the alias.

STREAMING | NOSTREAMING
This option is valid for online or batch Extract processes and any Oracle GoldenGate initial-load method that uses trails. Controls TCP/IP streaming.

STREAMING
Enables the asynchronous internet streaming protocol and is the default. In STREAMING mode, the receiver (Collector) does not send an acknowledgement to the sender (primary Extract or data pump) for any data packet unless the packet contains a flag requesting a response, typically when the sender must checkpoint or determine a write position. Because this method omits acknowledgements, the sender or receiver process terminates if there is a network disruption; therefore, when using STREAMING, use the AUTORESTART parameter in the Manager parameter file to restart Extract and Collector if they terminate.

NOSTREAMING
Enables the synchronous internet protocol. In NOSTREAMING mode, the sender sends a packet and then waits for the receiver to acknowledge it, before sending the next packet. This method is more reliable, because it enables the sender or receiver process to recover if there is a network disruption.

Extract falls back to the synchronous protocol automatically if the host system of the receiver process is not configured to use streaming.
Keep the `STREAMING` default unless you are requested to disable it, because streaming reduces transmission latency, especially in networks where latency is a problem already. Streaming is not supported for initial-load tasks where Extract communicates directly with Replicat.

`TCPBUFSIZE` ***`bytes`***
This option is valid for online or batch Extract processes and any Oracle GoldenGate initial-load method that uses trails. Controls the size of the TCP socket buffer, in bytes, that Extract will try to maintain.
By increasing the size of the buffer, you can send larger packets to the target system.The actual size of the buffer depends on the TCP stack implementation and the network. The default is 30,000 bytes, but modern network configurations usually support higher values. Valid values are from 1000 to 200000000 (two hundred million) bytes. Work with your network administrator to determine an optimal value. See also *Administering Oracle GoldenGate for Windows and UNIX* for more information about tuning the buffer size and other suggestions for improving the transfer of data across the network.
Testing has shown that using `TCPBUFSIZE` for initial loads produces three times faster throughput than loads performed without it. Do not use this parameter if the target system is NonStop.

`TCPFLUSHBYTES` ***`bytes`***
This option is valid for online or batch Extract processes and any Oracle GoldenGate initial-load method that uses trails. Controls the size of the buffer, in bytes, that collects data that is ready to be sent across the network.
When either this value or the value of the `FLUSHSECS` parameter is reached, the data is flushed to the target. The default is 30,000 bytes. Valid values are from 1000 to 200000000 (two hundred million) bytes, but should be at least the value of `TCPBUFSIZE`.
Do not use this parameter for an initial load Extract. It is valid only for an online Extract group. Do not use this parameter if the target system is NonStop.

`TIMEOUT` ***`seconds`***
This option is valid for online or batch Extract processes and any Oracle GoldenGate initial-load method that uses trails. Specifies how long Collector waits to get a connection from Extract, and how long Collector waits for a heartbeat signal from Extract before terminating a connection. Valid values are 1 second to 1800 seconds (30 minutes). The default value is 300 seconds (5 minutes). Setting the timeout to a very low value is not recommended in a production setting. You might need to increase the `TIMEOUT` value if you see a warning in the error log that there was a TCP/IP error 10054 (existing connection forcibly closed by remote host). This error typically occurs when the Collector terminates itself after the `TIMEOUT` value is exceeded. This parameter does not affect a static Collector.

`DGST` ***`SHA1`*****`|`*****`SHA2`***
This is a new Extract option to specify the AES encryption method. This option is only valid when the RMTHOST parameter is used with `PORT` and `ENCRYPT AES` options using Oracle wallet. Valid value is either `SHA1` or `SHA2`. `SHA1` is default and works with the previous release of server collector. `SHA2` only works with Server Collector 12.3. Both Extract and Server Collector must specify the same encryption method, otherwise the connection fails. Here’s an example of using this option:

```
$ server -p 9050 -encrypt AES128 -dgst SHA2
```

Examples

Example 1

```
RMTHOST 20.20.20.17, MGRPORT 7809, ENCRYPT AES192, KEYNAME newyork
```

Example 2

```
RMTHOST 20.20.20.17, MGRPORT 7809, ENCRYPT AES192
```

Example 3

```
RMTHOST newyork, MGRPORT 7809, COMPRESS, COMPRESSTHRESHOLD 750, NOSTREAMING
```

Example 4

```
RMTHOST newyork, MGRPORT 7809, TCPBUFSIZE 100000, TCPFLUSHBYTES 300000
```

Example 5

```
RMTHOST newyork, MGRPORT 18819, CPU 1, PRI 140, HOMETERM $ZTN0.#PTJ52A1,
PROCESSNAME $xyz1
```

Example 6

```
RMTHOST lc01abc, MGRPORT 7809, SOCKSPROXY 192.111.82.180:3128 PROXYCSALIAS
proxyAlias PROXYCSDOMAIN support
```

3.149 RMTHOSTOPTIONS

Valid For

Passive Extract

Description

Use the `RMTHOSTOPTIONS` parameter to control attributes of a TCP/IP connection made between an Extract group running in `PASSIVE` mode on a less trusted source to a target system in a more secure network zone. This parameter controls compression, data encryption, buffer attributes, streaming, and the wait period for a connection request. It also can be used to set Collector parameters.

This parameter differs from the `RMTHOST` parameter because it does not provide the host information needed to establish a remote connection. When Extract is running in `PASSIVE` mode, all connections between source and target are established by an alias Extract group on the target.

All parameter options must be specified in one `RMTHOSTOPTIONS` statement. If multiple `RMTHOSTOPTIONS` statements are used, the last one in the parameter file is used, and the others are ignored. `RMTHOSTOPTIONS` overrides any `RMTHOST` statements in the file.

See `RMTHOST` for additional information about supported IP protocols.

The `RMTHOST` and `RMTHOSTOPTIONS` parameters can be specified together; the `RMTHOST` parameter is *not* required for `RMTHOSTOPTIONS` if the dynamic IP assignment is properly configured. When `RMTHOSTOPTIONS` is used, the `MGRPORT` option is ignored.

For more information about using Oracle GoldenGate in a zoned network, see *Administering Oracle GoldenGate for Windows and UNIX*.

Default

None

Syntax

```
RMTHOSTOPTIONS
[, COMPRESS]
[, COMPRESSTHRESHOLD]
[, ENCRYPT algorithm [KEYNAME key_name]]
[, PARAMS collector_parameters]
[, STREAMING | NOSTREAMING]
[, TCPBUFSIZE bytes]
[, TCPFLUSHBYTES bytes]
[, TIMEOUT seconds]
```

`COMPRESS`
Compresses outgoing blocks of records to reduce bandwidth requirements. Oracle GoldenGate decompresses the data before writing it to the trail. `COMPRESS` typically results in compression ratios of at least 4:1 and sometimes better. However, compressing data can consume CPU resources.

`COMPRESSTHRESHOLD`
Sets the minimum block size for which compression is to occur. Valid values are from 0 and through 28000. The default is 1,000 bytes.

`ENCRYPT` *`algorithm`* `[KEYNAME` *`key_name`*`]`
Encrypts the data stream sent over TCP/IP to the target system. This option supports the following encryption options:

- **Master key and wallet method**: Generate a one-time AES key to encrypt the data across the TCP/IP network. Then, the one-time key is encrypted by the master-key and stored in the trail file header.
- **ENCKEYS method**: Generate an AES encryption key, store it under a given name in an `ENCKEYS` file, and configure Oracle GoldenGate to use that key to directly encrypt the data across the TCP/IP network.

  `algorithm`
  Specifies the encryption algorithm to use:

  - `AES128` uses the AES-128 cipher, which has a key size of 128 bits. AES128 is the default if no algorithm is specified.
  - `AES192` uses the AES-192 cipher, which has a key size of 192 bits.
  - `AES256` uses the AES-256 cipher, which has a key size of 256 bits.
  - `BLOWFISH` uses Blowfish encryption with a 64-bit block size and a variable-length key size from 32 bits to 128 bits. Use `BLOWFISH` for backward compatibility with earlier Oracle GoldenGate versions and for Oracle GoldenGate installations for DB2 on z/OS, DB2 for i, and SQL/MX on NonStop. On those platforms, `BLOWFISH` is the only supported encryption method. Use AES where supported, because it is more secure than `BLOWFISH` for those platforms.

`KEYNAME` ***`key_name`***
Specifies that the `ENCKEYS` method of encryption will be used. Not valid for the master key and wallet method. For *`key_name`*, specify the logical name of the user-defined encryption key. Oracle GoldenGate uses the key name to look up the actual key in the `ENCKEYS` lookup file. To use the `ENCKEYS` method, you must:

- Generate the encryption key.
- Store it in an `ENCKEYS` lookup file.
- Copy `ENCKEYS` to every system where encryption or decryption (or both) are performed.

To use AES encryption for any database other than Oracle on a 32-bit platform, the path of the `lib` sub-directory of the Oracle GoldenGate installation directory must be specified as an environment variable before starting any processes. This is not required on 64-bit platforms. Set the path as follows:

- UNIX: Specify the path as an entry to the `LD_LIBRARY_PATH` or `SHLIB_PATH` variable. For example:

  ```
  setenv LD_LIBRARY_PATH ./lib:$LD_LIBRARY_PATH
  ```

- Windows: Add the path to the `PATH` variable.

You can use the `SETENV` parameter to set the library as a session variable for the process.
For more information about using encryption, see the *Administering Oracle GoldenGate for Windows and UNIX*.

`PARAMS` ***`collector_parameters`***
Specifies Collector parameters on a NonStop target system.

Note:

Do not specify a Collector port (`-p` argument) if Manager will be starting Collector dynamically.

For more information about Collector parameters on the NonStop platform, see *Reference Guide for Oracle GoldenGate for HP NonStop (Guardian)*.

`STREAMING | NOSTREAMING`
Controls TCP/IP streaming.

`STREAMING`
Enables the asynchronous internet streaming protocol and is the default. In `STREAMING` mode, the receiver (Collector) does not send an acknowledgement to the sender (primary Extract or data pump) for any data packet unless the packet contains a flag requesting a response, typically when the sender must checkpoint or determine a write position. Because this method omits acknowledgements, the sender or receiver process terminates if there is a network disruption; therefore, when using `STREAMING`, use the `AUTORESTART` parameter in the Manager parameter file to restart Extract and Collector if they terminate.

`NOSTREAMING`
Enables the synchronous internet protocol. In `NOSTREAMING` mode, the sender sends a packet and then waits for the receiver to acknowledge it, before sending the next packet. This method is more reliable, because it enables the sender or receiver process to recover if there is a network disruption.

Extract falls back to the synchronous protocol automatically if the host system of the receiver process is not configured to use streaming.
Keep the `STREAMING` default unless you are requested to disable it, because streaming reduces transmission latency, especially in networks where latency is a problem already. Streaming is not supported for initial-load tasks where Extract communicates directly with Replicat.

`TCPFLUSHBYTES` ***`bytes`***
Controls the size of the buffer, in bytes, that collects data that is ready to be sent across the network. When either this value or the value of the `FLUSHSECS` parameter is reached, the data is flushed to the target.
The default is 30,000 bytes. Valid values are from 1000 to 200000000 (two hundred million) bytes, but should be at least the value of `TCPBUFSIZE`.
Do not use this parameter for an initial load Extract. It is valid only for an online Extract group. Do not use this parameter if the target system is NonStop.

`TIMEOUT` ***`seconds`***
Specifies how long an Extract running in `PASSIVE` mode waits to get a connection from Collector, and how long Extract waits for a heartbeat signal from Collector before terminating a connection. Valid values are 1 second to 1800 seconds (30 minutes). The default value is 300 seconds (5 minutes). Setting the timeout to a very low value is not recommended in a production setting. You might need to increase the `TIMEOUT` value if you see a warning in the error log that there was a TCP/IP error 10054 (existing connection forcibly closed by remote host). This error typically occurs when the Extract terminates itself after the `TIMEOUT` value is exceeded.

Example

```
RMTHOSTOPTIONS ENCRYPT AES192, KEYNAME newyork, COMPRESS, COMPRESSTHRESHOLD 750,
TCPBUFSIZE 100000, TCPFLUSHBYTES 300000, NOSTREAMING
```

3.150 RMTTASK

Valid For

Extract

Description

Use the `RMTTASK` parameter for an initial-load Extract to initiate a Replicat processing task during an Oracle GoldenGate direct load or a direct bulk load to SQL*Loader. `RMTTASK` directs Extract to communicate directly with Replicat over TCP/IP and bypasses the use of a Collector process or trail storage. `RMTTASK` also directs Extract to request that Manager start Replicat automatically, and then stop Replicat when the run is finished. Tasks do not use checkpoints.

Dependent parameters are as follows:

- A `RMTHOST` statement must follow each `RMTTASK` statement in the initial-load Extract parameter file.

- `EXTRACT` must be used in the initial-load Extract parameter file.
- `REPLICAT` must be used in the initial-load Replicat parameter file.
- `SOURCEISTABLE` must be used in the `ADD EXTRACT` command.
- `SPECIALRUN` must be used in the `ADD REPLICAT` command.

`RMTTASK` does not support encryption of any kind. To use encryption, you can use the initial-load method that writes data to a file, which is read by Replicat to load the data.

`RMTTASK` supports all Oracle data types, including BLOB, CLOB, NCLOB, LONG, UDT, and XML.

When using `RMTTASK`, do not start Replicat with the `START REPLICAT` command. Replicat is started automatically during the task.

See the *Administering Oracle GoldenGate for Windows and UNIX* for more information about performing initial data loads.

Default

None

Syntax

```
RMTTASK REPLICAT, GROUP group_name
[FORMAT RELEASE major.minor]
```

`GROUP` ***`group_name`***
The group name of the Initial Load Replicat on the target system.

`FORMAT RELEASE` ***`major.minor`***
Specifies the metadata format of the data that is sent by Extract to Replicat. The metadata tells Replicat whether the data records are of a version that it supports. The metadata format depends on the version of the Oracle GoldenGate process. Older Oracle GoldenGate versions contain different metadata than newer ones.

- `FORMAT` is a required keyword.
- `RELEASE` specifies an Oracle GoldenGate release version. *`major`* is the major version number, and *`minor`* is the minor version number. The `X.x` must reflect a current or earlier, generally available (GA) release of Oracle GoldenGate. Valid values are 9.0 through the current Oracle GoldenGate `X.x` version number, for example 11.2 or 12.1. (If you use an Oracle GoldenGate version that is earlier than 9.0, specify either 9.0 or 9.5.)

  The release version is programmatically mapped back to an appropriate internal compatibility level. The default is the current version of the process that writes to this trail. Note that `RELEASE` versions earlier than 12.1 do not support three-part object names.

There is a dependency between `FORMAT` and the `RECOVERYOPTIONS` parameter. When `RECOVERYOPTIONS` is set to `APPENDMODE`, `FORMAT` must be set to `RELEASE 10.0` or greater. When `RECOVERYOPTIONS` is set to `OVERWRITEMODE`, `FORMAT` must be set to `RELEASE 9.5` or less.
See *Administering Oracle GoldenGate for Windows and UNIX* for more information about initial loads.

Example

```
RMTTASK REPLICAT, GROUP initrep, FORMAT RELEASE 10.0
```

3.151 RMTTRAIL

Valid For

Extract

Description

Use the RMTTRAIL parameter to specify a remote trail that was created with the ADD RMTTRAIL command in GGSCI. A trail specified with RMTTRAIL must precede its associated TABLE statements. Multiple RMTTRAIL statements can be used to specify different remote trails. RMTTRAIL must be preceded by a RMTHOST parameter.

You can encrypt the data in this trail by using the ENCRYPTTRAIL parameter. See "ENCRYPTTRAIL | NOENCRYPTTRAIL" for more information.

Default

None

Syntax

```
RMTTRAIL trail_name
[, FORMAT RELEASE major.minor]
[, OBJECTDEFS | NO_OBJECTDEFS]
[, TRAILBYTEORDER {BIGENDIAN | LITTLEENDIAN | NATIVEENDIAN}]
```

name
The relative or fully qualified path name of the trail. Use two characters for the name. As trail files are aged, a six-character sequence number will be added to this name, for example /ggs/dirdat/rt000001.

FORMAT RELEASE *major.minor*
Specifies the metadata format of the data that is sent by Extract to the trail. The metadata tells the reader process whether the data records are of a version that it supports. Older Oracle GoldenGate versions contain different metadata than newer ones.

- FORMAT is a required keyword.
- RELEASE specifies an Oracle GoldenGate release version. *major* is the major version number, and *minor* is the minor version number. The X.x must reflect a current or earlier, generally available (GA) release of Oracle GoldenGate. Valid values are 9.0 through the current Oracle GoldenGate X.x version number, for example 11.2 or 12.1. (If you use an Oracle GoldenGate version that is earlier than 9.0, specify either 9.0 or 9.5.)

  The release version is programmatically mapped back to an appropriate internal compatibility level. The default is the current version of the process that writes to this trail. Note that RELEASE versions earlier than 12.1 do not support three-part object names.

There is a dependency between FORMAT and the RECOVERYOPTIONS parameter. When RECOVERYOPTIONS is set to APPENDMODE, FORMAT must be set to RELEASE 10.0 or greater. When RECOVERYOPTIONS is set to OVERWRITEMODE, FORMAT must be set to RELEASE 9.5 or less.

See *Administering Oracle GoldenGate for Windows and UNIX* for additional information about Oracle GoldenGate trail file versioning and recovery modes.

`OBJECTDEFS | NO_OBJECTDEFS`
Use the `OBJECTDEFS` and `NO_OBJECTDEFS` options to control whether or not to include the object definitions in the trail. These two options are applicable only when the output trail is formatted in Oracle GoldenGate canonical format and the trail format release is greater than 12.1. Otherwise, both options are ignored because no metadata record will be added to the trail.
When replicating from an Open Systems database to NonStop, specify format version below 12.2 to avoid including the object definitions in the trail since NonStop does not support processing object definitions from the trail.

`TRAILBYTEORDER {BIGENDIAN | LITTLEENDIAN | NATIVEENDIAN}`
Sets the byte format of the metadata in the trail records. This parameter does not affect the column data. Valid only for trails that have a `FORMAT RELEASE` version of at least 12.1. Valid values are `BIGENDIAN` (big endian), `LITTLEENDIAN` (little endian), and `NATIVEENDIAN` (default of the local system). The default is `BIGENDIAN`. See the `GLOBALS` version of TRAILBYTEORDER for additional usage instructions.

Examples

Example 1

```
RMTTRAIL dirdat/ny
```

Example 2

```
RMTTRAIL /ggs/dirdat/ny, FORMAT RELEASE 10.4
```

Example 3
Two trail formats within the same sets of tables being captured:

```
FORMAT RELEASE  11.2
TABLE tab1
TABLE tab2
FORMAT RELEASE 12.1
TABLE tab1
TABLE tab2
```

Example 4
Example of a data pump parameter file that sends an HR schema with object definitions and an ORD schema without object definitions:

```
RMTTRAIL $data/ggs12.2/a1, OBJECTDEFS
TABLE hr.*;
RMTTRAIL $data/ggs12.2/a2, NO_OBJECTDEFS
TABLE ord.*;
```

3.152 ROLLOVER

Valid For

Extract

Description

Use the `ROLLOVER` parameter to specify the interval at which trail files are aged and new ones are created. `ROLLOVER` is global and applies to all trails defined with `RMTTRAIL` or `RMTFILE` statements in a parameter file.

Use `ROLLOVER` to create trail files that represent distinct periods of time (for example, each day). It facilitates continuous processing while providing a means for organizing the output. It also provides a means for organizing batch runs by deactivating one file and starting another for the next run.

Files roll over between transactions, not in the middle of one, ensuring data integrity. Checkpoints are recorded when files roll over to ensure that previous files are no longer required for processing.

Rollover occurs only if the rollover conditions are satisfied during the run. For example, if `ROLLOVER ON TUESDAY` is specified, and data extraction starts on Tuesday, the rollover does not occur until the next Tuesday (unless more precise `ROLLOVER` rules are specified). You can specify up to 30 rollover rules.

Either the `AT` or `ON` option is required. Both options can be used together, and in any order. Using `AT` without `ON` creates a new trail file at the specified time every day.

A trail sequence number can be incremented from 000001 through 999999, and then the sequence numbering starts over at 000000.

Default

Roll over when the default file size is reached or the size specified with the `MEGABYTES` option of the `ADD RMTTRAIL` or `ADD EXTTRAIL` command is reached.

Syntax

```
ROLLOVER {AT hh:mi | ON day | AT hh:mi ON day} [REPORT]
```

`AT` *`hh:mi`*
The time of day to age the file.
Valid values:

- `hh` is based on a 24-hour clock, with valid values of 1 through 23.
- `mi` accepts values from 00 through 59.

`ON` *`day`*
The day of the week to age the file.
Valid values:

```
SUNDAY
MONDAY
TUESDAY
WEDNESDAY
THURSDAY
FRIDAY
SATURDAY
```

The values are not case-sensitive.

REPORT
Generates a report for the number of records extracted from each table since the last report was generated. The report represents the number of records output to the corresponding trail unless other reports are generated by means of the `REPORT` parameter.

Examples

Example 1

The following ages trails every day at 3:00 p.m.

```
ROLLOVER AT 15:00
```

Example 2

The following ages trails every Sunday at 8:00 a.m.

```
ROLLOVER AT 08:00 ON SUNDAY
```

3.153 SCHEMAEXCLUDE

Valid For

Extract, Replicat, DEFGEN

Description

Use the `SCHEMAEXCLUDE` parameter to exclude source objects that are owned by the specified source owner (such as a schema) from the Oracle GoldenGate configuration when wildcards are being used to specify the owners in `TABLE` or `MAP` statements. This parameter is valid for two- and three-part names.

Wildcards can be used for the optional *`catalog`* or *`container`* specification, as well as the *`schema`* specification. Make certain not to use wildcards such that all objects are excluded. Follow the rules for using wildcards in *Administering Oracle GoldenGate for Windows and UNIX*.

The positioning of `SCHEMAEXCLUDE` in relation to parameters that specify files or trails determines its effect. Parameters that specify trails or files are: `EXTFILE`, `RMTFILE`, `EXTTRAIL`, `RMTTRAIL`. The parameter works as follows:

- When a `SCHEMAEXCLUDE` specification is placed before any `TABLE` or `SEQUENCE` parameters, and also before the parameters that specify trails or files, it applies globally to all trails or files, and to all `TABLE` and `SEQUENCE` parameters.
- When a `SCHEMAEXCLUDE` specification is placed after a parameter that specifies a trail or file, it is effective only for that trail or file and only for the `TABLE` or `SEQUENCE` parameters that are associated with it. Multiple trail or file specifications can be made in a parameter file, each followed by a set of `TABLE`, `SEQUENCE`, and `TABLEEXCLUDE` specifications.

`SCHEMAEXCLUDE` is evaluated before evaluating the associated `TABLE` or `SEQUENCE` parameters. Thus, the order in which they appear does not make a difference.

See also the EXCLUDEWILDCARDOBJECTSONLY parameter.

Default

None

Syntax

```
SCHEMAEXCLUDE [container. | catalog.]schema
```

container. | catalog.
If the database requires three-part names, specifies the source Oracle container or SQL/MX catalog that contains the source owner that is to be excluded. Use if a qualifier is required to identify the correct owner to exclude.

schema
Specifies the name of the source owner that is to be excluded. For databases that require three-part names, you can use *schema* without *catalog* if the SCHEMAEXCLUDE specification precedes a set of TABLE or MAP parameters for which the default container or catalog is specified with the SOURCECATALOG parameter, or if the SQL/MX catalog is defined by the SOURCEDB or TARGETDB parameter.

Examples

Example 1
This example excludes the source test* schemas. Note that it omits the catalog specification from the owner name because the catalog is specified with the SOURCEDB parameter in a SQL/MX configuration.

```
EXTRACT capt
SOURCEDB catalog1, USERID schema1
RMTHOST sysb, MGRPORT 7809
RMTTRAIL /ggs/dirdat/aa
SCHEMAEXCLUDE test*
TABLE *.*;
```

Example 2
This Oracle example requires both *catalog* (container) and *schema* specifications and demonstrates how wildcards can be used as part of the specification.

```
EXTRACT capt
USERIDALIAS alias1
RMTHOST sysb, MGRPORT 7809
RMTTRAIL /ggs/dirdat/aa
SCHEMAEXCLUDE pdbtest.test*
TABLE pdb*.*.*;
```

Example 3
This example shows how to use SCHEMAEXCLUDE when the database requires only a two-part name.

```
TABLE abc*.*;
SCHEMAEXCLUDE abctest*
```

3.154 SEQUENCE

Valid For

Extract

Description

Use the `SEQUENCE` parameter to capture sequence values from the transaction log. Currently, Oracle GoldenGate supports sequences for the Oracle database.

> **Note:**
>
> DDL support for sequences (`CREATE`, `ALTER`, `DROP`, `RENAME`) is compatible with, but not required for, replicating sequence values. To replicate just sequence values, you *do not* need to install the Oracle GoldenGate DDL support environment. You can just use the `SEQUENCE` parameter.

Oracle GoldenGate ensures that the values of a target sequence are:

- higher than the source values if the increment interval is positive
- lower than the source values if the increment interval is negative

Depending on the increment direction, Replicat applies one of the following formulas as a test when it performs an insert:

```
source_highwater_value + (source_cache_size * source_increment_size) =
target_highwater_value
```

Or...

```
source_highwater_value + (source_cache_size * source_increment_size) >=
target_highwater_value
```

If the formula evaluates to `FALSE`, the target sequence is updated to be higher than the source value (if sequences are incremented) or lower than the source value (if sequences are decremented). The target must always be ahead of, or equal to, the expression in the parentheses in the formula. For example, if the source high water value is 40, and `CACHE` is 20, the target high water value should be at least 60:

```
40 + (20*1) <60
```

If the target high water value is less than 80, Oracle GoldenGate updates the sequence to increase the high water value, so that the target remains ahead of the source. To get the current high water value, perform this query:

```
SELECT last_number FROM all_sequences WHERE sequence_owner=upper('SEQUENCEOWNER')
AND sequence_name=upper('SEQUENCENAME');
```

Supported Processing Modes

The processing modes that support the capture of sequences are as follows:

- Oracle GoldenGate supports sequences in an active-passive high-availability configuration. Oracle GoldenGate does not support the replication of sequence values in an active-active configuration. An active-passive configuration includes a primary Extract, a data pump, and a Replicat on both servers, but the processes are active in only one direction. The Extract process on the failover server must be inactive, which includes not capturing sequences. See the *Administering Oracle GoldenGate for Windows and UNIX* for more information about how to configure Oracle GoldenGate for high-availability.

- If using `SEQUENCE` for a primary Extract that writes to a data pump, you must also use an identical `SEQUENCE` parameter in the data pump.
- Oracle GoldenGate initial load methods that contain the `SOURCEISTABLE` parameter, either as an Extract parameter or within `ADD EXTRACT`, do not support the replication of sequence values.

Guidelines for Using SEQUENCE

- The cache size and the increment interval of the source and target sequences must be identical.
- The cache can be any size, including 0 (`NOCACHE`).
- The sequence can be set to cycle or not cycle, but the source and target databases must be set the same way.
- To add `SEQUENCE` to a configuration in which DDL support is enabled, you must re-install the Oracle GoldenGate DDL objects in `INITIALSETUP` mode.

Error Handling

- If Extract cannot resolve a sequence name, it ignores the operation.
- To enable Replicat error handling for sequences, use the `REPERROR` parameter. This parameter is available as an option in the `MAP` parameter and also as a standalone parameter. `REPERROR` can detect if a sequence has been dropped on the target and can be used to retry a sequence operation until the sequence is recreated.
- `REPERROR` does not handle missing objects on startup. Use `DDLERROR` with `IGNOREMISSINGTABLES`.

Other Important Information

- Gaps are possible in the values of the sequences that Oracle GoldenGate replicates because gaps are inherent, and expected, in the way that sequences are maintained by the database. However, the target values will always be greater than those of the source.
- If Extract is running in single-threaded mode on a RAC system, and if sequences are updated on a node that has lag, it might take more time to capture a sequence. This is normal behavior.
- In a failover, any problem that causes the loss or corruption of data in a transaction log or Oracle GoldenGate trail file will cause the loss of the replicated sequence updates.
- The statistics shown by `SEND EXTRACT` and `SEND REPLICAT` when used with the `REPORT` option will show the sequence operation as an `UPDATE`.

Default

None

Syntax

```
SEQUENCE [container.]schema.sequence;
```

`[container.]schema.sequence`
Specifies the fully qualified name of the source sequence. Include the name of the pluggable database if the source is an Oracle container database. To specify object names and wildcards correctly, see *Administering Oracle GoldenGate for Windows and UNIX*.

`;`
Terminates the `SEQUENCE` parameter statement.

Example

```
SEQUENCE hr.employees_seq;
```

3.155 SESSIONCHARSET

Valid For

GLOBALS, not valid for MySQL, Sybase, or Teradata

Description

Use the `SESSIONCHARSET` parameter to set the database session character set for all database connections that are initiated by Oracle GoldenGate processes in the local Oracle GoldenGate instance. Processes that log into the database include GGSCI, DEFGEN, Extract, and Replicat.

This parameter supports Sybase, Teradata and MySQL. The database character set for other databases is obtained programmatically.

To display the language information in the process report file when using this option for a Sybase database, make certain that `locale.dat` is set properly in the Sybase installation directory. If the character set is not found in the supported Sybase database character set, then it is validated against the Oracle GoldenGate supported character set list. The character-set information is displayed with the `LOCALE INFORMATION` entry in the report output.

The `SESSIONCHARSET` option of the `DBLOGIN` command can be used to override this setting for any commands issued in the same GGSCI session. The `SESSIONCHARSET` option of the `SOURCEDB` and `TARGETDB` parameters can be used to override this setting for individual process logins.

Default

Character set of the operating system

Syntax

```
SESSIONCHARSET character_set
```

`character_set`
The database session character set.

Example

```
SESSIONCHARSET ISO-8859-11
```

3.156 SETENV

Valid For

Extract and Replicat

Description

Use the `SETENV` parameter to set a value for an environment variable. When Extract or Replicat starts, it uses the specified value instead of the one that is set in the operating system environment. A variable set in the `SETENV` statement overrides any existing variables set at the operating system level. Use one `SETENV` statement per variable to be set.

For integrated extracts, you can set new environment variables if they are available from the lcr server. The new environment variables are:

- `USERNAME`: Database login user name
- `OSUSERNAME`: Operating System user name
- `MACHINENAME`: Name of the host, machine, or server where the database is running
- `PROGRAMNAME`: Name of program or application that started the transaction or session
- `CLIENTIDENTIFIER`: Value set using `DBMS_SESSION.set_identifier()`

`SETENV` cannot be used with query parameters.

Default

None

Syntax

```
SETENV (
{environment_variable |
  GGS_CacheRetryCount |
  GGS_CacheRetryDelay}
= 'value'
)
```

`environment_variable`
The name of the environment variable to be set.

`'value'`
A value for the specified variable. Enclose the value within single quotes.

`GGS_CacheRetryCount`
(SQL Server) Oracle GoldenGate environment parameter that controls the number of times that Extract tries to read the source transaction log files when they are blocked because of excessive system activity. The default is 10 retries. After trying the specified number of times, Extract abends with an error that begins as follows:

```
GGS ERROR 600 [CFileInfo::Read] Timeout expired after 10 retries with 1000 ms delay
waiting to read transaction log or backup files.
```

If you continue to see timeout messages in the report file or error log, increase this parameter to allow more retries.

`GGS_CacheRetryDelay`
(SQL Server) Oracle GoldenGate environment parameter that controls the number of milliseconds that Extract waits before trying again to read the transaction logs when the previous attempt has failed. The default is 1000 milliseconds delay.

Examples

Example 1

Using separate `SETENV` statements allows a single instance of Oracle GoldenGate to connect to multiple Oracle database instances without having to change environment settings. The following parameter statements set a value for `ORACLE_HOME` and `ORACLE_SID`.

```
SETENV (ORACLE_HOME = '/home/oracle/ora9/product')
SETENV (ORACLE_SID = 'ora9')
```

Example 2

The following parameter statements set values for Oracle GoldenGate in a SQL Server environment where Extract tries to read the transaction log for a maximum of 20 times before abending, with a delay of 3000 milliseconds between tries.

```
SETENV (GGS_CacheRetryCount = 20)
SETENV (GGS_CacheRetryDelay = 3000)
```

3.157 SHOWSYNTAX

Valid For

Replicat

Description

Use the `SHOWSYNTAX` parameter to start an interactive session where you can view each Replicat SQL statement before it is applied. Viewing SQL statements that failed may help you diagnose the cause of the problem. For example, you could find out that the `WHERE` clause is using a non-indexed column.

As long as a data type can be applied with dynamic SQL and the column data is bound with a SQL statement, Replicat shows some or all of the data in string form, hexadecimal form, or as a data identifier, depending on the data type. By default, Replicat does not show LOB data or other data types that are treated as a LOB by the database or by Oracle GoldenGate, whether or not the data is bound in SQL. Examples are LOB, XML, and UDT data types. Instead, Replicat shows a data identifier, for example "`<LOB data>`." To display this type of data, specify the `INCLUDELOB` option of `SHOWSYNTAX`. If the column data is not bound in a SQL statement, Replicat does not show the data even when `INCLUDELOB` is used.

If `CHAR/VARCHAR/CLOB` or `NCHAR/NVARCHAR/NCLOB` character data has an unprintable character (U+0000 to U+001F), the character is escaped and displayed in `\xx` form, where *xx* is a decimal value that ranges from 00 to 31.

The first time that you use `SHOWSYNTAX`, request guidance from Oracle Support. It is a debugging parameter and can cause unwanted results if used improperly. It requires manual intervention, which suspends automated processing and can cause backlogs and latency. Use `SHOWSYNTAX` in a test environment. Create duplicates of your Replicat groups and target tables so that the production environment is not affected.

`SHOWSYNTAX` is not supported for a coordinated Replicat group.

If used for an integrated Replicat group, `sqltrace` is enabled for the associated database apply process.

If you capture XML column data using Integrated Extract, the column is captured as updated column even if you do not update the column. As a result of this behavior, `SHOWSYNTAX` shows the XML column as updated column. However, if you capture the table using Classic Extract, the XML column does not appear in the `SHOWSYNTAX` SQL statement if the column is not part of the update.

To use `SHOWSYNTAX`, Replicat must be started from the command shell of the operating system. Do not use `SHOWSYNTAX` if Replicat is started through GGSCI.

`BATCHSQL` processing is suspended when `SHOWSYNTAX` is running. `BATCHSQL` mode is resumed when Replicat is re-started without `SHOWSYNTAX`.

To use `SHOWSYNTAX`, do the following:

1. From the Oracle GoldenGate home directory, start Replicat from the command shell of the operating system using the following syntax. This syntax eliminates the `reportfile` option and directs the output to the screen.

   ```
   replicat paramfile dirprm/Replicat_name.prm
   ```

2. The first SQL statement is displayed with some prompts.
   - Choose `Keep Displaying` (the default) to execute the current statement and display the next one.
   - Choose `Stop Display` to resume normal processing and stop printing SQL statements to screen.
3. When finished viewing syntax, remove `SHOWSYNTAX` from the parameter file.

Default

None

Syntax

```
SHOWSYNTAX [APPLY | NOAPPLY] [INCLUDELOB [max_bytes | ALL]]
```

`APPLY | NOAPPLY`
Controls whether or not Replicat applies the data that is displayed with `SHOWSYNTAX` to the target database. The default is `APPLY` (apply the data to the target database). `NOAPPLY` prevents the application of the data to the target and does not write the records to the discard file.

`INCLUDELOB [`*`max_bytes`*`] | ALL`
Includes `LOB`, `XML`, and `UDT` data in the `SHOWSYNTAX` output. Without this option, only a data identifier is displayed, such as "`<LOB data>`." The default is 2.

> ***`max_bytes`***
> Specifies the maximum length of `LOB`, `XML`, or `UDT` data that is displayed. Valid units are `K`, `M`, or `G`. The default is to display the first 2K bytes.

`ALL`
Displays `LOB` data in its entirety.

Example

```
SHOWSYNTAX INCLUDELOB 1M
```

3.158 SOURCECATALOG

Valid For

Extract and Replicat

Description

Use the `SOURCECATALOG` parameter to specify one of the following for subsequent `TABLE` or `MAP` statements that contain two-part names, where three-part object names are required to fully identify an object:

- a default source Oracle pluggable database (PDB)
- a default source SQL/MX user catalog

This parameter provides an efficient alternative to specifying the full three-part object name (`container.schema.object` or `catalog.schema.object`) when specifying source objects from an Oracle consolidated database or a SQL/MX database. Only the two-part name (`schema.object`) need be specified in subsequent `TABLE` or `MAP` statements when `SOURCECATALOG` is used. You can use multiple instances of `SOURCECATALOG` to specify different default containers or catalogs for different sets of `TABLE` statements (or `SEQUENCE` statements, if Oracle).

Three-part name specifications encountered after `SOURCECATALOG` override the `SOURCECATALOG` specification in a `TABLE` statement, `MAP` statement, or other parameter that takes object names as input.

Default

None

Syntax

```
SOURCECATALOG {container | catalog}
```

`container`
The name of an Oracle pluggable database that contains the specified objects in the `TABLE` of `MAP` statement.

`catalog`
The name of a SQL/MX user catalog that contains the specified objects in the `TABLE` or `MAP` statement.

Example

In the following example, `SOURCECATALOG` is used to specify three different source Oracle PDBs in an Extract parameter file.

```
SOURCECATALOG FINANCETABLE SAP.*;
TABLE REPORTS.*;
SOURCECATALOG HRTABLE SIEBEL.*;
```

```
TABLE REPORTS.*;
SOURCECATALOG MFG
TABLE CUSTOMER.ORDERS;
TABLE REPORTS.*;
TABLE HQ.LOCATIONS.*;
```

In this example, Extract captures the following:

- All tables in the `SAP` and `REPORTS` schemas in the `FINANCE` PDB.
- All tables in the `SIEBEL` and `REPORTS` schemas in the `HR` PDB.
- All tables in the `CUSTOMER` and `REPORTS` schemas in the `MFG` PDB.
- For the last `TABLE` statement, Extract captures all tables in the `LOCATIONS` schema in the `HQ` PDB. This statement is a fully qualified three-part name and overrides the previous `SOURCECATALOG` specification.

3.159 SOURCECHARSET

Valid For

Replicat

Description

Use the `SOURCECHARSET` parameter to control the conversion of data from the source character set to the target character set by Replicat. Replicat converts character sets by default for versions 11.2.1 and later, but you may need to intervene in the following cases:

- To enable accurate conversion of data written by an Extract version earlier than 11.2.1. Extract versions prior to version 11.2.1 do not write information about the source character set to the trail, so the information must be supplied to Replicat directly. Extract versions 11.2.1 and later write information about the source character set to the trail for use by Replicat, and any `SOURCECHARSET` specification is ignored.
- To override the source database character set in the trail file. Use `SOURCECHARSET` with the `OVERRIDE` option to specify the character set you want to use. An example use case is migrating a database to UNICODE or particular character set database from garbage in, garbage out type of non-character set aware database by ignoring the source database character set.

Replicat issues a warning message when it uses the `SOURCECHARSET` character set.

Use the REPLACEBADCHAR parameter to handle validation errors where there are invalid characters in the source data or the target character set does not support a source character. It provides options to abend on these errors, skip the record that caused the error, or specify a substitute value for the character.

Default

None

Syntax

```
SOURCECHARSET {source_charset | PASSTHRU | OVERRIDE} [DB2ZOS]
```

source_charset
Specifies the source character set for data that is written by an Extract version that is earlier than 11.2.1. Replicat uses the specified character set when converting character-type columns to the target character set.
For *source_charset*, specify the appropriate character-set identifier that represents the source database. For a list of supported character sets, see *Administering Oracle GoldenGate for Windows and UNIX*.
For Oracle, if SOURCECHARSET is not specified but there is an NLS_LANG environment variable on the target, Replicat uses the NLS_LANG value as the source database character set. If neither SOURCECHARSET nor NLS_LANG is present, Replicat abends to prevent possible data corruption.

PASSTHRU
PASSTHRU
Forces Replicat to apply the data without converting the character set. Character set differences are ignored as follows:

- If the database is Oracle, the data is applied the way it is stored in the trail.
- If the database is other than Oracle, the data is applied as binary data if the database supports a bind as binary data. Otherwise, the data is applied as-is.

PASSTHRU is not compatible with the BULKLOAD parameter (direct-bulk load).
If PASSTHRU is specified and a mapping between CHAR/VARCHAR/CLOB and NCHAR/NVARCHAR/NCLOB exists in the MAP statement, Replicat abends.
If any Oracle GoldenGate column-mapping functions are used for character-based columns when PASSTHRU mode is specified, Replicat issues a warning message and converts the results of those functions to the target database character set before mapping them to the target column.
PASSTHRU should only be used if you are certain the source and target character sets are compatible. If you are not sure whether PASSTHRU is appropriate in your environment, contact Oracle Support before using it.

OVERRIDE
Forces Replicat to use the specified character set thus overriding the source database character set in the trail file. This option overrides character type column character set except in the following cases:

- The character set is overridden by the CHARSET and COLCHARSET parameters.
- Use of NCHAR, NVARCHAR and NCLOB data types.
- The database overrides the column character set explicitly to a set other than the database character set.

DB2 for z/OS
Valid for DB2 for z/OS.
Required if the version of a trail that contains DB2 data from the z/OS platform is Oracle GoldenGate 12.1 or lower. This parameter ensures that Replicat recognizes that the data is from DB2 for z/OS, which permits a mix of ASCII and EBCDIC character formats.

Examples

Example 1

```
SOURCECHARSET ISO-8859-9
```

Example 2

```
SOURCECHARSET PASSTHRU
```

Example 3

```
SOURCECAHRSET JA16EUC
```

Example 4

```
SOURCECHARSET OVERRIDE WE8ISO8859P15
```

3.160 SOURCEDB

Valid For

Manager, Extract, DEFGEN

Description

Use the `SOURCEDB` parameter for databases or data sets that require a data source name or identifier to be specified explicitly as part of the connection information. This option is required to identify one of the following:

- The source login database for heterogenous databases.
- The data source name (DSN) for supported databases that use ODBC
- The source SQL/MX catalog, valid when Extract will process data from only one catalog in the SQL/MX database
- The default DB2 for i database.

Tables specified in `TABLE` statements that follow `SOURCEDB` are assumed to be from the specified data source.

You might need to use the `USERID` or `USERIDALIAS` parameter in the `SOURCEDB` parameter statement, depending on the authentication that is required for the data source.

For databases that allow authentication at the operating-system level, you can specify `SOURCEDB` without `USERID` or `USERIDALIAS`.

For Manager, use `SOURCEDB` only when using Oracle GoldenGate parameters that cause Manager to interact with a source database, such as `PURGEOLDEXTRACTS`. You can use `SOURCEDB` for Manager on the source or target database.

For DB2 LUW, the `SOURCEDB` statement must refer to the database by its real name, rather than by any alias.

See USERID | NOUSERID or USERIDALIAS for more information.

Default

None

Syntax

```
SOURCEDB data_source[, SESSIONCHARSET character_set]
```

`data_source`
The name of the database, catalog, or data source name as applicable for the database.
For MySQL databases, you can use the format of `SOURCEDB` *`database_name@host_name`* to avoid connection issues caused by the incorrect configuration of `localhost` in the local hosts file. If running MySQL on a port other than the default of 3306, you must specify the port number in the connect string: `SOURCEDB` *`database_name@host_name`*:*`port`*.

`SESSIONCHARSET` ***`character_set`***
Supports Sybase, Teradata and MySQL. Sets the database session character set for the process login session. This parameter overrides any `SESSIONCHARSET` that is specified in the `GLOBALS` file.
To display the language information in the process report file when using this option for a Sybase database, make certain that `locale.dat` is set properly in the Sybase installation directory. If the character set is not found in the supported Sybase database character set, then it is validated against the Oracle GoldenGate supported character set list. The character-set information is displayed with the `LOCALE INFORMATION` entry in the report output.

Examples

Example 1
This example shows `SOURCEDB` without the `USERIDALIAS` parameter.

```
SOURCEDB mydb
```

Example 2
This example shows `SOURCEDB` with the `USERIDALIAS` parameter.

```
SOURCEDB mydb, USERIDALIAS tiger1
```

3.161 SOURCEDEFS

Valid For

Extract data pump and Replicat

Description

Use the `SOURCEDEFS` parameter to specify the name of a file that contains definitions of source tables or files. Source definitions are not required, by default, when trail files with format Oracle GoldenGate release 12.2.*x* are used because the trail files contains metadata records with the object definitions. However, source definitions are required when replicating data between heterogenous source and targets using trail files with format Oracle GoldenGate release 12.1.*x* and lower or when trail files with created with the `no_objectdefs` option.

Use `SOURCEDEFS` for one or more of the following processes, depending on your Oracle GoldenGate configuration:

- A Replicat process on the target system
- A data pump on a source or intermediary system.

To generate the source-definitions file, use the DEFGEN utility. Transfer the file to the intermediary or target system before starting a data pump or Replicat.

You can have multiple SOURCEDEFS statements in the parameter file if more than one source-definitions file will be used, for example if each SOURCEDEFS file holds the definitions for a distinct application.

See "ASSUMETARGETDEFS" for related information. Do not use SOURCEDEFS and ASSUMETARGETDEFS in the same parameter file.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about using data-definitions files.

Default

None

Syntax

```
SOURCEDEFS file_name [OVERRIDE]
```

file_name
The relative or fully qualified name of the file containing the source data definitions.

OVERRIDE
By default, the table definitions from the metadata records override the definitions from any SOURCEDEFS file.
Specify OVERRIDE to request Replicat to use the definitions from the definitions file instead of the metadata.

Examples

Example 1

```
SOURCEDEFS dirdef\tcust.def
```

Example 2

```
SOURCEDEFS /ggs/dirdef/source_defs
```

3.162 SOURCEISTABLE

Valid For

Extract

Description

Use the SOURCEISTABLE parameter to extract complete records directly from source tables in preparation for loading them into another table or file. SOURCEISTABLE extracts all column data specified within a TABLE statement.

This parameter applies to the following initial load methods:

- Loading data from file to Replicat.
- Loading data from file to database utility.

Do not use this parameter for the following initial load methods:

- An Oracle GoldenGate direct load, where Extract sends load data directly to the Replicat process without use of a file.

- An Oracle GoldenGate direct bulk load to SQL*Loader.

For those processes, `SOURCEISTABLE` is specified as an `ADD EXTRACT` argument instead of being used in the parameter file.

When used, `SOURCEISTABLE` must be the first parameter statement in the Extract parameter file.

To use `SOURCEISTABLE`, disable DDL extraction and replication by omitting the `DDL` parameter from the Extract and Replicat parameter files. See "DDL" for more information.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about configuring initial data loads.

Default

None

Syntax

```
SOURCEISTABLE
```

3.163 SOURCETIMEZONE

Valid For

Replicat

Description

Use the `SOURCETIMEZONE` parameter to specify the time zone of the source database. Use this parameter for one of the following purposes:

- To override the source time zone that is stored in the trail. By default, Replicat sets its session to the specified time zone, in both region ID and offset value. This option applies to Oracle GoldenGate versions 12.1.2 or later, where the source time zone is written to the trail by Extract. Replicat will set its session to the specified time zone.
- To supply the time zone of the source database when the trail is written by an Extract version that is older than 12.1.2. In these versions, Extract does not write the source time zone to the trail, so it must be supplied by this parameter. Replicat will set its session to the specified time zone.

To disable the default use of the source time zone by Replicat, use the `PRESERVETARGETTIMEZONE` parameter in the Replicat parameter file. See PRESERVETARGETTIMEZONE for more information.

Default

None

Syntax

```
SOURCETIMEZONE time_zone
```

`time_zone`
The time zone of the source database as output by the database for `DATE`, `TIME` and `TIMESTAMP` data types. It can be specified in the following ways.

- As a region ID that is valid in the IANA Time Zone Database (tz database). (A region ID is also known as an Olson time zone ID). An adjustment for Daylight Saving Time can be performed by the target database, if supported.
- As an offset from UTC.

Examples

The following examples show different ways to specify `SOURCETIMEZONE`.

- These examples specify a region ID.

  ```
  SOURCETIMEZONE America/New_York
  ```

  ```
  SOURCETIMEZONE US/Pacific
  ```

  ```
  SOURCETIMEZONE Japan
  ```

  ```
  SOURCETIMEZONE UTC
  ```

  ```
  SOURCETIMEZONE Pacific/Guam
  ```

- These examples specify an offset from UTC.

  ```
  SOURCETIMEZONE +09:00
  ```

  ```
  SOURCETIMEZONE -04:30
  ```

3.164 SPACESTONULL | NOSPACESTONULL

Valid For

Replicat on Oracle Database only

Description

Use the `SPACESTONULL` and `NOSPACESTONULL` parameters to control whether or not a source column that contains only spaces is converted to `NULL` in the target column. `SPACESTONULL` converts spaces to `NULL` if the target column accepts `NULL` values. `NOSPACESTONULL` converts spaces to a single space character in the target column.

This parameter is applicable to the follow two scenarios:

- a source column that contains only spaces
- a source column is empty, such as empty `CHAR`/`VARCHAR` column data from DB2

Oracle does not distinguish empty and `NULL` column though other databases do so you should consult your database documentation to determine how these types of columns.

The parameters are table specific. One parameter applies to all subsequent `MAP` statements, until the other parameter is encountered.

Because you can selectively enable or disable these parameters between `MAP` statements, you can enable or disable them for different threads of a coordinated

Replicat. Specify the `SPACESTONULL` threads in one set of `MAP` statements, and specify the `NOSPACESTONULL` threads in a different set of `MAP` statements.

Default

`NOSPACESTONULL`

Syntax

```
SPACESTONULL | NOSPACESTONULL
```

Example

This example shows how you can apply `SPACESTONULL` and `NOSPACESTONULL` selectively to different `MAP` statements, each of which represents a different thread of a coordinated Replicat.

```
SPACESTONULL
MAP sales.cust, TARGET sales.cust, THREAD (1);
MAP sales.ord, TARGET sales.ord, THREAD (2);
NOSPACESTONULL
MAP sales.loc, TARGET sales.loc, THREAD (3);
```

3.165 SPECIALRUN

Valid For

Replicat

Description

Use the `SPECIALRUN` parameter in a Replicat parameter file for a one-time processing run to direct Replicat not to create checkpoints. A one-time run has a beginning and an end, so checkpoints are not needed. Use `SPECIALRUN` for certain initial data load methods.

When Replicat is in `SPECIALRUN` mode, do not start it with the `START REPLICAT` command in GGSCI. It is started automatically during the initial load.

`SPECIALRUN` requires the use of the `END` parameter. Either `REPLICAT` or `SPECIALRUN` is required in the Replicat parameter file. See "REPLICAT" for more information.

Default

None

Syntax

```
SPECIALRUN
```

3.166 SQLDUPERR

Valid For

Replicat

Description

Use the SQLDUPERR parameter to specify the numeric error code returned by the target database when a duplicate row is encountered. A duplicate-record error indicates that an INSERT operation was attempted with a primary key that matches the key of an existing record in the database.

You must use SQLDUPERR when you specify the special handling of duplicate records with the OVERRIDEDUPS parameter. See "OVERRIDEDUPS | NOOVERRIDEDUPS" for more information.

Default

None

Syntax

```
SQLDUPERR error_number
```

error_number
The numeric error code to return for duplicate records.

Example

```
SQLDUPERR -2601
```

3.167 SQLEXEC

Valid For

Extract and Replicat

Description

Use the SQLEXEC parameter to execute a stored procedure, query, or database command within the context of Oracle GoldenGate processing. SQLEXEC enables Oracle GoldenGate to communicate directly with the database to perform any work that is supported by the database. This work can be part of the synchronization process, such as retrieving values for column conversion, or it can be independent of extracting or replicating data, such as executing a stored procedure that executes an action within the database.

Note:

SQLEXEC provides minimal globalization support. To use SQLEXEC in the capture parameter file of the source capture, make sure that the client character set in the source .prm file is either the same or a superset of the source database character set.

SQLEXEC works as follows:

- As a standalone statement at the root level of a parameter file to execute a SQL stored procedure or query or to execute a database command. As a standalone statement, SQLEXEC executes independently of a TABLE or MAP statement during

Oracle GoldenGate processing. When used in a standalone `SQLEXEC` parameter, a query or procedure cannot include parameters. See "Standalone SQLEXEC".

- As part of a `TABLE` or `MAP` parameter to execute a stored procedure or query with or without parameters. When used with parameters, the procedure or query that is executed can accept input parameters from source or target rows and pass output parameters. See "SQLEXEC in a TABLE or MAP Parameter".

Caution:

Use caution when executing `SQLEXEC` procedures against the database, especially against the production database. Any changes that are committed by the procedure can result in overwriting existing data.

Note:

The `SQLEXECONBEFOREIMAGE` parameter supports `SQLEXEC` execution on Before Image records.

Standalone SQLEXEC

A standalone `SQLEXEC` parameter is one that is used at the root level of a parameter file and acts independently of a `TABLE` or `MAP` parameter. The following are guidelines for using a standalone `SQLEXEC` parameter.

- A standalone `SQLEXEC` statement executes in the order in which it appears in the parameter file relative to other parameters.
- A `SQLEXEC` procedure or query must contain all exception handling.
- A query or procedure must be structured correctly when executing a `SQLEXEC` statement, with legal SQL syntax for the database; otherwise Replicat will abend, regardless of any error-handling rules that are in place. Refer to the SQL reference guide provided by the database vendor for permissible SQL syntax.
- A database credential for the Oracle GoldenGate user must precede the `SQLEXEC` clause. For Extract, use the `SOURCEDB` and `USERID` or `USERIDALIAS` parameters as appropriate for the database. For Replicat, use the `TARGETDB` and `USERID` or `USERIDALIAS` parameters, as appropriate.
- The database credential that the Oracle GoldenGate process uses is the one that executes the SQL. This credential must have the privilege to execute commands and stored procedures and call database-supplied procedures.
- A standalone `SQLEXEC` statement cannot be used to get input parameters from records or pass output parameters. You can use stored procedures and queries with parameters by using a `SQLEXEC` statement within a `TABLE` or `MAP` statement. See "SQLEXEC in a TABLE or MAP Parameter".
- All objects affected by a standalone `SQLEXEC` statement must exist before the Oracle GoldenGate processes start. Because of this, DDL support must be disabled for those objects; otherwise, DDL operations could change the structure of, or delete an object, before the `SQLEXEC` procedure or query executes on it.
- Object names must be fully qualified in their two-part or three-part name format.

- For DB2 on z/OS, Oracle GoldenGate uses the ODBC `SQLExecDirect` function to execute a SQL statement dynamically. ODBC prepares the SQL statement every time that it is executed, at a specified interval. To support this function, the connected database server must be configured to prepare SQL dynamically. See the DB2 for z/OS documentation for more information.

Getting More Information about Using Standalone SQLEXEC

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about how to use `SQLEXEC`.

Syntax for Standalone SQLEXEC

```
SQLEXEC
{'call procedure_name()' | 'SQL_query' | 'database_command'}
[EVERY n {SECONDS | MINUTES | HOURS | DAYS}]
[ONEXIT]
[, THREADS (threadID[, threadID][, ...][, thread_range[, thread_range][, ...])]
```

`'call procedure_name ()'`
Specifies the name of a stored procedure to execute. Enclose the statement within single quotes. The `call` keyword is required. The following is an example of how to execute a procedure with standalone `SQLEXEC`:

```
SQLEXEC 'call prc_job_count ()'
```

`'SQL_query'`
Specifies the name of a query to execute. Enclose the query within single quotes. Specify case-sensitive object names in the same format required by the database. The following is an example of how to execute a query with standalone `SQLEXEC`:

```
SQLEXEC ' select x from dual '
```

For a multi-line query, use the single quotes on each line. For best results, type a space after each begin quote and before each end quote (or at least before each end quote).

`'database_command'`
Executes a database command. The following is an example of how to execute a database command with standalone `SQLEXEC`:

```
SQLEXEC 'SET TRIGGERS OFF'
```

`EVERY n {SECONDS | MINUTES | HOURS | DAYS}`
Causes a standalone stored procedure or query to execute at a defined interval, for example:

```
SQLEXEC 'call prc_job_count ()' EVERY 30 SECONDS
```

The interval must be a whole, positive integer.

`ONEXIT`
Executes the SQL when the Extract or Replicat process stops gracefully, for example:

```
SQLEXEC 'call prc_job_count ()' ONEXIT
```

`THREADS (threadID[, threadID][, ...][, thread_range[, thread_range][, ...])`
Executes `SQLEXEC` only for the specified thread or threads of a coordinated Replicat.

***threadID*[, *threadID*][, ...]**
Specifies a thread ID or a comma-delimited list of threads in the format of `threadID, threadID, threadID`.

[, *thread_range*[, *thread_range*][, ...]
Specifies a range of threads in the form of `threadIDlow-threadIDhigh` or a comma-delimted list of ranges in the format of `threadIDlow-threadIDhigh`, `threadIDlow-threadIDhigh`.

A combination of these formats is permitted, such as `threadID`, `threadID`, `threadIDlow-threadIDhigh`.

If no `THREADS` clause is used, the SQL is executed by all of the threads that were configured for this Replicat group by the `ADD REPLICAT` command. However, if the SQL satisfies the criteria for a barrier transaction, the entire `SQLEXEC` statement is processed by thread 0 regardless of the actual thread mapping.

SQLEXEC in a TABLE or MAP Parameter

A `SQLEXEC` parameter in a `TABLE` or `MAP` parameter can be used to execute a stored procedure or query that does or does not accept parameters. The following are `SQLEXEC` dependencies and restrictions when used in a `MAP` or `TABLE` statement:

- The SQL is executed by the database user under which the Oracle GoldenGate process is running. This user must have the privilege to execute stored procedures and call database-supplied procedures.
- A query or procedure must be structured correctly when executing a `SQLEXEC` statement. If Replicat encounters a problem with the query or procedure, the process abends immediately, despite any error-handling rules that are in place. Refer to the SQL reference guide provided by the database vendor for permissible SQL syntax.
- The `COMMIT` operation of a Replicat transaction to the target database also commits any DML changes that are made in a `SQLEXEC` statement within the boundary of the original source transaction. This is not true for Extract, because Extract does not perform SQL transactions. When using `SQLEXEC` for Extract, you can either enable implicit commits or execute an explicit commit within the `SQLEXEC` procedure.
- Specify literals in single quotes. Specify case-sensitive object names the same way they are specified in the database.
- Do not use `SQLEXEC` to change the value of a primary key column. The primary key value is passed from Extract to Replicat. Without it, Replicat operations cannot be completed. If primary key values must be changed with `SQLEXEC`, you may be able to avoid errors by mapping the original key value to another column and then defining that column as a substitute key with the `KEYCOLS` option of the `TABLE` and `MAP` parameters.
- For DB2 on z/OS, Oracle GoldenGate uses the ODBC `SQLExecDirect` function to execute a SQL statement dynamically. ODBC prepares the SQL statement every time that it is executed, at a specified interval. To support this function, the connected database server must be configured to prepare SQL dynamically. See the DB2 for z/OS documentation for more information.
- When using Oracle GoldenGate to replicate DDL, all objects that are affected by a stored procedure or query must exist with the correct structures prior to the execution of the SQL. Consequently, DDL on these objects that affects structure (such as `CREATE` or `ALTER`) must execute before the `SQLEXEC` executes.

- All object names in a `SQLEXEC` statement must be fully qualified with their two-part or three-part names, as appropriate for the database.
- Do not use `SQLEXEC` for tables being processed in pass-through mode by a data-pump Extract group.
- The following data types are supported by `SQLEXEC` for input and output parameters.
  - Numeric data types
  - Date data types
  - Character data types
- When executed by a coordinated Replicat, `SQLEXEC` is executed by the thread or threads that are specified with the `THREAD` or `THREADRANGE` option of the `MAP` statement. However, if the `SQLEXEC` is specified in a `MAP` parameter that contains the `COORDINATED` keyword, it is executed as a barrier transaction automatically by the thread with the lowest ID number, regardless of the actual thread mapping.

Getting More Information About Using SQLEXEC in TABLE and MAP

For more information about how to use `SQLEXEC`, see *Administering Oracle GoldenGate for Windows and UNIX*.

For more information about `TABLE` and `MAP`, see "TABLE | MAP".

Syntax for SQLEXEC in TABLE or MAP

```
SQLEXEC (
{SPNAME procedure_name[, ID logical_name] |
   ID logical_name, QUERY ' SQL_query '}
{, PARAMS [OPTIONAL | REQUIRED] parameter_name = {source_column | OGG_function} |
   NOPARAMS}
[, AFTERFILTER | BEFOREFILTER]
[, ALLPARAMS {OPTIONAL | REQUIRED}]
[, ERROR {IGNORE | REPORT | RAISE | FINAL | FATAL}]
[, EXEC {MAP | ONCE | TRANSACTION | SOURCEROW}][, MAXVARCHARLEN bytes]
[, PARAMBUFSIZE bytes]
[, TRACE]
[, ...]
[, BEFORE_col1 = @BEFORE(col1),
)
```

`SPNAME` *`procedure_name`*`[, ID` *`logical_name`*`]`
Executes a stored procedure.

> **`SPNAME` *`procedure_name`***
> Specifies the name of the procedure to execute.
> The following example shows a single execution of a stored procedure named `lookup`. In this case, the actual name of the procedure is used. A logical name is not needed.
>
> ```
> SQLEXEC (SPNAME lookup), PARAMS (param1 = srccol)), &
> COLMAP (targcol = lookup.param1);
> ```
>
> **`ID` *`logical_name`***
> Defines an optional logical name for the procedure. For example, logical names for a procedure named `lookup` might be `lookup1`, `lookup2`, and so forth. Use this

option to execute the procedure multiple times within a `MAP` statement. A procedure can execute up to 20 times per `MAP` statement. `ID` is not required when executing a procedure once.
The following example shows the use of the `ID` option to enable multiple executions of a stored procedure that gets values from a lookup table. The values are mapped to target columns.

```
SQLEXEC (SPNAME lookup, ID lookup1, &
  PARAMS (long_name = current_residence_state)), &
SQLEXEC (SPNAME lookup, ID lookup2, &
  PARAMS (long_name = birth_state)), &
COLMAP (custid = custid, current_residence_state_long = lookup1.long_name, &
birth_state_long = lookup2.long_name);
```

`ID` ***`logical_name`*****`, QUERY '`** ***`SQL_query`*** **`'`**
Executes a query.

`ID` ***`logical_name`***
Defines a logical name for the query. A logical name is required in order to extract values from the query results. *`ID logical_name`* references the column values returned by the query.

`QUERY '` ***`SQL_query '`***
Specifies the SQL query syntax to execute against the database. The query can either return results with a `SELECT` statement or execute an `INSERT`, `UPDATE`, or `DELETE` statement. A `SELECT` statement should only return one row. If multiple rows are returned, only the first row is processed. Do not specify an `INTO ...` clause for any `SELECT` statements.The query must be valid, standard query language for the database against which it is being executed. Most queries require placeholders for input parameters. How parameters are specified within the query depends on the database type, as follows:

- For Oracle, input parameters are specified by using a colon (:) followed by the parameter name, as in the following example.

  ```
  'SELECT NAME FROM ACCOUNT WHERE SSN = :SSN AND ACCOUNT = :ACCT'
  ```

- For other databases, input parameters are specified by using a question mark, as in the following example.

  ```
  'SELECT NAME FROM ACCOUNT WHERE SSN = ? AND ACCOUNT = ?'
  ```

The query must be contained on one line, within single quotes. Quotation marks are not required around a parameter name for any database.
The following examples illustrate the use of a `SQLEXEC` query for Oracle and SQL Server queries, respectively.
Oracle example:

```
MAP sales.account, TARGET sales.newacct, &
  SQLEXEC (ID lookup, &
  QUERY 'select desc_col into desc_param from lookup_table &
  where code_col = :code_param', &
  PARAMS (code_param = account_code)), &
  COLMAP (newacct_id = account_id, newacct_val = lookup.desc_param);
```

SQL Server example:

```
MAP sales.account, TARGET sales.newacct, &
  SQLEXEC (ID lookup, &
  QUERY 'select desc_col into desc_param from lookup_table &
  where code_col = ?', &
  PARAMS (p1 = account_code)), &
  COLMAP (newacct_id = account_id, &
  newacct_val = lookup.desc_param);
```

`PARAMS [OPTIONAL | REQUIRED]` *`parameter_name`* `= {`*`source_column`* `|` *`OGG_function`*`} | NOPARAMS`
Defines whether or not the procedure or query accepts parameters and, if yes, maps the parameters to the input source. Either a `PARAMS` clause or `NOPARAMS` must be used.

`OPTIONAL | REQUIRED`
Determines whether or not the procedure or query executes when parameter values are missing.
`OPTIONAL` indicates that a parameter value is not required for the SQL to execute. If a required source column is missing from the database operation, or if a column-conversion function cannot complete successfully because a source column is missing, the SQL executes anyway. `OPTIONAL` is the default for all databases except Oracle. For Oracle, whether or not a parameter is optional is automatically determined when retrieving the stored procedure definition.
`REQUIRED` indicates that a parameter value must be present. If the parameter value is not present, the SQL will not be executed.

`parameter_name` **`= {`*`source_column`* `|` *`OGG_function`*`}`**
Maps the name of a parameter to a column or function that provides the input.
The following data types are supported by `SQLEXEC` for input and output parameters.

- Numeric data types
- Date data types
- Character data types

`parameter_name` is one of the following:

- For a stored procedure, it is the name of any parameter in the procedure that can accept input.
- For an Oracle query, it is the name of any input parameter in the query *excluding* the leading colon. For example, `:vemplid` would be specified as `vemplid` in the `PARAMS` clause. Oracle permits naming an input parameter any logical name.

  ```
  SQLEXEC (ID appphone, QUERY ' select per_type from ps_personal_data '
      ' where emplid = :vemplid '
      ' and per_status = 'N' and per_type = 'A' ',
      PARAMS (vemplid = emplid)),
  TOKENS (applid = @GETVAL(appphone.per_type));
  ```

- For a non-Oracle query, it is `P`*`n`*, where *`n`* is the number of the parameter within the statement, starting from 1. For example, in a query with two parameters, the *`parameter_name`* entries are `p1 and p2`. Consider whether the database requires the `p` to be upper or lower case.

```
SQLEXEC (ID appphone, QUERY ' select per_type from ps_personal_data '
    ' where emplid = ? '
    ' and per_status = 'N' and per_type = 'A' ',
    PARAMS (p1 = emplid)),
TOKENS (applid = @GETVAL(appphone.per_type));
```

source_column is the name of a source column that provides the input. By default, if the specified column is not present in the log (because the record only contains the values of columns that were updated) the parameter assumes any default value specified by the procedure or query for the parameter.
OGG_function is the name of an Oracle GoldenGate column-conversion function that executes to provide the input. See "Column Conversion Functions".

To pass output values from the stored procedure or query as input to a `FILTER` or `COLMAP` clause, use the following syntax:

{procedure_name | logical_name}.parameter

Where:

- *procedure_name* is the actual name of a stored procedure, which must match the value given for `SPNAME` in the `SQLEXEC` statement. Use this argument only if executing a procedure one time during the course of the Oracle GoldenGate run.
- *logical_name* is the logical name specified with the `ID` option of `SQLEXEC`. Use this argument to pass input values from either a query or an instance of a stored procedure when the procedure executes multiple times within a `MAP` statement.
- *parameter* is the name of a parameter or `RETURN_VALUE` if extracting returned values. By default, output values are truncated at 255 bytes per parameter. If output parameters must be longer, use the `MAXVARCHARLEN` option.

Note:

As an alternative to the preceding syntax, you can use the `@GETVAL` function. See "GETVAL" for more information.

The following examples apply to a set of Oracle source and target tables and a lookup table. These examples show how parameters for the tables are passed for a single instance of a stored procedure and multiple instances of a stored procedure.
Source table cust:

```
custid                    Number
current_residence_state   Char(2)
birth_state               Char(2)
```

Target table cust_extended:

```
custid                         Number
current_residence_state_long   Varchar(30)
birth_state_long               Varchar(30)
```

Lookup table state_lookup

```
abbreviation     Char(2)
long_name        Varchar(30)
```

The following example shows the use of a stored procedure that executes once to get a value from the lookup table. When processing records from the `cust` table, Oracle GoldenGate executes the `lookup` stored procedure before executing the column map. The `long_name` parameter in the procedure accepts input from the `birth_state` source column.The value is mapped to the target column `birth_state_long` in the `COLMAP` statement.

```
MAP sales.cust, TARGET sales.cust_extended, &
SQLEXEC (SPNAME lookup, &
PARAMS (long_name = birth_state)), &
COLMAP (custid = custid, &
birth_state_long = lookup.long_name);
```

The following example shows the use of the `ID` option to enable multiple executions of a stored procedure that gets values from a lookup table. The values are mapped to target columns.

```
MAP sales.cust, TARGET sales.cust_extended, &
SQLEXEC (SPNAME lookup, ID lookup1, &
PARAMS (long_name = current_residence_state)), &
SQLEXEC (SPNAME lookup, ID lookup2, &
PARAMS (long_name = birth_state)), &
COLMAP (custid = custid, current_residence_state_long = lookup1.long_name, &
birth_state_long = lookup2.long_name);
```

`AFTERFILTER | BEFOREFILTER`
Use `AFTERFILTER` and `BEFOREFILTER` to specify when to execute the stored procedure or query in relation to the `FILTER` clause of a `MAP` statement.

> **`AFTERFILTER`**
> Causes the SQL to execute after the `FILTER` statement. This enables you to skip the overhead of executing the SQL unless the filter is successful. This is the default.
>
> **`BEFOREFILTER`**
> Causes the SQL to execute before the `FILTER` statement, so the results can be used in the filter.

The following is an example using `BEFOREFILTER`.

```
SQLEXEC (SPNAME check, NOPARAMS, BEFOREFILTER)
```

`ALLPARAMS [OPTIONAL | REQUIRED]`
Use `ALLPARAMS` as a global rule that determines whether or not all of the specified parameters must be present for the stored procedure or query to execute. Rules for individual parameters established within the `PARAMS` clause override the global rule set with `ALLPARAMS`.

> **`OPTIONAL`**
> Permits the SQL to execute whether or not all of the parameters are present. This is the default.
>
> **`REQUIRED`**
> Requires all of the parameters to be present for the SQL to execute.

The following is an example using `OPTIONAL`.

```
SQLEXEC (SPNAME lookup,
PARAMS (long_name = birth_state, short_name = state),
ALLPARAMS OPTIONAL)
```

`ERROR {IGNORE | REPORT | RAISE | FINAL | FATAL}`
Use `ERROR` to define a response to errors associated with the stored procedure or query. Without explicit error handling, the Oracle GoldenGate process abends on errors. Make certain your procedures return errors to the process and specify the responses with `ERROR`.

`IGNORE`
Causes Oracle GoldenGate to ignore all errors associated with the stored procedure or query and continue processing. Any resulting parameter extraction results in "column missing" conditions. This is the default.

`REPORT`
Ensures that all errors associated with the stored procedure or query are reported to the discard file. The report is useful for tracing the cause of the error. It includes both an error description and the value of the parameters passed to and from the procedure or query. Oracle GoldenGate continues processing after reporting the error.

`RAISE`
Handles errors according to rules set by a `REPERROR` parameter. Oracle GoldenGate continues processing other stored procedures or queries associated with the current `MAP` statement before processing the error.

`FINAL`
Is similar to `RAISE` except that when an error associated with a procedure or query is encountered, remaining stored procedures and queries are bypassed. Error processing is invoked immediately after the error.

`FATAL`
Causes Oracle GoldenGate to abend immediately upon encountering an error associated with a procedure or query.

`EXEC {MAP | ONCE | TRANSACTION | SOURCEROW}`
Use `EXEC` to control the frequency with which a stored procedure or query in a `MAP` statement executes and how long the results are considered valid, if extracting output parameters.

`MAP`
Executes the procedure or query once for each source-target table map for which it is specified. Using `MAP` renders the results invalid for any subsequent maps that have the same source table. `MAP` is the default.
The following example shows the incorrect use of the default of `MAP`. Because `MAP` is the default, it need not be explicitly listed in the `SQLEXEC` statement. In this example, a source table is mapped in separate `MAP` parameters to two different target tables. In this case, the results are valid only for the first mapping. The results of the procedure `lookup` are expired by the time the second `MAP` parameter executes, and the second `MAP` results in a "column missing" condition. To implement this correctly so that each `MAP` returns valid results, `SOURCEROW` should be used.

```
MAP sales.srctab, TARGET sales.targtab, &
SQLEXEC (SPNAME lookup, PARAMS (param1 = srccol)), &
COLMAP (targcol = lookup.param2);

MAP sales.srctab, TARGET sales.targtab2, &
COLMAP (targcol2 = lookup.param2);
```

ONCE
Executes the procedure or query once during the course of the Oracle GoldenGate run, upon the first invocation of the associated `MAP` statement. The results remain valid for as long as the process remains running.
The following is an example of using `ONCE`.

```
MAP sales.cust, TARGET sales.cust_extended, &
SQLEXEC (SPNAME lookup, PARAMS (long_name = birth_state), EXEC ONCE), &
COLMAP (custid = custid, &
birth_state_long = lookup.long_name);
```

TRANSACTION
Executes the procedure or query once per source transaction. The results remain valid for all operations of the transaction.
The following is an example of using `TRANSACTION`.

```
MAP sales.cust, TARGET sales.cust_extended, &
SQLEXEC (SPNAME lookup, PARAMS (long_name = birth_state), EXEC TRANSACTION), &
COLMAP (custid = custid, &
birth_state_long = lookup.long_name);
```

SOURCEROW
Executes the procedure or query once per source row operation. Use this option when you are synchronizing a source table with more than one target table, so that the results of the procedure or query are invoked for each source-target mapping.
The following is an example of using `SOURCEROW`. In this case, the second map returns a valid value because the procedure executes on every source row operation.

```
MAP sales.srctab, TARGET sales.targtab, &
SQLEXEC (SPNAME lookup, PARAMS (param1 = srccol), EXEC SOURCEROW), &
COLMAP (targcol = lookup.param2);

MAP sales.srctab, TARGET sales.targtab2, &
COLMAP (targcol2 = lookup.param2);
```

MAXVARCHARLEN *bytes*
Use `MAXVARCHARLEN` to specify the maximum byte length allocated for the output value of any parameter in a stored procedure or query. Beyond this maximum, the output values are truncated. The default is 255 bytes without an explicit `MAXVARCHARLEN` clause. The valid range of values is from 50 to 32767 bytes.
The following example limits the byte length of output values to 100.

```
MAXVARCHARLEN 100
```

PARAMBUFSIZE *bytes*
Use `PARAMBUFSIZE` to specify the maximum number of bytes allowed for the memory buffer that stores `SQLEXEC` parameter information, including both input and output parameters. The default is 10,000 bytes without an explicit `PARAMBUFSIZE` clause. The valid range of values is from 1000 to 2000000 bytes. Oracle GoldenGate issues a

warning whenever the memory allocated for parameters is within 500 bytes of the maximum.
The following example increases the buffer to 15,000 bytes.

```
PARAMBUFSIZE 15000
```

TRACE {ALL | ERROR}
Use TRACE to log SQLEXEC input and output parameters to the report file.
The following is a sample report file with SQLEXEC tracing enabled:

```
Input parameter values...
LMS_TABLE: INTERACTION_ATTR_VALUES
   KEY1: 2818249
  KEY2: 1
Report File:
From Table MASTER.INTERACTION_ATTR_VALUES to MASTER.INTERACTION_ATTR_VALUES:
       #  inserts:      0
       #  updates:      0
       #  deletes:      0
       #  discards:     1

  Stored procedure GGS_INTERACTION_ATTR_VALUES:
       attempts:       2
       successful:     0
```

ALL
Writes the input and output parameters for each invocation of the procedure or query to the report file. This is the default.

ERROR
Writes the input and output parameters for each invocation of the procedure or query to the report file only after a SQL error occurs.

3.168 STARTUPVALIDATIONDELAY[CSECS]

Valid For

Manager

Description

Use the STARTUPVALIDATIONDELAY or STARTUPVALIDATIONDELAYCSECS parameter to set a delay time after which Manager validates the status of a process that was started with the START EXTRACT or START REPLICAT command. If a process is not running after the specified delay time, an error message is displayed at the GGSCI prompt.

These parameters account for processes that fail before they can generate an error message or report, for example when there is not enough memory to launch the processes. Startup validation makes Oracle GoldenGate users aware of such failures. The minimum is 0.

Default

0 seconds (do not validate startup status)

Syntax

```
STARTUPVALIDATIONDELAY seconds | STARTUPVALIDATIONDELAYCSECS centiseconds
```

STARTUPVALIDATIONDELAY *seconds*
Specifies the delay in seconds.

STARTUPVALIDATIONDELAYCSECS *centiseconds*
Specifies the delay in centiseconds.

Example

In the following example, Manager waits ten centiseconds after a `START` command is issued and then checks the status of the process.

```
STARTUPVALIDATIONDELAYCSECS 10
```

3.169 STATOPTIONS

Valid For

Extract and Replicat

Description

Use the `STATOPTIONS` parameter to specify the information that is to be included in statistical displays generated by the `STATS EXTRACT` or `STATS REPLICAT` command. These options also can be enabled as needed as arguments to those commands.

Default

See individual options.

Syntax

```
STATOPTIONS
[, REPORTDETAIL | NOREPORTDETAIL]
[, REPORTFETCH | NOREPORTFETCH]
[, RESETREPORTSTATS | NORESETREPORTSTATS]
[, THREADS (threadID[, threadID][, ...][, thread_range[, thread_range][, ...])]
```

REPORTDETAIL | NOREPORTDETAIL
Valid for Replicat. Controls the reporting of statistics for operations that were not applied to the target because they were discarded as the result of collision handling.

> **REPORTDETAIL**
> Returns statistics for the discarded operations. These operations are reported in the regular `STATS REPLICAT` statistics (inserts, updates, and deletes performed) and as discard statistics if `STATS REPLICAT` is issued with the `DETAIL` option. For example, if 10 records were `INSERT` operations and they were all ignored due to duplicate keys, the report would indicate that there were 10 inserts and also 10 discards due to collisions. `REPORTDETAIL` is the default.
>
> **NOREPORTDETAIL**
> Turns off the reporting of statistics for discarded operations.

REPORTFETCH | NOREPORTFETCH
Valid for Extract. Controls the reporting of statistics for the amount of row fetching performed by Extract, such as the fetches that are triggered by a `FETCHCOLS` clause or

fetches that must be performed when not enough information is in the transaction record.

`REPORTFETCH`
Reports statistics for row fetching. The output is as follows:

- `row fetch attempts`: The number of times Extract attempted to fetch a column value from the database when it could not obtain the value from the transaction log.
- `fetch failed`: The number of `row fetch attempts` that failed.
- row fetch by key: (Valid for Oracle) The number of row fetch attempts that were made by using the primary key.

`NOREPORTFETCH`
Turns off the reporting of fetch statistics. `NOREPORTFETCH` is the default.

`RESETREPORTSTATS | NORESETREPORTSTATS`
Valid for Extract and Replicat. Controls whether or not statistics generated by the `REPORT` parameter are reset when a new report is created. `RESETREPORTSTATS` resets the statistics from one report to the other. `NORESETREPORTSTATS` continues the statistics from one report to another and is the default. See "REPORT". Report rollover is controlled by the `REPORTROLLOVER` parameter. See "REPORTROLLOVER".

`THREADS (`*`threadID`*`[, `*`threadID`*`][, ...][, `*`thread_range`*`[, `*`thread_range`*`][, ...])`
Enables the selected `STATOPTIONS` options for the specified threads of a coordinated Replicat.

_`threadID`_`[, `_`threadID`_`][, ...]`
Specifies a thread ID or a comma-delimited list of threads in the format of `threadID, threadID, threadID`.

`[, `_`thread_range`_`[, `_`thread_range`_`][, ...]`
Specifies a range of threads in the form of `threadIDlow-threadIDhigh` or a comma-delimted list of ranges in the format of `threadIDlow-threadIDhigh, threadIDlow-threadIDhigh`.

A combination of these formats is permitted, such as threadID, threadID, `threadIDlow-threadIDhigh`.

Examples

Example 1

This example resets the statistics from one report to another for thread 0 of a coordinated Replicat .

```
STATOPTIONS RESETREPORTSTATS THREADS 0
```

Example 2

This example includes fetch details for thread 3 of a coordinated Replicat.

```
STATOPTIONS REPORTFETCH THREADS 3
```

3.170 SYSLOG

Valid For

GLOBALS, Manager

Description

Use the `SYSLOG` parameter to control the types of messages that Oracle GoldenGate sends to the system logs on a Windows or UNIX system, or to the `SYSOPR` message queue on an IBM i system. You can:

- include all Oracle GoldenGate messages
- suppress all Oracle GoldenGate messages
- filter to include information, warning, or error messages, or any combination of those types

You can use `SYSLOG` as a `GLOBALS` parameter or as a Manager parameter, or both. When present in the `GLOBALS` parameter file, it controls message filtering for all of the Oracle GoldenGate processes on the system. When present in the Manager parameter file, it controls message filtering only for the Manager process. If used in both the `GLOBALS` and Manager parameter files, the Manager setting overrides the `GLOBALS` setting for the Manager process. This enables you to use separate settings for Manager and all of the other Oracle GoldenGate processes.

Default

Write all Oracle GoldenGate messages to the system logs or `SYSOPR` message queue, depending on the platform.

Syntax

```
SYSLOG {[ALL | NONE] | [, INFO] [, WARN] [, ERROR]}
```

`ALL`
Sends all `INFO` (information), `WARN` (warning), and `ERROR` (error) messages to the system log or `SYSOPR` message queue. This is the default and is the same as:

```
SYSLOG INFO, WARN, ERROR
```

Cannot be combined with other options. By default, `INFO` messages are not reported in the SQL/MX Event Management Service.

`NONE`
Prevents Oracle GoldenGate messages from being written to the system logs or `SYSOPR` message queue. Cannot be combined with other options.

`INFO`
Sends messages that are reported as `INFO` to the system logs or `SYSOPR` message queue. Can be combined with `WARN` and `ERROR` in any order.
By default, these messages are not reported in the SQL/MX Event Management Service.

WARN
Sends messages that are reported as `WARN` to the system logs or `SYSOPR` message queue. Can be combined with `INFO` and `ERROR` in any order.

ERROR
Sends messages that are reported as `INFO` to the system logs or `SYSOPR` message queue. Can be combined with `INFO` and `WARN` in any order.

Example

Either of the following statements sends warning and error messages to the system logs or `SYSOPR` message queue, but does not send informational messages.

```
SYSLOG WARN, ERROR
```

or:

```
SYSLOG ERROR, WARN
```

3.171 TABLE | MAP

Valid For

`TABLE` is valid for Extract. `MAP` is valid for Replicat

Description

The `TABLE` and `MAP` parameters control the selection, mapping, and manipulation of the objects that are to be affected by an Oracle GoldenGate process. These parameters work as follows:

- Use the `TABLE` parameter in an Extract parameter file to specify one or more objects that are to be captured from the data source by the Extract process. `TABLE` options specify processing work such as filtering and token definitions that must be performed before Extract writes the captured data to the Oracle GoldenGate trail.
- Use the `MAP` parameter in the Replicat parameter file to map the data from the source objects to the appropriate target objects. `MAP` options specify processing work such as filtering, conversion, and error handling that must be performed before the data is applied to the target objects. Each target object that you want to synchronize with a source object must be associated with that source object by means of a `MAP` parameter. Multiple source-target relationships can be specified by means of a wildcard.

`TABLE` and `MAP` are valid for initial load configurations and for online processes configured to support the replication of transactional changes.

You can process the following objects with `TABLE` and `MAP`:

- Indexes
- Triggers
- Materialized views
- Tables

To specify a sequence for capture by Extract, use the `SEQUENCE` parameter.

Note:

Oracle GoldenGate supports the replication of the actual data values of Oracle materialized views. Oracle GoldenGate supports the replication of Oracle and Teradata DDL for indexes and triggers, but not the content of those objects.

You can use one or more `TABLE` or `MAP` statements in a parameter file, with or without wildcards, to specify all of the objects that you want to process.

You can exclude objects from a wildcarded `TABLE` or `MAP` statement with the TABLEEXCLUDE and MAPEXCLUDE parameters. Additional exclusion parameters are CATALOGEXCLUDE, SCHEMAEXCLUDE, and EXCLUDEWILDCARDOBJECTSONLY.

For more information about using `TABLE` and `MAP`, see *Administering Oracle GoldenGate for Windows and UNIX*.

Default

None

Syntax for TABLE

For tables, you can use all of the `TABLE` options. For non-table objects, use `TABLE` only to specify an object for capture.

```
TABLE source_table[, TARGET target_table]
[, ATTRCHARSET (charset)]
[, CHARSET character_set]
[, COLCHARSET character_set]
[, COLMAP (column_mapping)]
[, {COLS | COLSEXCEPT} (column_list)]
[, {DEF | TARGETDEF} template]
[, EVENTACTIONS action]
[, EXITPARAM 'parameter']
[, {FETCHCOLS | FETCHCOLSEXCEPT} (column_list)]
[, {FETCHMODCOLS | FETCHMODCOLSEXCEPT} (column_list)]
[, FETCHBEFOREFILTER]
[, FILTER (filter_clause)]
[, GETBEFORECOLS (column_specification)]
[, KEYCOLS (columns)]
[, SQLEXEC (SQL_specification)]
[, SQLPREDICATE 'WHERE where_clause']
[, TOKENS (token_definition)]
[, TRIMSPACES | NOTRIMSPACES]
[, TRIMVARSPACES | NOTRIMVARSPACES]
[, WHERE (clause)]
;
```

Syntax for MAP

```
MAP source_table, TARGET target_table
[, COLMAP (column_mapping)]
[, COMPARECOLS (column_specification)]
[, COORDINATED]
[, {DEF | TARGETDEF} template]
[, EXCEPTIONSONLY]
[, EXITPARAM 'parameter']
[, EVENTACTIONS (action)]
[, FILTER (filter_clause)]
[, HANDLECOLLISIONS | NOHANDLECOLLISIONS]
[, INSERTALLRECORDS]
[, INSERTAPPEND | NOINSERTAPPEND]
[, KEYCOLS (columns)]
[, MAPEXCEPTION (exceptions_mapping)]
[, MAPINVISIBLECOLUMNS | NOMAPINVISIBLECOLUMNS]
[, REPERROR (error, response)]
[, RESOLVECONFLICT (conflict_resolution_specification)]
[, SQLEXEC (SQL_specification)]
[, THREAD (thread_ID)]
[, THREADRANGE (thread_range[, column_list])]
[, TRIMSPACES | NOTRIMSPACES]
[, TRIMVARSPACES | NOTRIMVARSPACES]
[, WHERE (clause)]
;
```

TABLE and MAP Options

The following table summarizes the options that are available for the TABLE and MAP parameters. Note that not all options are valid for both parameters.

Table 3-34 Summary of TABLE and MAP Syntax Components

Component	Description	Valid For
TABLE *source_table*[, TARGET *taget_table*]	Specifies the source object in a TABLE statement for Extract and an optional mapping to a target object. Use in the Extract parameter file.	TABLE
MAP *source_table*, TARGET *target_table*	Specifies the source-target object mapping for the Replicat process. Use in the Replicat parameter file.	MAP
ATTRCHARSET *(charset)*	specifies the source character set information at UDT attribute level.	TABLE
CHARSET *character_set*	Specifies any supported character set.	TABLE
COLCHARSET *character_set*	Specifies any supported character set.	TABLE
COLMAP *(column_mapping)*	Maps records between different source and target columns.	TABLE and MAP
{COLS | COLSEXCEPT} (*column_list*)	Selects or excludes columns for processing.	TABLE
COMPARECOLS (*column_specification*)	Specifies columns to use for conflict detection and resolution.	TABLE and MAP
COORDINATED	Forces a transaction to be processed as a barrier transaction.	MAP
{DEF| TARGETDEF} *template*	Specifies a source-definitions or target-definitions template.	TABLE and MAP
EXCEPTIONSONLY	Specifies that the MAP statement is an exceptions MAP statement.	MAP

Table 3-34 (Cont.) Summary of TABLE and MAP Syntax Components

Component	Description	Valid For
EVENTACTIONS (*action*)	Triggers an action based on a record that satisfies a specified filter rule.	TABLE and MAP
EXITPARAM '*parameter*'	Passes a parameter in the form of a literal string to a user exit.	TABLE and MAP
FETCHBEFOREFILTER	Directs the FETCHCOLS or FETCHCOLSEXCEPT action to be performed before a filter is executed.	TABLE
{FETCHCOLS | FETCHCOLSEXCEPT} (*column_list*)	Enables the fetching of column values from the source database when the values are not in the transaction record.	TABLE
{FETCHMODCOLS | FETCHMODCOLSEXCEPT} (*column_list*)	Forces column values to be fetched from the database when the columns are present in the transaction log.	TABLE
FILTER (*filter_clause*)	Selects records based on a numeric value. FILTER provides more flexibility than WHERE.	TABLE and MAP
GETBEFORECOLS (*column_specification*)	Forces before images of columns to be captured and written to the trail.	TABLE
HANDLECOLLISIONS | NOHANDLECOLLISIONS	Reconciles the results of changes made to the target table by an initial load process with those applied by a change-synchronization group.	MAP
INSERTALLRECORDS	Applies all row changes as inserts.	MAP
INSERTAPPEND | NOINSERTAPPEND	Controls whether or not Replicat uses an Oracle APPEND hint for INSERT statements.	MAP
KEYCOLS (*columns*)	Designates columns that uniquely identify rows.	TABLE and MAP
MAPEXCEPTION (*exceptions_mapping*)	Specifies that the MAP statement contains exceptions handling for wildcarded tables.	MAP
MAPINVISIBLECOLUMNS | NOMAPINVISIBLECOLUMNS	Controls whether or not Replicat includes invisible columns in Oracle target tables for default column mapping. For invisible columns in Oracle target tables that use explicit column mapping, they are always mapped so do not require this option.	MAP
REPERROR (*error*, *response*)	Controls how Replicat responds to errors when executing the MAP statement.	MAP
RESOLVECONFLICT (*conflict_resolution_specification*)	Specifies rules for conflict resolution.	MAP

Table 3-34 (Cont.) Summary of TABLE and MAP Syntax Components

Component	Description	Valid For
`SQLEXEC (SQL_specification)`	Executes stored procedures and queries.	TABLE and MAP
`SQLPREDICATE 'WHERE where_clause'`	Enables a WHERE clause to select rows for an initial load.	TABLE
`THREAD (thread_ID)`	Valid for Replicat in coordinated mode. Specifies that the MAP statement will be processed by the specified Replicat thread.	MAP
`THREADRANGE (thread_range, column_list)`	Valid for Replicat in coordinated mode. Specifies that the MAP statement will be processed by the specified range of Replicat threads.	MAP
`TOKENS (token_definition)`	Defines user tokens.	TABLE
`TRIMSPACES | NOTRIMSPACES`	Controls whether trailing spaces are trimmed or not when mapping CHAR to VARCHAR columns.	TABLE and MAP
`TRIMVARSPACES | NOTRIMVARSPACES`	Controls whether trailing spaces are trimmed or not when mapping VARCHAR to CHAR or VARCHAR columns.	TABLE and MAP
`WHERE (clause)`	Selects records based on conditional operators.	TABLE and MAP
;	(Semicolon) Terminates the TABLE or MAP statement and is required.	TABLE and MAP

TABLE *source_table*[, TARGET *taget_table*]

TABLE is valid in an Extract parameter file.

Use TABLE to specify a source object for which you want Extract to capture data. Specify the fully qualified two-part or three-part name of the object, such as *schema.table* or *catalog.schema.table*. You can use a wildcard to specify multiple objects with one TABLE statement. To specify object names and wildcards correctly, see *Administering Oracle GoldenGate for Windows and UNIX*.

Use the TARGET option only when Extract must refer to a target definitions file (specified with the TARGETDEFS parameter) to perform conversions or when the COLMAP option is used to map columns. Otherwise, it can be omitted from a TABLE parameter. Column mapping with COLMAP and conversion work usually are performed on the target system to minimize the impact of replication activities on the source system, but can be performed on the source system if required. For example, column mapping and conversion can be performed on the source system in a configuration where there are multiple sources and one target. In this scenario, it may be easier to manage one target definitions file rather than managing a definitions file for each source database, especially if there are frequent application changes that require new definitions files to be generated.

Using TARGET in a TABLE parameter identifies the metadata of the extracted data based on the target structure, rather than that of the source, to reflect the structure of the record that is reflected in the definitions file or the column map. Do not use three-part names if `TARGET` specifies tables in a target Oracle container database or SQL/MX database. Replicat can only connect to one container or catalog, so it is assumed that the container or catalog portion of the name is the same as the one that Replicat logs into (as specified with `USERID`, `USERIDALIAS`, or `TARGETDB`, depending on the database).

If no other `TABLE` syntax options are required to process the specified source data, you can use a simple `TABLE` statement, making sure to terminate it with a semicolon.

```
TABLE sales.customers;
```

The following shows the use of a wildcard to specify multiple tables:

```
TABLE sales.*;
```

The preceding `TABLE` statements direct Extract to capture all supported column data for the specified objects and write it to the trail without performing any filtering, conversion, or other manipulation.

`MAP` *`source_table`*, `TARGET` *`target_table`*

`MAP` is valid in a Replicat parameter file.

Use `MAP` to specify a source object, and use `TARGET` to specify the target object to which Replicat applies the replicated source data. Together, the `MAP` and `TARGET` clause comprise a *mapping*.

- For `MAP` *`source_table`*, specify the source object. Specify the fully qualified two-part or three-part name of the object, such as *`schema.table`* or *`catalog.schema.table`*. You can use a wildcard to specify multiple source objects.
- For `TARGET` *`target_table`*, specify a two-part name, even if the target is a container database or SQL/MX database. Replicat can only connect to one container or catalog, so it is assumed that the container or catalog portion of the name is the same as the one that Replicat logs into (as specified with `USERID`, `USERIDALIAS`, or `TARGETDB`, depending on the database). You can use a wildcard to specify multiple target objects.

The following shows the use of a wildcard to specify multiple tables. Note that the `TARGET` clause does not include the `tab` prefix before the wildcard. That specification would be invalid, because the wildcard would be resolved as `sales.tabtab1`, `sales.tabtab2`, and so forth.

```
MAP sales.tab*, TARGET sales.*;
```

To specify object names and wildcards correctly in the `MAP` and `TARGET` clauses, see *Administering Oracle GoldenGate for Windows and UNIX*.

If no filtering, mapping, or other work is required for the objects, you can use simple `MAP` statements like the following, making sure to terminate each one with a semicolon.

```
MAP sales.customers, TARGET sales.customers;
MAP fin.*, TARGET fin.*;
```

`ATTRCHARSET` *`(charset)`*

`ATTRCHARSET` is valid for `TABLE`.

Use the ATTRCHARSET clause to specify the source character set information at UDT attribute level. It overrides the character set defined in the trail file or specified by SOURCECHARSET, CHARSET, or COLCHARSET parameters.

Valid values are character set names and valid UDT attribute names. Wildcard attribute names are supported. For example:

```
TABLE SCHEMA.T*,
  ATTRCHARSET(WE8DEC, col*.attr1, col1.attr*.attr3);
```

CHARSET *character_set*

CHARSET is valid for TABLE.

Use the CHARSET clause to specify any supported character set. See CHARSET for more information.

COLCHARSET *character_set*

COLCHARSET is valid for TABLE.

Use the COLCHARSET clause to specify any supported character set. See COLCHARSET for more information.

COLMAP *(column_mapping)*

COLMAP is valid for TABLE and MAP.

Use COLMAP to:

- Map individual source columns to target columns when the source and target columns have different names.
- Specify default column mapping when the source and target names are identical.

COLMAP provides instructions for selecting, translating, and moving column data from a source column to a target column.

Note:

To create *global* rules for column mapping across all tables in subsequent MAP statements, use the COLMATCH parameter.

Getting More Information About Configuring Column Mapping

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about using COLMAP. To use COLMAP, related configuration considerations must be taken into account, such as whether source and target column structures are identical or different and whether global column mapping parameters may be sufficient.

Syntax

```
COLMAP (
[USEDEFAULTS, ]
target_column = source_expression [BINARYINPUT]
[, ...]
)
```

USEDEFAULTS
Automatically maps source and target columns that have the same name if they were not specified in an explicit column mapping. The data types are translated automatically, as needed, based on the local data-definitions file. `USEDEFAULTS` eliminates the need for an explicit column mapping if those columns have the same name and the data does not require any filtering or conversion.
Specify `USEDEFAULTS` before explicit column mappings in the `COLMAP` clause. For additional information about default column mapping in `COLMAP`, see *Administering Oracle GoldenGate for Windows and UNIX*.

target_column* = *source_expression
Defines an explicit source-target column mapping.

target_column
Specifies the name of the target column. For supported characters in column names, see *Administering Oracle GoldenGate for Windows and UNIX*.

source_expression
Can be any of the following:

- The name of a source column, such as `ORD_DATE`
- A numeric constant, such as `123`
- A string constant within single quotes, such as `'ABCD'`
- An expression using an Oracle GoldenGate column-conversion function, such as `@STREXT (COL1, 1, 3)`. See "Column Conversion Functions" for more information.

BINARYINPUT
Use `BINARYINPUT` when the target column is defined as a binary data type, such as `RAW` or `BLOB`, but the source input contains binary zeros in the middle of the data. Use `BINARYINPUT` when replicating a full Enscribe record defined as a single column into a target column. The source input is handled as binary input, and replacement of data values is suppressed.

Example 1

```
MAP ggs.tran, TARGET ggs.tran2, COLMAP (loc2 = loc, type2 = type);
```

Example 2

```
TABLE ggs.tran, COLMAP (SECTION = @STRCAT('\u00a7', SECTION ));
```

{COLS | COLSEXCEPT} (*column_list*)

`COLS` and `COLSEXCEPT` are valid for `TABLE`.

Use `COLS` and `COLSEXCEPT` to control the columns for which data is captured.

- `COLS` specifies columns that contain the data that you want to capture. When `COLS` is used, all columns that are not in the `COLS` list are ignored by Oracle GoldenGate.
- `COLSEXCEPT` specifies columns to exclude from being captured. When `COLSEXCEPT` is used, all columns that are not in the `COLSEXCEPT` list are captured by Oracle GoldenGate. For tables with numerous columns, `COLSEXCEPT` may be more efficient than listing each column with `COLS`.

Caution:

Do *not* exclude key columns, and do *not* use `COLSEXCEPT` to exclude columns that contain data types that are not supported by Oracle GoldenGate. `COLSEXCEPT` does not exclude unsupported data types.

To use `COLS`, the following is required:

- The table must have one or more key columns, or a substitute key must be defined with the `KEYCOLS` option. See "`KEYCOLS (`*`columns`*`)`".
- The key columns or the columns specified with `KEYCOLS` must be included in the column list that is specified with `COLS`. Otherwise, they will not be captured, and an error will be generated during processing.

Without a primary key, a unique key, or a `KEYCOLS` clause in the `TABLE` statement, Oracle GoldenGate uses all of the columns in the table, rendering `COLS` unnecessary.

Note:

Do not use this option for tables that are processed in pass-through mode by a data-pump Extract group.

Syntax

```
{COLS | COLSEXCEPT} (column [, ...])
```

`column`
The name of a column. To specify multiple columns, create a comma-delimited list, for example:

```
COLS (name, city, state, phone)
```

Note:

If the database only logs values for columns that were changed in an update operation, a column specified for capture with `COLS` might not be available. To make those columns available, use the `FETCHCOLS` option in the `TABLE` statement or enable supplemental logging for the column.

Example

The `COLS` clause in this example captures *only* columns 1 and 3, whereas the `COLSEXCEPT` clause captures all columns *except* columns 1 and 3.

```
TABLE hq.acct, COLS (col1, col3);
TABLE hq.sales, COLSEXCEPT (col1, col3);
```

`COMPARECOLS (`*`column_specification`*`)`

`COMPARECOLS` is valid for `MAP`.

Use `COMPARECOLS` to specify the columns that Replicat uses to detect and resolve update or delete conflicts when configured with the `RESOLVECONFLICT` option of `MAP` in a multi-master configuration. A conflict is a mismatch between the before image of a record in the trail and the current data in the target table.

To use `COMPARECOLS`, the before image must be available in the trail record by means of the `GETBEFORECOLS` parameter in the Extract `TABLE` statement. The specified columns must exist in the target database and also be part of the Replicat configuration (satisfy the `TARGET` specification with or without a `COLMAP` clause).

Only scalar data types are supported by `COMPARECOLS` as comparison columns. A scalar data type can be used in a `WHERE` clause, has a single, atomic value and no internal components. Scalar data types supported by Oracle GoldenGate include the following, but not LOBs.

- Numeric data types
- Date data types
- Character data types

Some examples of non-scalar data types are spatial data, user-defined data types, large objects (LOB), XML, reference data types, and RAW. A row being considered for CDR can include non-scalar data so long as the conflict is not in the non-scalar data itself.

To specify conflict resolution routines, use the `RESOLVECONFLICT` option of `MAP`. `COMPARECOLS` and `RESOLVECONFLICT` can be in any order in the `MAP` statement.

Getting More Information About Configuring the CDR Feature

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about configuring conflict detection and resolution.

Syntax

```
COMPARECOLS(
{ON UPDATE | ON DELETE}
{ALL | KEY | KEYINCLUDING (col[,...]) | ALLEXCLUDING (col[,...]) }
[,...]
)
```

`{ON UPDATE | ON DELETE}`
Specifies whether the before image of the specified columns should be compared for updates or deletes. You can use `ON UPDATE` only, `ON DELETE` only, or both. If using both, specify them within the same `COMPARECOLS` clause. See the example for how to use both.

`{ALL | KEY | KEYINCLUDING (`*`col`*`[,...]) | ALLEXCLUDING (`*`col`*`[,...])}`
Specifies the columns for which a before image is captured.

> **`ALL`**
> Compares using all columns in the target table. An error is generated if any corresponding before images are not available in the trail. Using `ALL` imposes the highest processing load for Replicat, but allows conflict-detection comparisons to be performed using all columns for maximum accuracy.

KEY
Compares only the primary key columns. This is the fastest option, but does not permit the most accurate conflict detection, because keys can match but non-key columns could be different.

KEYINCLUDING
Compares the primary key columns and the specified column or columns. This is a reasonable compromise between speed and detection accuracy.

ALLEXCLUDING
Compares all columns except the specified columns. For tables with numerous columns, `ALLEXCLUDING` may be more efficient than `KEYINCLUDING`. Do *not* exclude key columns.

Example 1
In the following example, the key columns plus the `name`, `address`, and `salary` columns are compared for conflicts.

```
MAP src, TARGET tgt
COMPARECOLS (
ON UPDATE KEYINCLUDING (name, address, salary),
ON DELETE KEYINCLUDING (name, address, salary));
```

Example 2
In the following example, the `comment` column is ignored and all other columns are compared for conflicts.

```
MAP src, TARGET tgt
COMPARECOLS (ON UPDATE ALLEXCLUDING (comment))
```

COORDINATED

`COORDINATED` is valid for `MAP`. This option is valid when Replicat is in coordinated mode.

Use the `COORDINATED` option to force transactions made on objects in the same `MAP` statement to be processed as barrier transactions. It causes all of the threads across all `MAP` statements to synchronize to the same trail location. The synchronized position is the beginning of the transaction that contains a record that satisfies a `MAP` that contains the `COORDINATED` keyword. The transaction is then applied atomically by a single thread, which is either the thread with the lowest thread ID among the currently running threads or a dedicated thread with the ID of 0 if `USEDEDICATEDCOORDINATIONTHREAD` is specified in the parameter file.

`THREAD` and `THREADRANGE` clauses specified in conjunction with `COORDINATED` are ignored because the record will not be applied by the designated thread(s). The `COORDINATED` keyword results in temporarily suspending parallelism so that the target tables are in a consistent state before the force-coordinated transaction is applied. After this point, parallel execution commences again.

Replicat by default coordinates transactions in which the primary key is updated, transactions that perform DDL, and certain `EVENTACTIONS` actions. `COORDINATED` provides for explicit coordination.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about coordinated Replicat.

Syntax

```
COORDINATED
```

Example

The following is an example of the use of the `COORDINATED` option. In this example, business rules require that the target tables be in a consistent state before Replicat executes transactions that include `SQLEXEC` operations on the objects specified in the `MAP` statement. Parallelism must be temporarily converted to serial SQL processing in this case.

Given the following `MAP` statement, if another thread inserts into `t2` a record with a value of 100 for `col_val` before the insert to `t1` is performed by thread 1, then the `SQLEXEC` will delete the row. If other threads are still processing the record that has the value of 100, the `SQLEXEC` fails. The results of this `MAP` statement are, therefore, not predictable.

```
MAP u1.t1, TARGET u2.t1 SQLEXEC (ID test2, QUERY ' delete from u2.t2 where col_val
=100 ', NOPARAMS)), THREAD(1);
```

Conversely, when `COORDINATED` is used, all of the threads synchronize at a common point, including the one processing the `col_val=100` record, thereby removing the ambiguity of the results.

```
MAP u1.t1, TARGET u2.t1 SQLEXEC (ID test2, QUERY ' delete from u2.t2 where col_val
=100 ', NOPARAMS)), THREAD(1), COORDINATED;
```

`{DEF| TARGETDEF}` ***`template`***

`DEF` and `TARGETDEF` are valid for `TABLE` and `MAP`.

Use `DEF` and `TARGETDEF` to specify the name of a definitions template that was created by the DEFGEN utility.

- `DEF` specifies a source-definitions template.
- `TARGETDEF` specifies a target-definitions template.

A template is based on the definitions of a specific table. It enables new tables that have the same definitions as the original table to be added to the Oracle GoldenGate configuration without running DEFGEN for them, and without having to stop and start the Oracle GoldenGate process. The definitions in the template are used for definitions lookups.

Getting More Information About Creating Definitions Templates

For more information about templates and DEFGEN, see *Administering Oracle GoldenGate for Windows and UNIX*.

Syntax

```
{DEF | TARGETDEF} template
```

`template`
The name of one of the following definitions templates generated by the DEFGEN utility:

- Use `DEF` to specify a source-definitions template generated by the `DEF` option of the `TABLE` parameter in the DEFGEN parameter file.

- Use TARGETDEF to specify a target-definitions template generated by the TARGETDEF option of the TABLE parameter in the DEFGEN parameter file.

The definitions contained in the template must be identical to the definitions of the table or tables that are specified in the same TABLE or MAP statement.
Case-sensitivity of the template name is observed when the name is specified the same way that it is stored in the database. Make certain that the template name is specified the same way in both the DEF or TARGETDEF clause in this TABLE or MAP statement, and in the DEFGEN parameter file that created the template.

Example 1
This example shows a case-insensitive template name.

```
MAP acct.cust*, TARGET acct.cust*, DEF custdef;
```

Example 2
This example shows a case-sensitive template name when the database requires quotes to enforce case-sensitivity.

```
TABLE acct.cust*, DEF "CustDef";
```

Example 3
This example shows a case where both DEF and TARGETDEF are used.

```
MAP acct.cust*, TARGET acc.cust*, DEF custdef, TARGETDEF tcustdef;
```

EXCEPTIONSONLY

EXCEPTIONSONLY is valid for MAP.

Use EXCEPTIONSONLY in an exceptions MAP statement intended for error handling. The exceptions MAP statement must follow the MAP statement for which errors are anticipated. The exceptions MAP statement executes only if an error occurs for the last record processed in the preceding regular MAP statement.

To use EXCEPTIONSONLY, use a REPERROR statement with the EXCEPTION option either within the regular MAP statement or at the root of the parameter file. See "REPERROR" for more information.

> **Note:**
>
> If using the Oracle GoldenGate Conflict Detection and Resolution (CDR) feature, a REPERROR with EXCEPTION is not needed. CDR automatically sends all operations that cause errors to the exceptions MAP statement.

The exceptions MAP statement must specify the same source table as in the regular MAP statement, but the target table in the exceptions MAP statement must be an exceptions table.

> **Note:**
>
> See "MAPEXCEPTION *(exceptions_mapping)*" to support wildcarded object names.

Getting More Information About Configuring Exceptions Handling

For more information about configuring exceptions handling with an exceptions `MAP` statement, see *Administering Oracle GoldenGate for Windows and UNIX*.

Syntax

`EXCEPTIONSONLY`

`EVENTACTIONS (`*`action`*`)`

`EVENTACTIONS` is valid for `TABLE` and `MAP`. Some options apply only to one or the other parameter and are noted as such in the descriptions.

Use `EVENTACTIONS` to cause the process to take a defined action based on a record in the trail, known as the *event record*, that qualifies for a specific filter rule. You can use this system, known as the *event marker system* (or *event marker infrastructure*) to customize processing based on database events. For example, you can suspend a process to perform a transformation or report statistics. The event marker feature is supported for the replication of data changes, but not for initial loads.

To trigger actions that do not require data to be applied to target tables, you can use the Replicat `TABLE` parameter with filtering options that support `EVENTACTIONS`. See "TABLE for Replicat" for more information.

Caution:

`EVENTACTIONS` is not supported if the source database is Teradata and Extract is configured in maximum performance mode.

You may need to combine two or more actions to achieve your goals. When multiple actions are combined, the entire `EVENTACTIONS` statement is parsed first, and then the specified options execute in order of precedence. The following list shows the order of precedence. The actions listed before `Process the record` occur before the record is written to the trail or applied to the target (depending on the process). Actions listed after `Process the record` are executed after the record is processed.

`TRACE`
`LOG`
`CHECKPOINT BEFORE`
`DISCARD`
`SHELL`
`ROLLOVER`
(Process the record)
`IGNORE`
`REPORT`
`SUSPEND`
`ABORT`
`CHECKPOINT AFTER`
`FORCESTOP`
`STOP`

To prevent the event record itself from being processed in the normal manner, use the IGNORE or DISCARD option. Because IGNORE and DISCARD are evaluated before the record itself, they prevent the record from being processed. Without those options, EVENTACTIONS for Extract writes the record to the trail, and EVENTACTIONS for Replicat applies that operation to the target database.

You should take into account the possibility that a transaction could contain two or more records that trigger an event action. In such a case, there could be multiple executions of certain EVENTACTIONS specifications. For example, encountering two qualifying records that trigger two successive ROLLOVER actions will cause Extract to roll over the trail twice, leaving one of the two files empty of transaction data.

You should also take into account that when the GETUPDATEBEFORES parameter is in effect, two records are generated for UPDATE operations: a record that contains the before image and a record that contains the after image. An event action is triggered for each of those records when the operation qualifies as an event record. You can use the BEFOREAFTERINDICATOR token of the GGHEADER column-conversion function as a filter in a FILTER clause to qualify the records so that the event action triggers only once, either on the before record or the after record, but not both.

The following example filters on the BEFORE indicator. The EVENTACTION issues the ECHO shell command to output the string 'Triggered on BEFORE' to the event log when a BEFORE record is encountered.

```
TABLE qasource.test, &
FILTER(@STRFIND('BEFORE', @GETENV('GGHEADER' , 'BEFOREAFTERINDICATOR')) > 0), &
EVENTACTIONS ( shell ('echo --== Triggered on BEFORE ==-- '), LOG);
```

The following shows the result of the event action:

```
013-03-06 17:59:31  INFO    OGG-05301  Shell command output: '--== Triggered
on AFTER ==--'
```

The following example does the same thing, but for the AFTER indicator.

```
TABLE qasource.test, &
FILTER(@STRFIND('AFTER', @GETENV('GGHEADER' , 'BEFOREAFTERINDICATOR')) > 0), &
EVENTACTIONS ( shell ('echo --== Triggered on AFTER ==-- '), LOG);
```

In a Teradata configuration where Extract is configured in maximum protection mode, use EVENTACTIONS only in the VAM-sort Extract group. It is not supported by the primary Extract in this configuration because concurrent changes are not sorted in transaction order at this point in the processing stream. For more information, see *Installing and Configuring Oracle GoldenGate for Teradata*.

Getting More Information About Configuring the Event Marker System

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about using EVENTACTIONS and the Event Marker System.

Syntax

```
EVENTACTIONS (
[STOP | SUSPEND | ABORT | FORCESTOP]
[IGNORE [RECORD | TRANSACTION [INCLUDEVENT]]
[DISCARD]
[LOG [INFO | WARNING]]
[REPORT]
[ROLLOVER]
[SHELL 'command' |
  SHELL ('command', VAR variable = {column_name | expression}
  [, ...]) ]
[TRACE[2] file [TRANSACTION] [DDL[INCLUDE] | DDLONLY] [PURGE | APPEND]]
[CHECKPOINT [BEFORE | AFTER | BOTH]]
[, ...]
)
```

STOP
Valid in `TABLE` for Extract and in `MAP` for Replicat.
Brings the process to a graceful stop when the specified event record is encountered. The process waits for other operations within event transaction to be completed before stopping. If the transaction is a Replicat grouped or batched transaction, the current group of transactions are applied before the process stops gracefully. The process restarts at the next record after the event record, so long as that record also signified the end of a transaction.
The process logs a message if it cannot stop immediately because a transaction is still open. However, if the event record is encountered within a long-running open transaction, there is no warning message that alerts you to the uncommitted state of the transaction. Therefore, the process may remain running for a long time despite the `STOP` event.
`STOP` can be combined with other `EVENTACTIONS` options except for `ABORT` and `FORCESTOP`.

SUSPEND
Valid in `TABLE` for Extract and in `MAP` for Replicat.
Pauses the process so that it retains the active context of the current run and can still respond to `SEND` commands that are issued in GGSCI. When a process is suspended, the `INFO` command shows it as `RUNNING`, and the `RBA` field shows the last checkpoint position.
To resume processing, issue the `SEND` command with the `RESUME` option.
To use the `CHECKPOINT BEFORE` option in conjunction with `SUSPEND`, the event record must be the start of a transaction for the `SUSPEND` to take place. That way, if the process is killed while in the suspended state, the event record with the `SUSPEND` action is the first record to be reprocessed upon restart. If both `CHECKPOINT BERORE` and `SUSPEND` are specified, but the event record is not the start of a transaction, the process abends before `SUSPEND` can take place.
To use the `CHECKPOINT AFTER` option in conjunction with `SUSPEND`, the `RESUME` command must be issued before the checkpoint can take place, and the event record must be a `COMMIT` record. If the process is killed while in a `SUSPEND` state, the process reprocesses the transaction from the last checkpointed position upon restart.
`SUSPEND` cannot be combined with `ABORT` but can be combined with all other options.

ABORT
Valid in `TABLE` for Extract and in `MAP` for Replicat.
Forces the process to exit immediately when the specified event record is encountered, whether or not there are open transactions. The event record is not processed. A fatal error is written to the log, and the event record is written to the discard file if `DISCARD` is also specified. The process will undergo recovery on startup.
`ABORT` can be combined only with `CHECKPOINT BEFORE`, `DISCARD`, `SHELL`, and `REPORT`.

FORCESTOP
Valid in `TABLE` for Extract and in `MAP` for Replicat.

Forces the process to stop gracefully when the specified event record is encountered, but only if the event record is the last operation in the transaction or the only record in the transaction. The record is written normally.
If the event record is encountered within a long-running open transaction, the process writes a warning message to the log and exits immediately, as in `ABORT`. In this case, recovery may be required on startup. If the `FORCESTOP` action is triggered in the middle of a long-running transaction, the process exits without a warning message.
`FORCESTOP` can be combined with other `EVENTACTIONS` options except for `ABORT`, `STOP`, `CHECKPOINT AFTER`, and `CHECKPOINT BOTH`. If used with `ROLLOVER`, the rollover only occurs if the process stops gracefully.

`IGNORE [RECORD | TRANSACTION [INCLUDEVENT]]`
Valid in `TABLE` for Extract and in `MAP` for Replicat.
Ignores some or all of the transaction, depending on the selected action.

- `RECORD` is the default. It forces the process to ignore only the specified event record, but not the rest of the transaction. No warning or message is written to the log, but the Oracle GoldenGate statistics are updated to show that the record was ignored.
- Use `TRANSACTION` to ignore the entire transaction that contains the record that triggered the event. If `TRANSACTION` is used, the event record must be the first one in the transaction. When ignoring a transaction, the event record is also ignored by default. `TRANSACTION` can be shortened to `TRANS`.
- Use `INCLUDEEVENT` with `TRANSACTION` to propagate the event record to the trail or to the target, but ignore the rest of the associated transaction.

`IGNORE` can be combined with all other `EVENTACTIONS` options except `ABORT` and `DISCARD`.
An `IGNORE` action is processed after all the qualification, filtering, mapping, and user-exit operations are processed. The record or transaction is ignored in the final output phase and prevents the record or transaction from being written to the output target (the trail in the case of Extract or the database in the case of Replicat). Therefore, in certain expressions, for example those that include `SQLEXEC` operations, the `SQLEXEC` will be executed before the `IGNORE` is processed. This means that, while the record is not written to the trail or target database, all of the effects of processing the record through qualification, filtering, mapping and user-exit will occur.
This action is not valid for DDL records. Because DDL operations are autonomous, ignoring a record is equivalent to ignoring the entire transaction.

`DISCARD`
Valid in `TABLE` for Extract and in `MAP` for Replicat.
Causes the process to:

- write the specified event record to the discard file.
- update the Oracle GoldenGate statistics to show that the record was discarded.

The process resumes processing with the next record in the trail.
`DISCARD` can be combined with all other `EVENTACTIONS` options except `IGNORE`.

`LOG [INFO | WARNING]`
Valid in `TABLE` for Extract and in `MAP` for Replicat.
Causes the process to log the event when the specified event record is encountered. The message is written to the report file, to the Oracle GoldenGate error log, and to the system event log.
Use the following options to specify the severity of the message:

- `INFO` specifies a low-severity informational message. This is the default.
- `WARNING` specifies a high-severity warning message.

`LOG` can be combined with all other `EVENTACTIONS` options except `ABORT`. If using `ABORT`, `LOG` is not needed because `ABORT` logs a fatal error before the process exits.

`REPORT`
Valid in `TABLE` for Extract and in `MAP` for Replicat.
Causes the process to generate a report file when the specified event record is encountered. This is the same as using the `SEND` command with the `REPORT` option in GGSCI.
The `REPORT` message occurs after the event record is processed (unless `DISCARD`, `IGNORE`, or `ABORT` are used), so the report data will include the event record.
`REPORT` can be combined with all other `EVENTACTIONS` options.

`ROLLOVER`
Valid in `TABLE` for Extract.
Causes Extract to roll over the trail to a new file when the specified event record is encountered. The `ROLLOVER` action occurs before Extract writes the event record to the trail file, which causes the record to be the first one in the new file unless `DISCARD`, `IGNORE` or `ABORT` are also used.
`ROLLOVER` can be combined with all other `EVENTACTIONS` options except `ABORT`. `ROLLOVER` cannot be combined with `ABORT` because `ROLLOVER` does not cause the process to write a checkpoint, and `ROLLOVER` happens before `ABORT`.
Without a `ROLLOVER` checkpoint, `ABORT` causes Extract to go to its previous checkpoint upon restart, which would be in the previous trail file. In effect, this cancels the rollover.

`SHELL '`*`command`*`'`
Valid in `TABLE` for Extract and in `MAP` for Replicat.
Causes the process to execute the specified shell command when the event record is encountered. `SHELL '`*`command`*`'` executes a basic shell command. The command string is taken at its literal value and sent to the system that way. The command is case-sensitive. Enclose the command string within single quote marks, for example:

```
EVENTACTIONS (SHELL 'echo hello world! > output.txt')
```

If the shell command is successful, the process writes an informational message to the report file and to the event log. Success is based upon the exit status of the command in accordance with the UNIX shell language. In that language, zero indicates success.
If the system call is not successful, the process abends with a fatal error. In the UNIX shell language, non-zero equals failure. Note that the error message relates only to the execution of the `SHELL` command itself, and not the exit status of any subordinate commands. For example, `SHELL` can execute a script successfully, but commands in that script could fail.
`SHELL` can be combined with all other `EVENTACTIONS` options.

`SHELL ('`*`command`*`', VAR `*`variable`*` = {`*`column_name`*` | `*`expression`*`} [, ...])`
Valid in `TABLE` for Extract and in `MAP` for Replicat.
Causes the process to execute the specified shell command when the event record is encountered and supports parameter passing. The command and the parameters are case-sensitive.
When `SHELL` is used with arguments, the entire command and argument strings must be enclosed within parentheses, for example:

```
EVENTACTIONS (SHELL ('Current timestamp: $1  SQLEXEC result is $2 ',VAR $1 =
@GETENV('JULIANTIMESTAMP'),VAR $2 = mytest.description));
```

The input is as follows:

command
Is the command, which is passed literally to the system.

VAR
Is a required keyword that starts the parameter input.

variable
Is the user-defined name of the placeholder variable where the run-time variable value will be substituted. Extra variables that are not used in the command are ignored. Note that any literal in the `SHELL` command that matches a `VAR` variable name is replaced by the substituted `VAR` value. This may have unintended consequences, so test your code before putting it into production.

column_name
Can be the before or after (current) image of a column value.

expression
can be the following, depending on whether column data or DDL is being handled.

- Valid expressions for column data:
  - The value from a `TOKENS` clause in a `TABLE` statement.
  - A return value from any Oracle GoldenGate column-conversion function.
  - A return value from a `SQLEXEC` query or procedure.
- Valid expressions for DDL:
  - Return value from `@TOKEN` function (Replicat only).
  - Return value from `@GETENV` function.
  - Return value from other functions that do not reference column data (for example, `@DATENOW`).
  - Return value from `@DDL` function.

TRACE[2] file **[TRANSACTION] [DDL[INCLUDE] | DDLONLY] [PURGE | APPEND]**
Valid in `TABLE` for Extract and in `MAP` for Replicat.
Causes process trace information to be written to a trace file when the specified event record is encountered. `TRACE` provides step-by-step processing information. `TRACE2` identifies the code segments on which the process is spending the most time.
By default (without options), standard DML tracing without consideration of transaction boundaries is enabled until the process terminates.

- *`file`* specifies the name of the trace file and must appear immediately after the `TRACE` keyword. You can specify a unique trace file, or use the default trace file that is specified with the standalone `TRACE` or `TRACE2` parameter.

  The same trace file can be used across different `TABLE` or `MAP` statements in which `EVENTACTIONS TRACE` is used. If multiple `TABLE` or `MAP` statements specify the same trace file name, but the `TRACE` options are not used consistently, preference is given to the options in the last resolved `TABLE` or `MAP` that contains this trace file.

- Use `TRANSACTION` to enable tracing only until the end of the current transaction, instead of when the process terminates. For Replicat, transaction boundaries are based on the source transaction, not the typical Replicat grouped or batched target transaction. `TRANSACTION` can be shortened to `TRANS`. This option is valid only for DML operations.
- `DDL[INCLUDE]` traces DDL and also DML transactional data processing. Either `DDL` or `DDLINCLUDE` is valid.
- `DDLONLY` traces DDL but does not trace DML transactional data.

  These options are valid only for Replicat. By default DDL tracing is disabled.
- Use `PURGE` to truncate the trace file before writing additional trace records, or use `APPEND` to write new trace records at the end of the existing records. `APPEND` is the default.

`TRACE` can be combined with all other `EVENTACTIONS` options except `ABORT`.
To disable tracing to the specified trace file, issue the GGSCI `SEND` *`process`* command with the `TRACE OFF` *`file_name`* option.

`CHECKPOINT [BEFORE | AFTER | BOTH]`
Valid in `TABLE` for Extract and in `MAP` for Replicat.
Causes the process to write a checkpoint when the specified event record is encountered. Checkpoint actions provide a context around the processing that is defined in `TABLE` or `MAP` statements. This context has a begin point and an end point, thus providing synchronization points for mapping the functions that are performed with `SQLEXEC` and user exits.

`BEFORE`
`BEFORE` for an Extract process writes a checkpoint before Extract writes the event record to the trail. `BEFORE` for a Replicat process writes a checkpoint before Replicat applies the SQL operation that is contained in the record to the target.
`BEFORE` requires the event record to be the first record in a transaction. If it is not the first record, the process will abend. Use `BEFORE` to ensure that all transactions prior to the one that begins with the event record are committed.
When using `EVENTACTIONS` for a DDL record, note that since each DDL record is autonomous, the DDL record is guaranteed to be the start of a transaction; therefore the `CHECKPOINT BEFORE` event action is implied for a DDL record.
`CHECKPOINT BEFORE` can be combined with all `EVENTACTIONS` options.

`AFTER`
`AFTER` for Extract writes a checkpoint after Extract writes the event record to the trail. `AFTER` for Replicat writes a checkpoint after Replicat applies the SQL operation that is contained in the record to the target.
`AFTER` flags the checkpoint request as an advisory, meaning that the process will only issue a checkpoint at the next practical opportunity. For example, in the case where the event record is one of a multi-record transaction, the checkpoint will take place at the next transaction boundary, in keeping with the Oracle GoldenGate data-integrity model.
When using `EVENTACTIONS` for a DDL record, note that since each DDL record is autonomous, the DDL record is guaranteed to be the end (boundary) of a transaction; therefore the `CHECKPOINT AFTER` event action is implied for a DDL record.
`CHECKPOINT AFTER` can be combined with all `EVENTACTIONS` options except `ABORT`.

`BOTH`
`BOTH` combines `BEFORE` and `AFTER`. The Extract or Replicat process writes a checkpoint before and after it processes the event record.
`CHECKPOINT BOTH` can be combined with all `EVENTACTIONS` options except `ABORT`.

`CHECKPOINT` can be shortened to `CP`.

Example 1
The following example shows how you can configure a process to ignore certain records. When Extract processes any trail record that has `name = abc`, it ignores the record.

```
TABLE fin.cust, &
WHERE (name = 'abc'), &
EVENTACTIONS (ignore);
```

Example 2
Based on the compatibility and precedence rules of `EVENTACTIONS` options, `DISCARD` takes higher precedence than `ABORT`, so in this example the event record gets written to the discard file before the process abends.

```
MAP fin.cust, TARGET fin.cust2, &
WHERE (name = 'abc'), &
EVENTACTIONS (DISCARD, ABORT);
```

Example 3
The following example executes a `SHELL` action. It gets the result of a `SQLEXEC` query and pairs it with the current timestamp.

```
TABLE src.tab &
SQLEXEC (id mytest, query 'select description from lookup &
where pop = :mycol2', params (mycol2 = col2) ), &
EVENTACTIONS (SHELL ('Current timestamp: $1  SQLEXEC result is $2 ', &
VAR $1 = @GETENV('JULIANTIMESTAMP'), VAR $2 = mytest.description));
```

The shell command that results from this example could be similar to the following:

```
'Current timestamp: 212156002704718000  SQLEXEC result is test passed'
```

Example 4
The following example shows how invalid results can occur if a placeholder name conflicts with literal text in the command string. In this example, a placeholder named `$1` is associated with a column value, and the `SHELL` command echoes a literal string that includes `$1`.

```
MAP src.tab1, TARGET targ.tab1 &
EVENTACTIONS (SHELL ('echo Extra charge for $1 is $1', VAR $1 = COL1));
```

This is the unintended result, assuming the column value is `gift wrap`:

```
'Extra charge for gift wrap is gift wrap'
```

Changing the placeholder variable to `$col` results in the correct output:

```
MAP src.tab1, TARGET targ.tab1 &
EVENTACTIONS (SHELL ('echo Extra charge for $col is $1', VAR $col = COL1));
'Extra charge for gift wrap is $1'
```

The following shows similar potential for unintended results:

```
MAP src.tab1, TARGET targ.tab1 &
EVENTACTIONS (SHELL ('Timestamp: $1  Price is $13 > out.txt ', &
VAR $1 = @GETENV('JULIANTIMESTAMP')));
```

The redirected output file might contain a string like this (notice the second timestamp contains an appended value of `3`):

```
'Timestamp: 212156002704718000 Price is 2121560027047180003'
```

The intended result is this:

```
'Timestamp: 212156002704718000 Price is $13'
```

Example 5
These examples show different ways to configure tracing.

```
MAP tab1, TARGET tab1 EVENTACTIONS (TRACE ./dirrpt/trace1.txt);
MAP tab2, TARGET tab2 EVENTACTIONS (TRACE ./dirrpt/trace2.txt TRANSACTION);
```

- In the first `MAP` statement, the `trace1.txt` trace file is generated just before the first `tab1` event record is applied to the target. It contains all of the tracing information from that point forward until Replicat terminates or unless tracing is turned off with the GGSCI `SEND REPLICAT` command.
- Because the second `MAP` statement contains the `TRANSACTION` option, the `trace2.txt` file is generated just before the first `tab2` event record is applied to the target, but the tracing stops automatically at the conclusion of the transaction that contains the `tab2` event record.

Example 6
The following shows how `EVENTACTIONS` with `SUSPEND` can be used.

- *Case 1*: You are replicating DDL, and you want to ensure that there is enough space in the target database to create a new table. Use `EVENTACTIONS` with `SUSPEND` in the `MAP` statement that maps the `CREATE TABLE DDL` operation, and then execute a SQL statement in that `MAP` statement to query the amount of space remaining in a tablespace. If there is enough space, use `SEND REPLICAT` with `RESUME` to resume processing immediately; if not, leave Replicat suspended until a DBA can add the space, and then use `SEND REPLICAT` with `RESUME` to resume processing.
- *Case 2*: You want to fix unique key violations when they occur on any table. Because Replicat is processing thousands of tables, you do not want to stop the process each time there is a violation, because this would cause Replicat to spend time rebuilding the object cache again upon restart. By using `EVENTACTIONS` with `SUSPEND`, you can simply suspend processing until the problem is fixed.
- *Case 3*: At the end of the day, you suspend Replicat to run daily reports, and then resume processing immediately without stopping and restarting the process.

`EXITPARAM 'parameter'`

`EXITPARAM` is valid for `TABLE` and `MAP`.

Use `EXITPARAM` to pass a parameter to the `EXIT_PARAMS` function of a user exit routine whenever a record from the `TABLE` or `MAP` statement is encountered.

Getting More Information about User Exits

See *Administering Oracle GoldenGate for Windows and UNIX* for instructions on how to configure user exits.

See "User Exit Functions" for more information about the syntax for the user exits.

Syntax

```
EXITPARAM 'parameter string'
```

'parameter string'
A parameter that is a literal string. Enclose the parameter within single quotes. You can specify up to 100 characters for the parameter string.

FETCHBEFOREFILTER

FETCHBEFOREFILTER is valid for TABLE.

Use FETCHBEFOREFILTER to fetch columns that are specified with FETCHCOLS or FETCHCOLSEXCEPT before a FILTER operation is executed. Fetching before the filter ensures that values required for the filter are available. Without FETCHBEFOREFILTER, fetches specified with FETCHCOLS or FETCHCOLSEXCEPT are not performed until after filters are executed. Specify FETCHBEFOREFILTER before FILTER in the parameter file.

Do not use this option for tables being processed in pass-through mode by a data-pump Extract group.

FETCHBEFOREFILTER is not supported for the SQL/MX database.

Syntax

```
FETCHBEFOREFILTER
```

Example

```
TABLE hr.salary, FETCHCOLS (sal_level),
FETCHBEFOREFILTER,
FILTER (sal_level >= 8)
;
```

{FETCHCOLS | FETCHCOLSEXCEPT} (*column_list*)

FETCHCOLS and FETCHCOLSEXCEPT are valid for TABLE. These options are only valid for the primary extract and cannot be used on data pump.

Use FETCHCOLS and FETCHCOLSEXCEPT to fetch column values from the database when the values are not present in the transaction log record. Use this option if the database only logs the values of columns that were changed in an update operation, but you need to ensure that other column values required for FILTER operations are available.

- FETCHCOLS fetches the specified columns.
- FETCHCOLSEXCEPT fetches all columns except the specified columns. For tables with numerous columns, FETCHCOLSEXCEPT may be more efficient than listing each column with FETCHCOLS.

FETCHCOLS and FETCHCOLSEXCEPT are valid for all databases that are supported by Oracle GoldenGate, except NonStop SQL/MX.

For an Oracle database, Oracle GoldenGate fetches the values from the undo tablespace through Oracle's Flashback Query mechanism. The query provides a read-consistent image of the columns as of a specific time or SCN. For more information about how Oracle GoldenGate uses Flashback Query, see *Installing and Configuring Oracle GoldenGate for Oracle Database*.

Instead of using `FETCHCOLS` or `FETCHCOLSEXCEPT`, it may be more efficient to enable supplemental logging for the desired columns.

For Sybase, encrypted column data is not supported by these parameters because Oracle GoldenGate does not support Sybase encrypted data.

To control fetching and enable a response when a column specified for fetching cannot be located, use the `FETCHOPTIONS` parameter. To include fetch results in statistical displays generated by the `STATS EXTRACT` command, use the `STATOPTIONS` parameter.

If values for columns specified with `FETCHCOLS` or `FETCHCOLSEXCEPT` are present in the transaction log, no database fetch is performed. This reduces database overhead.

Syntax

```
{FETCHCOLS | FETCHCOLSEXCEPT} (column [, ...])
```

`column`
Can be one of the following:

- A column name or a comma-delimited list of column names, as in `(col1, col2)`.
- An asterisk wildcard, as in (*).

Example

The `FETCHCOLS` clause in this example fetches *only* columns 1 and 3, whereas the `FETCHCOLSEXCEPT` clause fetches all columns *except* columns 1 and 3.

```
TABLE hq.acct, FETCHCOLS (col1, col3);
TABLE hq.sales, FETCHCOLSEXCEPT (col1, col3);
```

`{FETCHMODCOLS | FETCHMODCOLSEXCEPT} (`*`column_list`*`)`

`FETCHMODCOLS` and `FETCHMODCOLSEXCEPT` are valid for `TABLE`. These options are only valid for the primary extract and cannot be used on data pump.

Use `FETCHMODCOLS` and `FETCHMODCOLSEXCEPT` to force column values to be fetched from the database even if the columns are present in the transaction log. These Depending on the database type, a log record can contain all of the columns of a table or only the columns that changed in the given transaction operation.

- `FETCHMODCOLS` fetches the specified columns.
- `FETCHMODCOLSEXCEPT` fetches all columns that are present in the transaction log, except the specified columns. For tables with numerous columns, `FETCHMODCOLSEXCEPT` might be more efficient than listing each column with `FETCHMODCOLS`.

`FETCHMODCOLS` and `FETCHMODCOLSEXCEPT` are valid for all databases that are supported by Oracle GoldenGate, except NonStop SQL/MX.

Observe the following usage guidelines:

- Do not use `FETCHMODCOLS` and `FETCHMODCOLSEXCEPT` for key columns.
- (Sybase) Do not use `FETCHMODCOLS` and `FETCHMODCOLSEXCEPT` for encrypted column data. Oracle GoldenGate does not support Sybase encrypted data.

Syntax

```
{FETCHMODCOLS | FETCHMODCOLSEXCEPT} (column [, ...])
```

`(column [, ...])`
Can be one of the following:

- A column name or a comma-delimited list of column names, as in `(col1, col2)`.
- An asterisk wildcard, as in (*).

Example

The `FETCHMODCOLS` clause in this example fetches *only* columns 1 and 3, whereas the `FETCHMODCOLSEXCEPT` clause fetches all columns *except* columns 1 and 3.

```
TABLE hq.acct, FETCHMODCOLS (col1, col3);
TABLE hq.sales, FETCHMODCOLSEXCEPT (col1, col3);
```

`FILTER (filter_clause)`

`FILTER` is valid for `TABLE` and `MAP`.

Use `FILTER` to select or exclude records based on a numeric value. A filter expression can use conditional operators, Oracle GoldenGate column-conversion functions, or both.

Note:

To filter based on a string, use one of the Oracle GoldenGate string functions. See "Column Conversion Functions" for more information about these functions. You can also use the `WHERE` option. See "`WHERE (clause)`".

Separate all `FILTER` components with commas. A `FILTER` clause can include the following:

- Numbers
- Columns that contain numbers
- Functions that return numbers
- Arithmetic operators:

  + (plus)

  - (minus)

  * (multiply)

  / (divide)

  \ (remainder)
- Comparison operators:

  > (greater than)

  >= (greater than or equal)

  < (less than)

<= (less than or equal)

= (equal)

<> (not equal)

Results derived from comparisons can be zero (indicating `FALSE`) or non-zero (indicating `TRUE`).

- Parentheses (for grouping results in the expression)
- Conjunction operators: `AND`, `OR`

Enclose literals in single quotes. Specify case-sensitive column names as they are stored in the database, and enclose them in double quotes if the database requires quotes to enforce case-sensitivity (such as Oracle).

Oracle GoldenGate supports `FILTER` for columns that have a multi-byte character set.

Getting More Information about Record Filtering

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about `FILTER` and other filtering options.

Syntax

```
FILTER (
[, ON INSERT | ON UPDATE| ON DELETE]
[, IGNORE INSERT | IGNORE UPDATE | IGNORE DELETE]
, filter_clause
[, RAISEERROR error_number]
)
```

`filter_clause`
Selects records based on an expression, such as:

```
FILTER ((PRODUCT_PRICE*PRODUCT_AMOUNT) > 10000))
```

You can use the column-conversion functions of Oracle GoldenGate in a filter clause, as in:

```
FILTER (@COMPUTE (PRODUCT_PRICE*PRODUCT_AMOUNT)>10000)
```

Enclose literals in single quotes. Specify case-sensitive column names as they are stored in the database, and enclose them in double quotes if the database requires quotes to enforce case-sensitivity (such as Oracle).
Oracle GoldenGate does not support `FILTER` for columns that have a multi-byte character set or a character set that is incompatible with the character set of the local operating system.
The maximum size of the filter clause is 5,000 bytes.

`ON INSERT | ON UPDATE | ON DELETE`
Restricts record filtering to the specified operation(s). Separate operations with commas, for example:

```
FILTER (ON UPDATE, ON DELETE,
@COMPUTE (PRODUCT_PRICE*PRODUCT_AMOUNT)>10000)
```

The preceding example executes the filter for `UPDATE` and `DELETE` operations, but not `INSERT` operations.

IGNORE INSERT | IGNORE UPDATE | IGNORE DELETE
Does not apply the filter for the specified operation(s). Separate operations with commas, for example:

```
FILTER (IGNORE INSERT, @COMPUTE (PRODUCT_PRICE*PRODUCT_AMOUNT)>10000)
```

The preceding example executes the filter on `UPDATE` and `DELETE` operations, but ignores `INSERT` operations.

RAISEERROR *error*
Raises a user-defined error number if the filter fails. Can be used as input to the `REPERROR` parameter to invoke error handling. Make certain that the value for *`error`* is outside the range of error numbers that is used by the database or by Oracle GoldenGate. For example: `RAISEERROR 21000`.

GETBEFORECOLS (*column_specification*)

`GETBEFORECOLS` is valid for `TABLE`.

Use `GETBEFORECOLS` to specify columns for which you want before image to be captured and written to the trail upon an update or delete operation. Use `GETBEFORECOLS` when using the Oracle GoldenGate Conflict Detection and Resolution (CDR) feature in a bi-directional or multi-master configuration. Also use it when using conversion functions or other processing features that require the before image of a record.

For updates, the before image of the specified columns is included in the trail whether or not any given column is modified. In addition to the columns specified in the `GETBEFORECOLS` clause, an Oracle database will also log the before image of other columns that are modified. For other supported databases, you can use the `GETUPDATEBEFORES` parameter to force the inclusion of the before values of other columns that are modified.

Note:

`GETUPDATEBEFORES` overrides `GETBEFORECOLS` if both are used in the same parameter file.

To use this parameter, supplemental logging must be enabled for any database that does not log before values by default.

`GETBEFORECOLS` overrides `COMPRESSUPDATES` and `COMPRESSDELETES` if used in the same parameter file.

This parameter is valid for all databases except DB2. For DB2 on all platforms that are supported by Oracle GoldenGate, use the `GETUPDATEBEFORES` parameter instead of `GETBEFORECOLS`.

Syntax

```
GETBEFORECOLS(
{ON UPDATE | ON DELETE}
{ALL | KEY | KEYINCLUDING (col[,...])  | KEYANDMOD | | ALLEXCLUDING (col[,...]) }
[,...]
)
```

{ON UPDATE | ON DELETE}
Specifies whether the before image of the specified columns should be captured for updates or deletes. You can use `ON UPDATE` only, `ON DELETE` only, or both. If using both, specify them within the same `GETBEFORECOLS` clause. See the example for how to use both.

{ALL | KEY | KEYINCLUDING (*col*[,...]) | KEYANDMOD | ALLEXCLUDING (*col*[,...])}
Specifies the columns for which a before image is captured.

ALL
Captures a before image of all supported data type columns in the target table, including the primary key; all unsupported columns are skipped and logged in the Extract or Replicat parameter file as an information message. This imposes the highest processing load for Extract, but allows conflict-detection comparisons to be performed using all columns for maximum accuracy.

KEY
Capture before image only for the primary key. This is the fastest option, but does not permit the most accurate conflict detection, because keys can match but non-key columns could be different. `KEY` is the default.

KEYINCLUDING
Capture before image of the primary key and also the specified column or columns. This is a reasonable compromise between speed and detection accuracy.

KEYANDMOD
Use this option as an extension of the key option for both Extract and Replicat. For update DMLs on the source, Extract logs the key and modified columns. Replicat on the target will use the `KEY` and `MODIFIED` columns during conflict detection in a `WHERE` clause. With Oracle databases, the modified column is always used for conflict detection by default and this parameter makes it explicit.

ALLEXCLUDING
Capture before image of all columns except the specified columns. For tables with numerous columns, `ALLEXCLUDING` may be more efficient than `KEYINCLUDING`. Do *not* exclude key columns.

Example

In the following example, the before images for the key column(s) plus the `name`, `address`, and `salary` are always written to the trail file on update and delete operations.

```
TABLE src,
GETBEFORECOLS (
ON UPDATE KEYINCLUDING (name, address,  salary),
ON DELETE KEYINCLUDING (name, address, salary));
```

HANDLECOLLISIONS | NOHANDLECOLLISIONS

`HANDLECOLLISIONS` and `NOHANDLECOLLISIONS` are valid for `MAP`.

Use `HANDLECOLLISIONS` and `NOHANDLECOLLISIONS` to control whether or not Oracle GoldenGate reconciles the results of an initial load with replicated transactional changes that are made to the same tables. When Oracle GoldenGate applies replicated changes after the load is finished, `HANDLECOLLISIONS` causes Replicat to overwrite duplicate records in the target tables and provides alternate handling of errors for missing records.

`HANDLECOLLISIONS` and `NOHANDLECOLLISIONS` can be used globally for all `MAP` statements in the parameter file or as an `ON/OFF` switch for groups of tables specified with `MAP` statements, and they can be used within a `MAP` statement. When used in a `MAP` statement, they override the global specifications.

See "HANDLECOLLISIONS | NOHANDLECOLLISIONS" for syntax and usage.

`INSERTALLRECORDS`

`INSERTALLRECORDS` is valid for `MAP`.

Use the `INSERTALLRECORDS` parameter to convert all mapped operations to `INSERT` operations on the target. `INSERTALLRECORDS` can be used at the root level of the parameter file, within a `MAP` statement, and within a `MAPEXCEPTION` clause of a `MAP` statement.

See "INSERTALLRECORDS" for syntax and usage.

`INSERTAPPEND | NOINSERTAPPEND`

`INSERTAPPEND` is valid for `MAP`.

Use the `INSERTAPPEND` and `NOINSERTAPPEND` parameters to control whether or not Replicat uses an `APPEND` hint when it applies `INSERT` operations to Oracle target tables. These parameters are valid only for Oracle databases.

See "INSERTAPPEND | NOINSERTAPPEND" for syntax and usage.

`KEYCOLS (`*`columns`*`)`

`KEYCOLS` is valid for `TABLE` and `MAP`.

Use `KEYCOLS` to define one or more columns of the target table as unique. The primary use for `KEYCOLS` is to define a substitute primary key when a primary key or an appropriate unique index is not available for the table. You can also use `KEYCOLS` to specify additional columns to use in the row identifier that Replicat uses. Without the availability of a key or `KEYCOLS` clause, Replicat uses all columns of the table to build its `WHERE` clause, essentially performing a full table scan.

The columns of a key rendered by `KEYCOLS` must uniquely identify a row, and they must match the columns that are used as a key on the source table. The source table must contain at least as many key or index columns as the `KEYCOLS` key specified for the target table. Otherwise, in the event of an update to the source key or index columns, Replicat will not have the before images for the extra target `KEYCOL` columns.

When defining a substitute key with `KEYCOLS`, observe the following guidelines:

- If the source and target tables both lack keys or unique indexes, use a `KEYCOLS` clause in the `TABLE` parameter and in the `MAP` parameter, and specify matching sets of columns in each `KEYCOLS` clause.
- If either of the tables lacks a key or unique index, use `KEYCOLS` for that table. Specify columns that match the actual key or index columns of the other table. If a matching set cannot be defined with `KEYCOLS`, you must use `KEYCOLS` for the source table (`TABLE` parameter) and for the target table (`MAP` parameter). Specify matching sets of columns that contain unique values. `KEYCOLS` overrides a key or unique index.
- If the target table has a larger key than the source table does (or if it has more unique-index columns), use `KEYCOLS` in the `TABLE` statement to specify the source

columns that match the extra target columns. You must also include the actual source key or index columns in this `KEYCOLS` clause. Using `KEYCOLS` in this way ensures that before images are available to Replicat in case the non-key columns are updated on the source.

When using `KEYCOLS`, make certain that the specified columns are configured for logging so that they are available to Replicat in the trail records. For an Oracle database, you can enable the logging by using the `COLS` option of the `ADD TRANDATA` command.

On the target tables, create a unique index on the `KEYCOLS`-defined key columns. An index improves the speed with which Oracle GoldenGate locates the target rows that it needs to process.

Do not use `KEYCOLS` for tables being processed in pass-through mode by a data-pump Extract group.

Syntax

```
KEYCOLS (column [, ... ])
```

`column`
Defines a column to be used as a substitute primary key. If a primary or unique key exists, those columns must be included in the `KEYCOLS` specification. To specify multiple columns, create a comma-delimited list as in:

```
KEYCOLS (id, name)
```

The following column-types are **not** supported in `KEYCOLS`:

- Oracle column types **not** supported by `KEYCOLS`:

  Virtual columns, UDTs, function-based columns, and any columns that are explicitly excluded from the Oracle GoldenGate configuration.
- SQL Server, DB2 LUW, DB2 z/OS, MySQL, SQL/MX, Teradata, TimesTen column types **not** supported by `KEYCOLS`:

  Columns that contain a timestamp or non-materialized computed column, and any columns excluded from the Oracle GoldenGate configuration. For SQL Server Oracle GoldenGate enforces the total length of data in rows for target tables without a primary key to be below 8000 bytes.
- Sybase column types **not** supported by `KEYCOLS`:

  Computed columns, function-based columns, and any columns that are explicitly excluded from the GoldenGate configuration.

Example

```
TABLE hr.emp, KEYCOLS (id, first, last, birthdate);
```

`MAPEXCEPTION (`*`exceptions_mapping`*`)`

`MAPEXCEPTIONS` is valid for `MAP`.

Use `MAPEXCEPTION` as part of an exceptions `MAP` statement intended for error handling. `MAPEXCEPTION` maps failed operations that are flagged as exceptions by the `REPERROR` parameter to an *exceptions table*. Replicat writes the values of these operations along with other information to the exceptions table.

You can use `MAPEXCEPTION` within the same `MAP` statement that includes the source-target table mapping and other standard `MAP` options. The source and target table names can include wildcards.

When using `MAPEXCEPTION`, use a `REPERROR` statement with the `EXCEPTION` option either within the same `MAP` statement or at the root of the Replicat parameter file. See "`EXCEPTIONSONLY`" and "REPERROR".

Getting More Information About Exceptions Handling

For more information about configuring exceptions handling with an exceptions `MAP` statement, see *Administering Oracle GoldenGate for Windows and UNIX*.

Syntax

```
MAPEXCEPTION (TARGET exceptions_table, INSERTALLRECORDS [, exception_MAP_options])
```

`TARGET exceptions_table`
The fully qualified name of the exceptions table. Standard Oracle GoldenGate rules for object names apply to the name of the exceptions table. See *Administering Oracle GoldenGate for Windows and UNIX*.

`exception_MAP_options`
Any valid options of the `MAP` parameter that you want to apply to the exceptions handling.

`INSERTALLRECORDS`
Applies all exceptions to the exceptions table as `INSERT` operations. This parameter is required when using `MAPEXCEPTION`.

Example

This is an example of how to use `MAPEXCEPTION` for exceptions mapping. The `MAP` and `TARGET` clauses contain wildcarded source and target table names. Exceptions that occur when processing any table with a name beginning with `TRX` will be captured to the `fin.trxexceptions` table using the specified mapping.

```
MAP src.trx*, TARGET trg.*,
MAPEXCEPTION (TARGET fin.trxexceptions,
INSERTALLRECORDS,
COLMAP (USEDEFAULTS,
ACCT_NO = ACCT_NO,
OPTYPE = @GETENV ('LASTERR', 'OPTYPE'),
DBERR = @GETENV ('LASTERR', 'DBERRNUM'),
DBERRMSG = @GETENV ('LASTERR', 'DBERRMSG')
)
);
```

`MAPINVISIBLECOLUMNS | NOMAPINVISIBLECOLUMNS`

`MAPINVISIBLECOLUMNS` and `NOMAPINVISIBLECOLUMNS` are valid for `MAP`.

Use `MAPINVISIBLECOLUMNS` and `NOMAPINVISIBLECOLUMNS` to control whether or not Replicat includes invisible columns in Oracle target tables for default column mapping. For invisible columns in Oracle target tables that use explicit column mapping, they are always mapped so do not require this option.

`MAPINVISIBLECOLUMNS` and `NOMAPINVISIBLECOLUMNS` can be used in two different ways. When specified at a global level, one parameter remains in effect for all subsequent

MAP statements, until the other parameter is specified. When used within a MAP statement, they override the global specifications

See “MAPINVISIBLECOLUMNS | NOMAPINVISIBLECOLUMNS” for syntax and usage.

`REPERROR (`*`error`*`, `*`response`*`)`

`REPERROR` is valid for `MAP`.

Use `REPERROR` to specify an error and a response that together control how Replicat responds to the error when executing the `MAP` statement. You can use `REPERROR` at the `MAP` level to override and supplement global error handling rules set with the `REPERROR` parameter at the root level of the parameter file. Multiple `REPERROR` statements can be applied to the same `MAP` statement to enable automatic, comprehensive management of errors and interruption-free replication processing.

For syntax and descriptions, see "REPERROR".

`RESOLVECONFLICT (`*`conflict_resolution_specification`*`)`

`RESOLVECONFLICT` is valid for `MAP`.

Use `RESOLVECONFLICT` in a bi-directional or multi-master configuration to specify how Replicat handles conflicts on operations made to the tables in the `MAP` statement.

Multiple resolutions can be specified for the same conflict type and are executed in the order listed in `RESOLVECONFLICT`. Multiple resolutions are limited to `INSERTROWEXISTS` and `UPDATEROWEXISTS` conflicts only.

`RESOLVECONFLICT` can be used multiple times in a `MAP` statement to specify different resolutions for different conflict types.

The following are the data types and platforms that are supported by `RESOLVECONFLICT`.

- `RESOLVECONFLICT` supports all databases that are supported by Oracle GoldenGate for Windows and UNIX.
- To use `RESOLVECONFLICT`, the database must reside on a Windows, Linux, or UNIX system (including those running on NonStop OSS).
- CDR supports data types that can be compared with simple SQL and without explicit conversion. See the individual parameter options for details.
- Do not use `RESOLVECONFLICT` for columns that contain LOBs, abstract data types (ADT), or user-defined types (UDT).
- Do not use `RESOLVECONFLICT` for BigNum data types in a SQL/MX database.

Getting More Information About Configuring Conflict Resolution

See *Administering Oracle GoldenGate for Windows and UNIX* for detailed instructions on configuring bi-directional replication and conflict resolution, including use cases and examples.

Syntax

```
RESOLVECONFLICT (
{INSERTROWEXISTS | UPDATEROWEXISTS | UPDATEROWMISSING |
   DELETEROWEXISTS | DELETEROWMISSING}
( {DEFAULT | resolution_name},
  {USEMAX (resolution_column) | USEMAXEQ (resolution_column) | USEMIN
(resolution_column) | USEMINEQ (resolution_column) | USEDELTA |
     DISCARD | OVERWRITE | IGNORE}
 )
[, COLS (column[,...])]
)
```

INSERTROWEXISTS | UPDATEROWEXISTS | UPDATEROWMISSING | DELETEROWEXISTS | DELETEROWMISSING
The type of conflict that this resolution handles.

INSERTROWEXISTS
An inserted row violates a uniqueness constraint on the target.

UPDATEROWEXISTS
An updated row exists on the target, but one or more columns have a before image in the trail that is different from the current value in the database.

UPDATEROWMISSING
An updated row does not exist in the target.

DELETEROWEXISTS
A deleted row exists in the target, but one or more columns have a before image in the trail that is different from the current value in the database.

DELETEROWMISSING
A deleted row does not exist in the target.

DEFAULT | *resolution_name*

DEFAULT
The default column group. The resolution that is associated with the `DEFAULT` column group is used for all columns that are not in an explicitly named column group. You must define a `DEFAULT` column group.

resolution_name
A name for a specific column group that is linked to a specific resolution type. Supply a name that identifies the resolution type. Valid values are alphanumeric characters. Avoid spaces and special characters, but underscores are permitted, for example:

```
delta_res_method
```

Use either a named resolution or `DEFAULT`, but not both.

USEMAX (*resolution_column*) | USEMAXEQ (*resolution_column*) | USEMIN (*resolution_column*) | USEMINEQ (*resolution_column*) | USEDELTA | DISCARD | OVERWRITE | IGNORE
The conflict-handler logic that is used to resolve the conflict. Valid resolutions are:

USEMAX
If the value of *`resolution_column`* in the trail record is greater than the value of the column in the database, the appropriate action is performed.

- (`INSERTROWEXISTS` conflict) Apply the trail record, but change the insert to an update to avoid a uniqueness violation, and overwrite the existing values.

- (`UPDATEROWEXISTS` conflict) Apply the trail record as an update.

`USEMAXEQ`
If the value of *`resolution_column`* in the trail record is greater than or equal to the value of the column in the database, the appropriate action is performed.

- (`INSERTROWEXISTS` conflict) Apply the trail record, but change the insert to an update to avoid a uniqueness violation, and overwrite the existing values.
- (`UPDATEROWEXISTS` conflict) Apply the trail record as an update.

`USEMIN`
If the value of *`resolution_column`* in the trail record is less than the value of the column in the database, the appropriate action is performed:

- (`INSERTROWEXISTS` conflict) Apply the trail record, but change the insert to an update to avoid a uniqueness violation, and overwrite the existing values.
- (`UPDATEROWEXISTS` conflict) Apply the update from the trail record.

`USEMINEQ`
If the value of *`resolution_column`* in the trail record is less than or equal to the value of the column in the database, the appropriate action is performed:

- (`INSERTROWEXISTS` conflict) Apply the trail record, but change the insert to an update to avoid a uniqueness violation, and overwrite the existing values.
- (`UPDATEROWEXISTS` conflict) Apply the update from the trail record.

`resolution_column`
The name of a `NOT NULL` column that serves as the resolution column. This column must be part of the column group that is associated with this resolution. The value of the resolution column compared to the current value in the target database determines how a resolution should be applied. The after image of the resolution column is used for the comparison, if available; otherwise the before image value is used. Use a column that can be compared through simple SQL:

- `NUMERIC`
- `DATE`
- `TIMESTAMP`
- `CHAR/NCHAR`
- `VARCHAR/ NVARCHAR`

To use a latest-timestamp resolution, use a timestamp column as the *`resolution_column`* and set the timestamp column to the current time when a row is inserted or updated. If possible, define the resolution column with the `SYSTIMESTAMP` data type, which supports fractional seconds. When comparisons are performed with sub-second granularity, there is little need for tie-breaking conflict handlers that resolve cases where the value of the resolution column is identical in both trail and target. If you ensure that the value of the timestamp column can only increase or only decrease (depending on the resolution), then `USEMAX` and `USEMIN` does not lead to data divergence.

Note:

Do not use a primary key column as the resolution column in a `USEMAX` statement for the `UPDATEROWEXISTS` conflict. Otherwise, Replicat abends with an error similar to the following:

```
2013-04-04 10:18:38  ERROR   OGG-01922  Missing  RESOLUTION COLUMN NAME
while mapping to target table "FIN"."ACCT".
```

`USEDELTA`
(`UPDATEROWEXISTS` conflict only) Add the difference between the before and after values in the trail record to the current value of the column in the target database. If any of the values is `NULL`, an error is raised. Base `USEDELTA` on columns that contain `NUMERIC` data types. `USEDELTA` is useful in a multi-node configuration when a row is getting simultaneously updated on multiple nodes. It propagates only the difference in the column values to the other nodes, so that all nodes become synchronized.

`DISCARD`
(Valid for all conflict types) Retain the current value in the target database, and write the data in the trail record to the discard file.
Use `DISCARD` with caution, because it can lead to data divergence.

`OVERWRITE`
(Valid for all conflict types except `DELETEROWMISSING`) Apply the trail record as follows:

- (`INSERTROWEXISTS` conflict) Apply the trail record but change the insert to an update to avoid a uniqueness violation, and overwrite the existing values.
- (`UPDATEROWEXISTS` conflict) Apply the update from the trail record.
- (`UPDATEROWMISSING` conflict) Apply the trail record but convert the missing `UPDATE` to an `INSERT` by using the modified columns from the after image and the unmodified columns from the before image. To convert an update to an insert, the before image of all columns of the row must be available in the trail. Use supplemental logging if the database does not log before images by default, and specify `ALL` for the Extract `GETBEFORECOLS` parameter.
- (`DELETEROWEXISTS` conflict) Apply the delete from the trail record, but use only the primary key columns in the `WHERE` clause.

Use `OVERWRITE` with caution, because it can lead to data divergence.

`IGNORE`
(Valid for all conflict types) Retain the current value in the target database, and ignore the trail record: Do not apply to the target table or a discard file.

`COLS (`*`column`*`[, ...])`
A non-default column group. This is a list of columns in the target database (after mapping) that are linked to, and operated upon by, a specific resolution type. If no column group is specified for a conflict, then all columns are affected by the resolution that is specified for the given conflict.
Alternatively, you can specify a `DEFAULT` column group, which includes all columns that are not listed in another column group. See the `DEFAULT` option.

You can specify multiple column groups, each with a different resolution. For example, you could use `OVERWRITE` for `col2` and `col3`, and you could use `USEDELTA` for `col4`. No column in any group can be in any other group. Conflicts for columns in different column groups are resolved separately according to the specified resolution, and in the order listed.
Column groups work as follows:

- For `INSERTROWEXISTS` and `UPDATEROWEXISTS` conflicts, you can use different column groups to specify more than one of these conflict types and resolutions per table. Conflicts for columns in different column groups are resolved separately, according to the conflict resolution method specified for the column group.
- For `UPDATEROWMISSING`, `DELETEROWEXISTS`, and `DELETEROWMISSING`, you can use only one column group, and all columns of the table must be in this column group (considered the *default* column group).

Examples

The following examples are explained in detail in *Administering Oracle GoldenGate for Windows and UNIX*.

Example 1
This example demonstrates all conflict types with `USEMAX`, `OVERWRITE`, `DISCARD`.

```
MAP fin.src, TARGET fin.tgt,
    COMPARECOLS (ON UPDATE ALL, ON DELETE ALL),
    RESOLVECONFLICT (UPDATEROWEXISTS, (DEFAULT, USEMAX (last_mod_time)),
    RESOLVECONFLICT (INSERTROWEXISTS, (DEFAULT, USEMAX (last_mod_time)),
    RESOLVECONFLICT (DELETEROWEXISTS, (DEFAULT, OVERWRITE)),
    RESOLVECONFLICT (UPDATEROWMISSING, (DEFAULT, OVERWRITE)),
    RESOLVECONFLICT (DELETEROWMISSING, (DEFAULT, DISCARD)),
    );
```

Example 2
This example demonstrates `UPDATEROWEXISTS` with `USEDELTA` and `USEMAX`.

```
MAP fin.src, TARGET fin.tgt,
    COMPARECOLS
    (ON UPDATE KEYINCLUDING (address, phone, salary, last_mod_time),
    ON DELETE KEYINCLUDING (address, phone, salary, last_mod_time)),
    RESOLVECONFLICT (
    UPDATEROWEXISTS,
    (delta_res_method, USEDELTA, COLS (salary)),
    (DEFAULT, USEMAX (last_mod_time)));
```

Example 3
This example demonstrates `UPDATEROWEXISTS` with `USEDELTA`, `USEMAX`, and `IGNORE`.

```
MAP fin.src, TARGET fin.tgt,
    COMPARECOLS
    (ON UPDATE ALLEXCLUDING (comment)),
    RESOLVECONFLICT (
    UPDATEROWEXISTS,
    (delta_res_method, USEDELTA, COLS (salary, balance)),
    (max_res_method, USEMAX (last_mod_time), COLS (address, last_mod_time)),
    (DEFAULT, IGNORE));
```

`SQLEXEC (`*`SQL_specification`*`)`

`SQLEXEC` is valid for `TABLE` and `MAP`.

Use `SQLEXEC` to execute a SQL stored procedure or query from within a `MAP` statement during Oracle GoldenGate processing. `SQLEXEC` enables Oracle GoldenGate to communicate directly with the database to perform any work that is supported by the database. This work can be part of the synchronization process, such as retrieving values for column conversion, or it can be independent of extracting or replicating data, such as executing a stored procedure that executes an action within the database.

See "SQLEXEC" for syntax and usage.

`SQLPREDICATE 'WHERE` ***`where_clause`*****`'`**

`SQLPREDICATE` is valid for `TABLE`.

Use `SQLPREDICATE` to include a conventional SQL `WHERE` clause in the `SELECT` statement that Extract uses when selecting data from a table in preparation for an initial load. `SQLPREDICATE` forces the records returned by the selection to be ordered by the key values.

`SQLPREDICATE` is a faster selection method for initial loads than the `WHERE` or `FILTER` options. It affects the SQL statement directly and does not require Extract to fetch all records before filtering them.

For Oracle tables, `SQLPREDICATE` reduces the amount of data that is stored in the undo segment, which can reduce the incidence of snapshot-too-old errors. This is useful when loading very large tables.

By using a `SQLPREDICATE` clause, you can partition the rows of a large table among two or more parallel Extract processes. This configuration enables you to take advantage of parallel delivery load processing as well.

`SQLPREDICATE` also enables you to select data based on a timestamp or other criteria to filter the rows that are extracted and loaded to the target table. `SQLPREDICATE` can be used for `ORDER BY` clauses or any other type of selection clause.

Make certain that the `WHERE` clause contains columns that are part of a key or index. Otherwise, Extract performs a full table scan, which reduces the efficiency of the `SELECT` statement.

`SQLPREDICATE` is valid for Oracle, DB2 LUW, DB2 on z/OS, SQL Server, and Teradata databases. Do not use `SQLPREDICATE` for an Extract group that is configured to synchronize transactional changes. It is only appropriate for an initial load Extract, because it re quires a `SELECT` statement that selects records directly from tables.

Syntax

```
TABLE source_table, SQLPREDICATE 'WHERE where_clause';
```

`WHERE`
This is a required keyword.

`where_clause`
A valid SQL `WHERE` clause that selects records from the source tables.

Example

```
TABLE hr.emp, SQLPREDICATE 'WHERE state = 'CO' and city = 'DENVER''
```

THREAD (*thread_ID*)

THREAD is valid for MAP. This option is valid when Replicat is in coordinated mode.

Use THREAD to specify that all of the object or objects in the same MAP statement are to be processed by the specified Replicat thread. The specified thread handles filtering, manipulation, delivery to the target, error handling, and other work that is configured for those objects. Wildcards can be used in the TARGET clause when THREAD is used.

All tables that have referential dependencies among one another must be mapped in the same thread. For example, if tables scott.cust and scott.ord have a foreign-key relationship, the following is a possible mapping:

```
MAP scott.cust, TARGET scott.cust, THREAD (5);
MAP scott.ord, TARGET scott.ord, THREAD (5);
```

The thread with the lowest thread ID always processes barrier transactions if the THREAD or THREADRANGE option is omitted. Additionally, and work that is not explicitly assigned to a thread is processed through this thread. For example, if there are threads with IDs ranging from 1 to 10, barrier and non-assigned transactions are performed by thread 1.

To process a MAP statement among multiple threads, see THREADRANGE (*thread_range*, *column_list*). THREAD and THREADRANGE are mutually exclusive options. Do not use them together in the same MAP statement.

For more information about Replicat modes, see "Deciding Which Apply Method to Use" in *Installing and Configuring Oracle GoldenGate for Oracle Database* and "BATCHSQL".

Syntax

```
THREAD (thread_ID)
```

thread_ID
A numerical identifier for the thread that will process this MAP statement. Valid values are 1 through the value that was specified with the MAXTHREADS option of the ADD REPLICAT command that created this group. You can use the INFO REPLICAT command to verify the maximum number of threads allowed for a Replicat group. When specifying thread IDs, the following must be true:

- The *total number* of threads specified across all MAP statements of a Replicat group cannot exceed the value of MAXTHREADS.
- No single *thread_ID* value in the Replicat group can be higher than the value of MAXTHREADS. For example, if MAXTHREADS is 25, there cannot be a *thread_ID* of 26 or higher.

If MAXTHREADS was not used, the default maximum number of threads is 25.

Examples

The following examples show some ways to use the THREAD option.

Example 1
In this example, thread 1 processes table cust.

```
MAP scott.cust, TARGET scott.cust, THREAD (1);
```

Example 2
In this example, thread 1 processes all of the tables in the `scott` schema.

```
MAP scott.*, TARGET scott.*, THREAD (1);
```

Example 3
In this example, the `orders` table is partitioned among two `MAP` statements through the use of `FILTER (filter_clause)` and the `@RANGE` function. For more information about `@RANGE`, see "RANGE".

```
MAP scott.orders, TARGET scott.orders, FILTER (@RANGE (1, 2, OID)), THREAD (1);
MAP scott.orders, TARGET scott.orders, FILTER (@RANGE (2, 2, OID)), THREAD (2);
```

`THREADRANGE (`*`thread_range`*`, `*`column_list`*`)`

`THREADRANGE` is valid for `MAP`. This option is valid when Replicat is in coordinated mode.

Use `THREADRANGE` to specify that the workload of the target table is to be partitioned evenly among a range of Replicat threads, based on the value of a specified column or columns. For example, if the partitioning is based on the value of a column named `ID`, and the `THREADRANGE` value is 1-3, then thread 1 processes rows with `ID` values from 1 through 10, thread 2 processes rows with `ID` values from 11 through 20, and thread 3 processes rows with `ID` values from 21 through 30. The partitioning may not be as absolutely even as shown in the preceding example, depending on the initial calculation of the workload, but it is coordinated so that same row is always processed by the same thread. Each specified thread handles filtering, manipulation, error handling, delivery to the target, and other work for its range of rows.

Partitioning a table across a range of threads may improve apply performance for very large tables or tables that frequently incur long-running transactions or heavy volume, but can be used in other cases, as well. You can process more than one table through the same range of threads.

A wildcarded `TARGET` clause can be used when `THREADRANGE` is used if the optional column list is omitted. When using a column list, use separate explicit `MAP` statements for each table that is using the same thread range.

To process a `MAP` statement with one specific thread, see `THREAD (thread_ID)`. `THREAD` and `THREADRANGE` are mutually exclusive options. Do not use them together in the same `MAP` statement.

Do not specify tables that have referential dependencies among one another in a thread range. Use the `THREAD` option and process all of those tables with the same thread.

Do not use `THREADRANGE` to partition sequences. If coordination is required, for example when a sequence is part of a `SQLEXEC` operation, partition the sequence work to one thread with the `THREAD` option.

The thread with the lowest thread ID always processes barrier transactions if the `THREAD` or `THREADRANGE` option is omitted. Additionally, and work that is not explicitly assigned to a thread is processed through this thread. For example, if there are threads with IDs ranging from 1 to 10, barrier and non-assigned transactions are performed by thread 1.

For more information about Replicat modes, see "Deciding Which Apply Method to Use" in *Installing and Configuring Oracle GoldenGate for Oracle Database* and "BATCHSQL".

Syntax

```
THREADRANGE (lowID-highID, [column[, column][, ...]])
```

lowID
The lowest thread identifier of this range. Valid values are 1 through 500.

highID
The highest thread identifier of this range, which must be a higher number than *lowID*. Valid values are *lowID*+1 through 500. The number of threads in the range cannot exceed the value that was specified with the MAXTHREADS option of the ADD REPLICAT command. If MAXTHREADS was not used, the default maximum number of threads is 25.

[*column*[, *column*][, ...]]
Optional. Specifies one or more unique columns on which to base the row partitioning. To specify multiple columns, use a comma-delimited list, such as col1, col2, col3. When this option is omitted, the partitioning among the threads is based by default on the following columns, in the order of preference shown:

- Primary key
- KEYCOLS clause in the same MAP statement
- All of the columns of the table that are supported by Oracle GoldenGate for use as a key.

Example

The following example divides the orders and order_lines tables between the same two threads, based on the value of the OID column.

```
MAP scott.orders, TARGET scott.orders, THREADRANGE (1-2, OID);
MAP scott.order_lines, TARGET scott.order_lines, THREADRANGE (1-2, OID);
```

TOKENS (*token_definition*)

TOKENS is valid for TABLE.

Use TOKENS to define a user token and associate it with data. Tokens enable you to extract and store data within the user token area of a trail record header. Token data can be retrieved and used in many ways to customize the way that Oracle GoldenGate delivers data. For example, you can use token data in column maps, stored procedures called by SQLEXEC, or macros.

To use the defined token data in target tables, use the @TOKEN column-conversion function in the COLMAP clause of a Replicat MAP statement. The @TOKEN function maps the name of a token to a target column.

Do not use this option for tables being processed in pass-through mode by a data-pump Extract group.

The character set of token data is not converted. The token must be in the character set of the source database for Extract and in the character set of the target database for Replicat.

Do not use this option for source tables that are encoded as EBCDIC on a z/OS system if the target tables are not EBCDIC.

For more information about using tokens, see *Administering Oracle GoldenGate for Windows and UNIX*.

Syntax

```
TOKENS (token_name = token_data [, ...])
```

token_name
A name of your choice for the token. It can be any number of valid characters and is not case-sensitive. Multi-byte names are not supported.

token_data
Any valid character string of up to 2000 bytes. The data can be either a literal that is enclosed within single quotes (or double quotes if NOUSEANSISQLQUOTES is in use) or the result of an Oracle GoldenGate column-conversion function. See "USEANSISQLQUOTES | NOUSEANSISQLQUOTES" for more information.

Example

The following creates tokens named TK-OSUSER, TK-GROUP, and TK-HOST and maps them to token data obtained with the @GETENV function.

```
TABLE ora.oratest, TOKENS (
TK-OSUSER = @GETENV ('GGENVIRONMENT' , 'OSUSERNAME'),
TK-GROUP = @GETENV ('GGENVIRONMENT' , 'GROUPNAME')
TK-HOST =  @GETENV ('GGENVIRONMENT' , 'HOSTNAME'));
```

TRIMSPACES | NOTRIMSPACES

TRIMSPACES and NOTRIMSPACES are valid for TABLE and MAP.

Use TRIMSPACES and NOTRIMSPACES at the root level of a parameter file or within a TABLE or MAP statement to control whether or not trailing spaces in a source CHAR column are truncated when applied to a target CHAR or VARCHAR column. The default is TRIMSPACES.

See "TRIMSPACES | NOTRIMSPACES" for syntax and usage.

TRIMVARSPACES | NOTRIMVARSPACES

TRIMVARSPACES and NOTRIMVARSPACES are valid for TABLE and MAP.

Use TRIMVARSPACES and NOTRIMVARSPACES at the root level of a parameter file or within a TABLE or MAP statement to control whether or not trailing spaces in a source VARCHAR column are truncated when applied to a target CHAR or VARCHAR column. The default is NOTRIMVARSPACES.

See "TRIMVARSPACES | NOTRIMVARSPACES" for syntax and usage.

WHERE (*clause*)

WHERE is valid for TABLE and MAP.

Use WHERE to select records based on a conditional statement. WHERE does not support the following:

- Columns that have a multi-byte character set or a character set that is incompatible with the character set of the local operating system.
- The evaluation of the before image of a primary key column in the conditional statement as part of a primary key update operation.

Enclose literals in single quotes. Specify case-sensitive column names as they are stored in the database, and enclose them in double quotes if the database requires quotes to enforce case-sensitivity (such as Oracle).

Getting More Information about Record Filtering

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about `WHERE` and other filtering options.

Syntax

```
WHERE (clause)
```

`clause`
Selects records based on a condition, such as:

```
WHERE (branch = 'NY')
```

Table 3-35 shows permissible `WHERE` operators.

Table 3-35 Permissible WHERE Operators

Operator	Example
Column names	`PRODUCT_AMT` `"Product_Amt"`
Numeric values	`-123, 5500.123`
Literal strings enclosed in single quotes	`'AUTO', 'Ca'`
Column tests	`@NULL`, `@PRESENT`, `@ABSENT` (column is null, present or absent in the record). These tests are built into Oracle GoldenGate.
Comparison operators	`=, <>, >, <, >=, <=`
Conjunctive operators	`AND, OR`
Grouping parentheses	Use open and close parentheses for logical grouping of multiple elements.

Example

The following `WHERE` example returns all records when the `AMOUNT` column is over 10,000 and does not cause a record to be discarded when `AMOUNT` is absent.

```
WHERE (amount = @PRESENT AND amount > 10000)
```

3.172 TABLE for DEFGEN

Valid For

DEFGEN

Description

Use the `TABLE` parameter in a DEFGEN parameter file to identify a source table or tables for which you want to run the utility.

You can output definitions for objects that are in different containers in an Oracle container database or from different SQL/MX catalogs to the same definitions file. All table attributes must be identical, such as case sensitivity, character set, and the use of the full three-part name. For example, you cannot use two-part names (stripped of their container or catalog by the `NOCATALOG` parameter) and three-part names in the same definitions file.

Default

None

Syntax

```
TABLE [catalog.]owner.table[, DEF template];
```

`[catalog.]owner.table`
The container (Oracle container database) or catalog (SQL/MX) if applicable, and the owner and name of the table. This parameter accepts wildcards. Oracle GoldenGate automatically increases the internal storage to track up to 100,000 wildcard entries. Oracle GoldenGate preserves the case of the table name. Some databases require a name to be within double quotes to enforce case-sensitivity. Other case-sensitive databases do not require double quotes to enforce case-sensitivity, but the names must be specified the way they are stored in the database. See *Administering Oracle GoldenGate for Windows and UNIX* for how to specify object names.

`DEF template`
Creates a definitions template based on the definitions of the specified table. A template enables new tables that have the same definitions as the specified table to be added during an Oracle GoldenGate process run, without the need to run DEFGEN for them first, and without the need to stop and start the Oracle GoldenGate process to update its definitions cache. To use a template that is generated by DEFGEN, specify it with the `DEF` or `TARGETDEF` option of the `TABLE` or `MAP` statement. To retain case-sensitivity, specify the template name the way you would specify any case-sensitive object in the database. This option is not supported for initial loads.

;
Terminates the `TABLE` statement.

Examples

Example 1

```
TABLE fin.account;
```

Example 2

```
TABLE fin.acc*;
```

Example 3

```
TABLE fin."acct1", DEF "acctdefs";
```

3.173 TABLE for Replicat

Valid For

Replicat

Description

Use the TABLE parameter in a Replicat parameter file to specify filtering rules that qualify a data record from the trail to be eligible for an event action that is specified with EVENTACTIONS.

Caution:

EVENTACTIONS is not supported if the source database is Teradata and Extract is configured in maximum performance mode.

This form of TABLE statement is similar to that of the Replicat MAP statement, except that there is no mapping of the source table in the data record to a target table by means of a TARGET clause. TABLE for Replicat is solely a means of triggering a non-data action to be taken by Replicat when it encounters an event record. If Replicat is in coordinated mode, all actions are processed through the thread with the lowest thread ID.

Because a target table is not supplied, the following apply:

- No options are available to enable Replicat to map table names or columns to a target table, nor are there options to enable Replicat to manipulate data.
- The ASSUMETARGETDEFS parameter cannot be used in the same parameter file as a Replicat TABLE statement, because ASSUMETARGETDEFS requires the names of target tables so that Replicat can query for table definitions. You must create a source-definitions file to provide the definitions of the source tables to Replicat. Transfer this file to the target system and use the SOURCEDEFS parameter in the Replicat parameter file to specify the path name of the file. See *Administering Oracle GoldenGate for Windows and UNIX* for more information about creating source-definitions files.
- The event record itself is not applied to the target database by Replicat. You must specify either IGNORE or DISCARD as one of the EVENTACTIONS options.

See *Administering Oracle GoldenGate for Windows and UNIX* for information about how to specify object names in TABLE statements.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about how to use EVENTACTIONS and the Event Marker System.

Syntax

See "TABLE | MAP" for descriptions of the following syntax options.

```
TABLE table_spec,
[, SQLEXEC (SQL_specification), BEFOREFILTER]
[, FILTER (filter_clause)]
[, WHERE (where_clause)]
```

```
{, EVENTACTIONS ({IGNORE | DISCARD} [action])}
;
```

Example

The following example enables Replicat tracing for an order transaction that contains an insert operation for a specific order number (`order_no = 1`). The trace information is written to the `order_1.trc` trace file. The `MAP` parameter specifies the mapping of the source table to the target table.

```
MAP sales.order, TARGET rpt.order;
TABLE sales.order,
FILTER (@GETENV ('GGHEADER', 'OPTYPE') = 'INSERT' AND @STREQ (order_no, 1), &
EVENTACTIONS (TRACE order_1.trc TRANSACTION);
```

3.174 TABLEEXCLUDE

Valid For

Extract

Description

Use the `TABLEEXCLUDE` parameter with the `TABLE` and `SEQUENCE` parameters to explicitly exclude tables and sequences from a wildcard specification. The positioning of `TABLEEXCLUDE` in relation to parameters that specify files or trails determines its effect. Parameters that specify trails or files are: `EXTFILE`, `RMTFILE`, `EXTTRAIL`, `RMTTRAIL`. The parameter works as follows:

- When a `TABLEEXCLUDE` specification is placed before any `TABLE` or `SEQUENCE` parameters, and also before the parameters that specify trails or files, it applies globally to all trails or files, and to all `TABLE` and `SEQUENCE` parameters.
- When a `TABLEEXCLUDE` specification is placed after a parameter that specifies a trail or file, it is effective only for that trail or file and only for the `TABLE` or `SEQUENCE` parameters that are associated with it. Multiple trail or file specifications can be made in a parameter file, each followed by a set of `TABLE`, `SEQUENCE`, and `TABLEEXCLUDE` specifications.

`TABLEEXCLUDE` is evaluated before evaluating the associated `TABLE` or `SEQUENCE` parameter. Thus, the order in which they appear does not make a difference.

When using wildcards, be careful not to place them such that all objects are excluded, leaving nothing to capture. For example, the following captures nothing:

```
TABLE cat1.schema*.tab*;
TABLEEXCLUDE cat1.*.*
```

The default for resolving wildcards is `WILDCARDRESOLVE DYNAMIC`. Therefore, if a table that is excluded with `TABLEEXCLUDE` is renamed to a name that satisfies a wildcard, the data will be captured. The `DYNAMIC` setting enables new table names that satisfy a wildcard to be resolved as soon as they are encountered and included in the Oracle GoldenGate configuration immediately. For more information, see WILDCARDRESOLVE.

See also the EXCLUDEWILDCARDOBJECTSONLY parameter.

Default

None

Syntax

```
TABLEEXCLUDE [container. | catalog.]owner.{table | sequence}
```

container.* | *catalog.
If the database requires three-part names, specifies the name or wildcard specification of the Oracle container or SQL/MX catalog that contains the object to exclude.

owner
Specifies the name or wildcard specification of the owner, such as the schema, of the object to exclude.

table* | *sequence
The name or wildcard specification of the object to exclude. To specify object names and wildcards correctly, see *Administering Oracle GoldenGate for Windows and UNIX*.

Example

In this example, `test.tab*` specifies that all tables beginning with `tab` in schema `test` are to be excluded from all trail files. Table `fin.acct` is excluded from trail `ee`. Table `fin.sales` is excluded from trail `ff`.

```
TABLEEXCLUDE  test.tab*
    EXTTRAIL ./dirdat/ee
TABLE pdb1.*.*;
TABLEEXCLUDE pdb1.fin.acct
    EXTTRAIL ./dirdat/ff
TABLE pdb2.*.*;
TABLEEXCLUDE pdb2.fin.sales
```

3.175 TARGETDB

Valid For

Replicat

Description

Use the `TARGETDB` parameter for databases or data sets that require a data source name or identifier to be specified explicitly as part of the connection information. This option is required to identify one of the following:

- The target login database for heterogeneous databases.
- The target data source name (DSN) if Replicat uses ODBC to connect to the database.
- The target SQL/MX catalog

Tables specified in `MAP` statements that follow `TARGETDB` are assumed to be from the specified data source.

You might need to use the USERID or USERIDALIAS parameter in the TARGETDB parameter statement, depending on the authentication that is required for the data source.

For databases that allow authentication at the operating-system level, you can specify TARGETDB without USERID or USERIDALIAS.

For DB2 LUW, the TARGETDB statement must refer to the database by its real name, rather than by any alias.

See USERID | NOUSERID or USERIDALIAS for more information.

See also SOURCEDB to specify a source data source.

Default

None

Syntax

```
TARGETDB data_source[, SESSIONCHARSET character_set]
```

data_source
The name of the database, catalog, or data source name.
For MySQL databases, you can use the format of `TARGETDB database_name@host_name` to avoid connection issues caused by the incorrect configuration of `localhost` in the local hosts file. If running MySQL on a port other than the default of 3306, you must specify the port number in the connect string: `TARGETDB database_name@host_name:port`.

SESSIONCHARSET *character_set*
Supports Sybase, Teradata and MySQL. Sets the database session character set for the process login session. This parameter overrides any SESSIONCHARSET that is specified in the GLOBALS file.

Examples

Example 1
This example shows TARGETDB without the USERIDALIAS parameter.

```
TARGETDB mydb
```

Example 2
This example shows TARGETDB with the USERIDALIAS parameter.

```
TARGETDB mydb, USERIDALIAS tiger2
```

3.176 TARGETDEFS

Valid For

Extract (primary and data pump)

Description

Use the TARGETDEFS parameter to specify a target-definitions file. A target-definitions file is needed in certain cascading configurations or when the target is an Enscribe file. TARGETDEFS names a file on the source system or on an intermediary system that contains data definitions of tables and files that exist on the target system. Specify at least one `TARGETDEFS` entry before the `TABLE` statements for which the targets are Enscribe files.

You can have multiple `TARGETDEFS` statements in the parameter file if more than one target-definitions file is needed for different definitions, for example if each `TARGETDEFS` file holds the definitions for a specific application.

To generate the target-definitions file, use the DEFGEN utility. Transfer the file to the source or intermediary system before starting Extract.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about using data-definitions files.

Default

None

Syntax

```
TARGETDEFS file
```

`file`
The relative or fully qualified path name of the target-definitions file.

Examples

Example 1

```
TARGETDEFS C:\repodbc\sales.def
```

Example 2

```
TARGETDEFS /ggs/dirdef/ODBC/tandem_defs
```

3.177 TCPSOURCETIMER | NOTCPSOURCETIMER

Valid For

Extract

Description

Use the `TCPSOURCETIMER` and `NOTCPSOURCETIMER` parameters to manage the timestamps of replicated operations for reporting purposes within the Oracle GoldenGate environment.

`TCPSOURCETIMER` and `NOTCPSOURCETIMER` are global parameters and apply to all `TABLE` statements in the Extract parameter file.

Default

```
TCPSOURCETIMER
```

Syntax

```
TCPSOURCETIMER | NOTCPSOURCETIMER
```

TCPSOURCETIMER
Adjusts the timestamp of data records when they are sent to other systems, making it easier to interpret synchronization lag. This is the default.

NOTCPSOURCETIMER
Retains the original timestamp value. Use `NOTCPSOURCETIMER` when using timestamp-based conflict resolution in a bidirectional configuration and when using a user token that refers to `'GGHEADER'`, `'COMMITTIMESTAMP'` of the `@GETENV` column-conversion function.

3.178 THREADOPTIONS

Valid For

Extract

Description

Use the `THREADOPTIONS` parameter to control how a threaded Extract operates.

Stop and restart GGSCI, Manager, and Extract for the change to take effect.

Default

None

Syntax

```
THREADOPTIONS
[INQUEUESIZE n]
[OUTQUEUESIZE n]
[PROCESSTHREADS SELECT thread_spec | PROCESSTHREADS EXCEPT thread_spec]
[STACKSIZE bytes]
```

INQUEUESIZE *n*
Specifies the number of queue entries in the input queue of each producer Extract thread in an Oracle RAC cluster. Higher values produce better performance for large amounts of data. Lower values move data more quickly in environments with very little activity. Valid values are 16 to 65535. The default is 128. The default should be adequate in most cases, but if you need to increase it, 1000 should be sufficient in most types of environments. See also `OUTQUEUESIZE`.
In addition to `INQUEUESIZE` and `OUTQUEUESIZE`, AIX users might obtain better performance by setting the environment variable `AIXTHREAD_SCOPE` to `S` (system scope) which specifies the use of multiple CPUs so that processes can run concurrently. To use system scope, add the following to the `.profile` file of the user who starts the Manager process or else export the variable manually before starting GGSCI.

```
AIXTHREAD_SCOPE=S
export AIXTHREAD_SCOPE
```

OUTQUEUESIZE *n*
Specifies the number of queue entries in the output queue of each producer Extract thread in an Oracle RAC cluster. Valid values are 8 to 65535. The default is 2048. The default should be adequate in most cases.

[PROCESSTHREADS SELECT *thread_spec* | PROCESSTHREADS EXCEPT *thread_spec*]
Specifies the Extract threads to be processed or to be excluded from processing. Valid values are:

- A single thread ID, such as 1
- A range, such as 1-5

Extract threads are mapped to redo threads. Caution: Excluding any of the Extract threads from being processed excludes that data from being synchronized with the target tables.
Primarily for use when Extract is in Archived Log Only mode (ALO).

[STACKSIZE *bytes*]
Specifies the stack size of each producer Extract thread in an Oracle RAC cluster. Valid values are a range of 65536 - 33554432; the default is 1048576.

3.179 TRACE | TRACE2

Valid For

Extract and Replicat

Description

Use the `TRACE` and `TRACE2` parameters to capture Extract or Replicat processing information to help reveal processing bottlenecks. Both support the tracing of DML and DDL.

Tracing also can be turned on and off by using the `SEND EXTRACT` or `SEND REPLICAT` command in GGSCI. See "SEND EXTRACT" or "SEND REPLICAT".

Contact Oracle Support for assistance if the trace reveals significant processing bottlenecks.

Default

No tracing

Syntax

```
TRACE | TRACE2
[, DDL[INCLUDE] | DDLONLY]
[, [FILE] file_name]
[, THREADS (threadID[, threadID][, ...][, thread_range[, thread_range][, ...])]
```

TRACE
Provides step-by-step processing information.

TRACE2
Identifies the code segments on which Extract or Replicat is spending the most time.

DDL[INCLUDE] | DDLONLY
(Replicat only) Enables DDL tracing and specifies how DDL tracing is included in the trace report.

DDL[INCLUDE]
Traces DDL and also traces transactional data processing. This is the default. Either `DDL` or `DDLINCLUDE` is valid.

DDLONLY
Traces DDL but does not trace transactional data.

[FILE] ***file_name***
The relative or fully qualified name of a file to which Oracle GoldenGate logs the trace information. The `FILE` keyword is optional, but must be used if other parameter options will follow the file name, for example:

```
TRACE FILE file_name DDLINCLUDE
```

If no other options will follow the file name, the `FILE` keyword can be omitted, for example:

```
TRACE DDLINCLUDE file_name
```

THREADS (*threadID*[, *threadID*][, ...][, *thread_range*[, *thread_range*][, ...])
Enables tracing only for the specified thread or threads of a coordinated Replicat. Tracing is only performed for threads that are active at runtime.

***threadID*[, *threadID*][, ...]**
Specifies a thread ID or a comma-delimited list of threads in the format of `threadID, threadID, threadID`.

[, *thread_range*[, *thread_range*][, ...]
Specifies a range of threads in the form of `threadIDlow-threadIDhigh` or a comma-delimted list of ranges in the format of `threadIDlow-threadIDhigh`, `threadIDlow-threadIDhigh`.

A combination of these formats is permitted, such as threadID, threadID, `threadIDlow-threadIDhigh`.
If the Replicat is in coordinated mode and `TRACE` is used with a `THREADS` list or range, a trace file is created for each currently active thread. Each file name is appended with its associated thread ID. This method of identifying trace files by thread ID does not apply when `SEND REPLICAT` is issued by `groupname` with `threadID` (as in `SEND REPLICAT fin003` `TRACE`...) or when only one thread is specified with `THREADS`.
Contact Oracle Support for assistance if the trace reveals significant processing bottlenecks.

Examples

Example 1

The following traces to a file named `trace.trc`. If this is a coordinated Replicat group, the tracing applies to all active threads.

```
TRACE /home/ggs/dirrpt/trace.trc
```

Example 2

The following enables tracing for only thread 1. In this case, because only one thread is being traced, the trace file will not have a *`threadID`* extension. The file name is `trace.trc`.

```
TRACE THREADS(1) FILE ./dirrpt/trace.trc
```

Example 3
The following enables tracing for threads 1,2, and 3. Assuming all threads are active, the tracing produces files `trace001`, `trace002`, and `trace003`.

```
TRACE THREADS(1-3) FILE ./dirrpt/trace.trc
```

3.180 TRACETABLE | NOTRACETABLE

Valid For

Extract and Replicat

Description

Use the `TRACETABLE` and `NOTRACETABLE` parameters with Oracle databases to identify a trace table that was created with the `ADD TRACETABLE` command. `TRACETABLE` is required only if the trace table was created with a name other than the default of `GGS_TRACE`. If a trace table named `GGS_TRACE` exists in the database, trace table functionality is enabled automatically, and `TRACETABLE` is not required.

A trace table is not used when Replicat is in integrated mode. `TRACETABLE` and `NOTRACETABLE` are ignored in that mode.

The trace table is used for bidirectional synchronization to identify Replicat transactions to Extract.

If used, `TRACETABLE` must appear in both the Extract and Replicat parameter files.

- In the Replicat parameter file, `TRACETABLE` causes Replicat to write an operation to the trace table at the beginning of each transaction.
- In the Extract parameter file, `TRACETABLE` causes Extract to identify as a Replicat transaction any transaction that begins with an operation on the trace table.

`NOTRACETABLE` prevents Replicat from writing an operation to the trace table, thus preventing Extract from recognizing Replicat transactions.

To control whether Replicat transactions are extracted by Extract or ignored, use the `GETREPLICATES` and `IGNOREREPLICATES` parameters. See "GETREPLICATES | IGNOREREPLICATES" for more information.

For instructions on configuring bidirectional synchronization, see the *Administering Oracle GoldenGate for Windows and UNIX*.

Default

`GGS_TRACE`

Syntax

```
TRACETABLE [catalog.]owner.table | NOTRACETABLE
```

`[catalog.]owner.table`
The catalog (if stored in a consolidation database), owner, and name of the trace table.

Examples

Example 1
This example shows a two-part name.

```
TRACETABLE ggs.excl_trans
```

Example 2
This example shows a three-part name.

```
TRACETABLE user.ggs.excl_trans
```

3.181 TRAILBYTEORDER

Valid For

GLOBALS

Description

Use the `TRAILBYTEORDER` parameter in the `GLOBALS` file to set the byte format of the metadata in the trails or files created with the `EXTFILE`, `EXTTRAIL`, `RMTFILE`, and `RMTTRAIL` parameters. By default, Extract always writes the trail metadata in big endian byte order, regardless of the byte order of the source or target machine.

This parameter affects only the metadata of the trail records. It does not affect the column data.

When used in the `GLOBALS` file, `TRAILBYTEORDER` affects all of the files or trails in the same Oracle GoldenGate instance. To specify the byte order of a specific trail or file, use the `TRAILBYTEORDER` option of the associated `EXTFILE`, `RMTFILE`, `EXTTRAIL`, or `RMTTRAIL` parameter in the Extract parameter file. In cases where Extract writes to multiple trails or files on different platforms, `TRAILBYTEORDER` in the Extract parameter file enables the correct byte ordering of each one. When `TRAILBYTEORDER` is used as an Extract parameter, it overrides any `TRAILBYTEORDER` specification in the `GLOBALS` file.

`TRAILBYTEORDER` reduces the overhead of conversion work when the source and target machines both use little endian. In this case, because the default without `TRAILBYTEORDER` is `BIGENDIAN`, the conversion work must be performed from little endian to big endian (to write to trail) and then from big endian to little endian to read the trail on the target. `TRAILBYTEORDER` prevents unnecessary conversions by allowing you to specify the byte order that is used by both the source and target machines (`LITTLEENDIAN`) as the byte order of the trail.

In the case where the source byte order is big endian and the target is little endian, where some conversion is required, you can decide whether the conversion takes place at the source or at the target. To perform the conversion on the source, set `TRAILBYTEORDER` to `LITTLEENDIAN`. The trail is converted to little endian, and no conversion is needed on the target. To perform the conversion on the target, leave the default set to `BIGENDIAN`. If the target system of the trail is big endian, `TRAILBYTEORDER` is not needed, because the default is big endian.

Use the `NATIVEENDIAN` option for a primary Extract or a data pump if the byte order of the source machine is not known, but you want to keep that format and do not want conversion performed on the source. If nothing is specified with `TRAILBYTEORDER`, a data pump writes the trail using the same byte order as the input trail, which may not be the desired format.

`TRAILBYTEORDER` is valid for files that have a `FORMAT RELEASE` version of at least 12.1. For older versions, this parameter is ignored.

Do not use `TRAILBYTEORDER` when replicating data to a NonStop system. On the NonStop platform, Oracle GoldenGate only supports `BIGENDIAN`, the default.

To identify the byte order of the metadata in a trail, use the `ENV` command of the Logdump utility.

Default

```
BIGENDIAN
```

Syntax

```
TRAILBYTEORDER {BIGENDIAN | LITTLEENDIAN | NATIVEENDIAN}
```

`BIGENDIAN`
Formats the trail metadata in big endian.

`LITTLEENDIAN`
Formats the trail metadata in little endian.

`NATIVEENDIAN`
Formats the trail metadata in the default byte order of the local system. Enables you to make certain the output trail is converted to the native format of the source machine.

Example

```
TRAILBYTEORDER LITTLEENDIAN
```

3.182 TRAILCHARSET

Valid For

Replicat

Description

Note:

This parameter has been replaced by the `SOURCECHARSET` parameter but may still be retained in existing parameter files for backward compatibility.

Use the `TRAILCHARSET` parameter to supply a character set for the source data if the trail is written by an Extract version that is earlier than 11.2.1.0.0. In the earlier versions, the source character set is not stored in the trail.

When `TRAILCHARSET` is used, Replicat uses the specified character set as the source character set when converting character-type columns to the target character set. Replicat issues a warning message when it uses the `TRAILCHARSET` character set.

By default, Replicat performs character set conversion. This feature is controlled by the `CHARSETCONVERSION` (default) and `NOCHARSETCONVERSION` parameters. To use `TRAILCHARSET`, `NOCHARSETCONVERSION` cannot be used.

Default

Character set of the operating system

Syntax

```
TRAILCHARSET source_charset [, REPLACEBADCHAR];
```

`source_charset`
The ICU character-set identifier or an Oracle character-set identifier of the source database. For Oracle databases, Oracle GoldenGate converts an Oracle identifier to the corresponding ICU identifier for conversion to the character set that is specified with the `NLS_LANG` specification in the `SETENV` parameter in the Replicat parameter file.

`REPLACEBADCHAR`
Prevents Replicat from abending when a conversion attempt fails. The failed character is replaced with a replacement character for each target character set. The replacement character is pre-defined in each character set.

Examples

Example 1

```
TRAILCHARSET ISO-8859-9;
```

Example 2

```
TRAILCHARSET windows-932, REPLACEBADCHAR;
```

Example 3

```
TRAILCAHRSET EUC-CN;
```

3.183 TRAILCHARSETASCII

Valid For

Extract for DB2 on z/OS; not valid for Extract data pump or Replicat.

Description

Use `TRAILCHARSETASCII` to cause character data to be written to the trail file in the local ASCII code page of the DB2 subsystem from which data is to be captured.

- Specification of this parameter on a single-byte DB2 z/OS subsystem causes character data from non-Unicode tables to be written to the trail file in the installed ASCII single-byte CCSID. Data from EBCDIC tables is converted to this ASCII CCSID.
- Specification of this parameter on a multi-byte DB2 z/OS subsystem causes Extract to process only ASCII and Unicode tables. Extract abends with an error if it encounters EBCDIC tables. Data from ASCII tables is written to the trail file in the installed ASCII mixed CCSID.

Either `TRAILCHARSETASCII` or `TRAILCHARSETEBCDIC` is required if the target is a multi-byte system. To replicate both ASCII and EBCDIC tables to a multi-byte DB2 z/OS target, process each character set with an Extract process for the EBCDIC tables.

Default

Character data is written in the character set of the host table.

Syntax

```
TRAILCHARSETASCII
```

3.184 TRAILCHARSETUNICODE

Valid For

Extract for DB2 for i

Description

In all prior releases of the DB2 for i, for Extract all text data was converted to Unicode. Either UTF-8 for single and multi-byte CCSIDs or UTF-16 for double byte CCSIDs. For SQL that means all non-binary `CHAR`, `VARCHAR` and `CLOB` data would be converted to UTF-8 and all `GRAPHIC`, `VARGRAPHIC` and `DBCLOB` data would be converted to UTF-16 for the trail, either for initial loads or "normal" Extracts. This is still true if you are using a trail format in Extract that is prior to the Oracle GoldenGate 12*c* (12.2.0.1) release.

The behavior of `defgen` in prior releases for versions that had a column charset column, was to indicate -1 to represent that the column characters set was the default for columns that used character sets. The trail header would then be used to indicate the character set for the column data that was always set to UTF-8/UTF16.

In this release, the default behavior allows character sets that are supported by Oracle GoldenGate conversions to pass through unchanged. This automatically reduces the CPU consumption and increases the throughput rate of Extracts proportional to the amount of text data in the records being processed. If a CCSID is found in the Extract that Oracle GoldenGate cannot convert, the Extract defaults to its original behavior and convert the text data to the appropriate Unicode character set as it did in prior releases. This ensures that any Replicat that processes a trail from the new Extract is capable of handling the text data from the Extract.

If you want to use the original behavior of the DB2 for i Extract, then the keyword `TRAILCHARSETUNICODE` must be added to the Extract `prm` file. This causes all text data to be converted to Unicode as it was in the prior releases.

Alternatively, you can selectively revert to the old conversion behavior at the specific object or even column level by using the COLCHARSET parameter on the table definition.

Examples in a typical `prm` file for a "normal" (non-initial load) Extract:

- All text data in objects included in all table statements is converted to Unicode.
- - if this keyword is not included the extract will not convert text data by default

  `table` *`schema.table`*`, COLCHARSET(UTF-8, ALL)`

  or

`table schema.table, charset(UTF-8)`

- All text data in objects that match this specific table statement are converted to Unicode (double-byte columns are UTF-16).

  `table schema.table, COLCHARSET(UTF-8, TXTCOL4)`

- Only `TXTCOL4` is converted to UTF-8; all other text data passes through unchanged.

> **Note:**
>
> Due to how the DB2 for i PASE database layer functions, as well as Oracle GoldenGate's internal processing, there are certain situations where Unicode conversion is still required.

- Initial Load Extracts automatically convert all data to Unicode and indicate the Unicode data in the columns.
- Extracts that use a trail format that is prior to the Oracle GoldenGate 12c (12.2.0.1) release, these Extracts automatically fall back to converting text data to Unicode.
- Table specifications that include any column functions, or `SQLEXEC`, `FETCHCOLUMNS`, or `FETCHMODCOLS` require that either `TRAILCHARSETUNICODE` is specified or the specific tables or columns are changed to include the `COLCHARSET` modifier. This is true if Replicat is using column functions as well. In such a case, the extract tables that map to the Replicat tables must be sent as Unicode.

`DEFGEN` and `TRAILCHARSETUNICODE`

For `DEFGEN`, `TRAILCHARSETUNICODE` is not supported because `DEFGEN` does not generate a trail. If you are using `TRAILCHARSETUNICODE` or overriding the column character sets and are using a `defs` file on Replicat, then `defgen` must also specify the equivalent column `CHARSET` overrides as follows:

- `table schema.table, COLCHARSET(ALL, UTF-8)`

  or

  `table schema.table, CHARSET(UTF-8)`

- All text data in objects that match this specific table statement will be converted to Unicode (double byte columns will be UTF-16).

  `table schema.table, COLCHARSET(TXTCOL4, UTF-8)`

- Only `TXTCOL4` is converted to UTF-8; all other text data will pass through unchanged.

In this release, the default behavior is to have column metadata included in the trail data inline with the operation data as required. This means that definitions files are no longer needed by Oracle GoldenGate replication and are ignored.

However, if the Oracle GoldenGate Replicats or pumps indicate that they choose to override this behavior and use the definitions files, or a prior trail format level is used, the `defgen` definitions files must be recreated. In this case, care must be taken to ensure that the definitions match what extract is writing to the trails. Therefore, any `TRAILCHARSETUNICODE` keywords, `CHARSET` or `COLCHARSET` modifiers that exist in the extract `prm` file must also exist in the `defgen prm` file that matches the Extract.

Any `ASSUMETARGETDEFS OVERRIDE` in Replicat also require that the Extract use `TRAILCHARSETUNICODE` or the equivalent `COLCHARSET` modifiers on the tables in the Extract parameter file. This is due to Replicat still connecting to the database with a Unicode connection so internally treats all text fields as Unicode.

Default

None

Syntax

```
TRAILCHARSETUNICODE
```

3.185 TRAILCHARSETEBCDIC

Valid For

Extract for DB2 on z/OS; not valid for Extract data pump or Replicat.

Description

Use `TRAILCHARSETEBCDIC` to cause character data to be written to the trail file in the local EBCDIC code page of the DB2 subsystem from which data is to be captured.

- Specification of this parameter causes all character data to be written to the trail file in the EBCDIC code page of the job in which Extract is running.
- Specification of this parameter on a single-byte DB2 z/OS subsystem causes character data from non-Unicode tables to be written to the trail file in the installed EBCDIC single-byte CCSID. Data from ASCII tables is converted to this EBCDIC CCSID.
- Specification of this parameter on a multi-byte DB2 z/OS subsystem causes Extract to process only EBCDIC and Unicode tables. Extract abends with an error if it encounters ASCII tables. Data from EBCDIC tables is written to the trail file in the installed EBCDIC mixed CCSID.

Either `TRAILCHARSETASCII` or `TRAILCHARSETEBCDIC` is required if the target is a multi-byte system. To replicate both ASCII and EBCDIC tables to a multi-byte DB2 z/OS target, process each character set with an Extract process for the EBCDIC tables.

Default

Character data is written in the character set of the host table.

Syntax

```
TRAILCHARSETEBCDIC
```

3.186 TRAIL_SEQLEN_6D | TRAIL_SEQLEN_9D

Valid For

GLOBALS

Description

Use the `TRAIL_SEQLEN_6D | TRAIL_SEQLEN_9D` parameters to control the number of digits of trail file sequence numbers. `TRAIL_SEQLEN_6D` produces a six digit sequence number for trails and `TRAIL_SEQLEN_9D` produces nine digits.r.

Default

```
TRAIL_SEQLEN_9D
```

Syntax

```
[TRAIL_SEQLEN_9D | TRAIL_SEQLEN_6D]
```

Example

```
TRAIL_SEQLEN_9D
TRAIL_SEQLEN_6D
```

3.187 TRANLOGOPTIONS

Valid For

Extract

Description

Use the `TRANLOGOPTIONS` parameter to control the way that Extract interacts with the transaction log or with the API that passes transaction data, depending on the database or capture mode. You can use multiple `TRANLOGOPTIONS` statements in the same parameter file, or you can specify multiple options within the same `TRANLOGOPTIONS` statement, if permissible for those options.

Use a given `TRANLOGOPTIONS` option only for the database or databases for which it is intended.

Default

None

Syntax

```
TRANLOGOPTIONS {
[{ACTIVATIONIDPADLEN | DATABASEIDPADLEN | THREADPADLEN | SEQPADLEN |
RESETLOGSIDPADLEN} width]
[ADGTIMEOUT seconds]
[ACTIVESECONDARYTRUNCATIONPOINT | MANAGESECONDARYTRUNCATIONPOINT |
NOMANAGESECONDARYTRUNCATIONPOINT]
[ALLOWTABLECOMPRESSION]
[ALTARCHIVEDLOGFORMAT string] [INSTANCE instance] [THREADID id]
[ALTARCHIVELOGDEST [PRIMARY] [INSTANCE instance] path]
[ALTARCHIVELOGONLY ('path' FILESPEC 'file_pattern']
   [[[NOT] RECURSIVE] [PRIMARY])]
[ALTLOGDEST path]
[ARCHIVEDLOGONLY]
[{ASMBUFSIZE size | DBLOGREADERBUFSIZE size}]
[ASMUSER SYS@ASM_instance, ASMPASSWORD password
```

```
   [algorithm ENCRYPTKEY {key_name | DEFAULT}]
[ASMUSERALIAS alias [DOMAIN domain]]
[ASYNCTRANSPROCESSING buffer_size | NOASYNCTRANSPROCESSING]
[BUFSIZE size]
[CHECKPOINTRETENTIONTIME days]
[CHECKTABLELEVELSUPPLOG]
[COMPLETEARCHIVEDLOGONLY]
[COMPLETEARCHIVEDLOGTIMEOUT seconds]
[DBLOGREADER]
[DBLOGREADERBUFSIZE size]
[EXCLUDETAG [tag | NULL] | [EXCLUDETAG +]
[EXCLUDETRANS transaction]
[EXCLUDEUSER user]
[EXCLUDEUSERID Oracle_uid]
[FAILOVERTARGETDESTID n]
[FETCHLOBIFERROR]
[FETCHPARTIALLOB]
[FETCHPARTIALXML]
[FILTERTABLE table]
[FORCEFETCHLOB]
[GETCTASDML | NOGETCTASDML]
[HANDLEDLFAILOVER]
[IGNOREDATACAPTURECHANGES | NOIGNOREDATACAPTURECHANGES]
[IGNOREDIRECTLOADINSERTS]
[INCLUDEAUX (AUX_specification)]
[INCLUDEREGIONID | INCLUDEREGIONIDWITHOFFSET]
[INTEGRATEDPARAMS (parameter [, ...])]
[LOGRETENTION [ENABLED | SR | DISABLED]
[LOGSOURCE platform, [PATHMAP path]]
[MAXREADSIZE records]
[MAXWARNEOF seconds]
[MINEFROMACTIVEDG | NOMINEFROMACTIVEDG]
[MINEFROMSNAPSHOTSTBY | NOMINEFROMSNAPSHOTSTBY]
[MININGUSER {/ | user}[, MININGPASSWORD password]
   [algorithm ENCRYPTKEY {key_name | DEFAULT}] [SYSDBA]
[MININGUSERALIAS alias [DOMAIN domain]]
[NODDLCHANGEWARNING]
[NOFLUSH]
[PATHMAP NFS_mount_point log_path]
[PREPAREFORUPGRADETOIE | NOPREPAREFORUPGRADETOIE]
[PURGEORPHANEDTRANSACTIONS | NOPURGEORPHANEDTRANSACTIONS]
[QUERYRETRYCOUNT number] |
[READQUEUESIZE size]
[READTIMEOUT milliseconds]
[REQUIRELONGDATACAPTURECHANGES | NOREQUIRELONGDATACAPTURECHANGES]
[TRANSCLEANUPFREQUENCY minutes]
[TSLOOKUPBEGINLRI | TSLOOKUPENDLRI]
[USENATIVEOBJSUPPORT | NOUSENATIVEOBJSUPPORT]
[USEPREVRESETLOGSID | NOUSEPREVRESETLOGSID]
[USE_ROOT_CONTAINER_TIMEZONE]
[VAMCOMPATIBILITY {1 | 2 | 3}]
}
[, ...]
```

{ACTIVATIONIDPADLEN | DATABASEIDPADLEN | THREADPADLEN | SEQPADLEN | RESETLOGSIDPADLEN} ***width***

(Oracle) Valid for Extract in classic capture mode

Specifies the minimum default padding length when Extract forms the archive log name using the format specifiers %A, %D, %T, %S, and %R in the `ALTARCHIVELOGFORMAT` parameter. When the corresponding number is smaller than the field width, it is zero-padded on the left. Table 3-36 shows the specifier that relates to each option and the default length.

Option	Specifier	Default padding length
`ACTIVATIONIDPADLEN`	%A	8
`DATABASEIDPADLEN`	%D	8
`THREADPADLEN`	%T	3 on Windows, 4 on other platforms
`SEQPADLEN`	%S	5 on Windows, 10 on other platforms
`RESETLOGSIDPADLEN`	%R	10

`ADGTIMEOUT` ***`seconds`***
(Oracle) Valid for Extract in classic capture mode
Sets the interval, in seconds, after which Extract times out if `v$database.current_scn` has not moved past the commit SCN associated with the record for which it needs to process. The default is 30 seconds. Supports Extract in classic capture mode when capturing in an Oracle Data Guard environment.

`ACTIVEMANAGESECONDARYTRUNCATIONPOINT | MANAGESECONDARYTRUNCATIONPOINT | NOMANAGESECONDARYTRUNCATIONPOINT`
(SQL Server and Sybase) Controls the way that the secondary truncation point is managed.

`ACTIVESECONDARYTRUNCATIONPOINT`
Valid for SQL Server, not supported for Sybase.
Use `ACTIVESECONDARYTRUNCATIONPOINT` if Extract will not be running concurrently with SQL Server transactional replication or any non-Oracle Change Data Capture (CDC) implementation, and if non-native SQL Server log backups are taken against the database. It enables Extract to manage the secondary truncation point by marking transactions as distributed once they have been captured. Unlike when in `MANAGESECONDARYTRUNCATIONPOINT` mode, Extract in `ACTIVESECONDARYTRUNCATIONPOINT` mode does not read from transaction log backups. Therefore, you can use any third-party transaction-log backup software. Because only one Extract manages the secondary truncation point in this configuration, do not to use `ACTIVESECONDARYTRUNCATIONPOINT` if there are multiple Extract groups capturing from the same database.

`MANAGESECONDARYTRUNCATIONPOINT`
Valid for SQL Server and Sybase.
SQL Server usage: Use `MANAGESECONDARYTRUNCATIONPOINT` if Extract will not be running concurrently with SQL Server transactional replication or any non-Oracle CDC implementation. It enables Oracle GoldenGate to maintain the secondary truncation point by means of a high-water mark, wherein any transactions older than this mark are considered distributed.
This method requires that the database transaction logs be available and readable by Extract. See *Installing and Configuring Oracle GoldenGate for SQL Server* for transaction log backup requirements. If using this parameter with at least one Extract in a multi-Extract configuration for the same database, it must be used for all of the Extract groups.
Sybase usage: Use `MANAGESECONDARYTRUNCATIONPOINT` if Extract will not be running concurrently with Sybase Replication Server. It enables Extract to manage the secondary truncation point.

`NOMANAGESECONDARYTRUNCATIONPOINT`
Valid for SQL Server and Sybase.
SQL Server usage: Use `NOMANAGESECONDARYTRUNCATIONPOINT` if Extract will be running concurrently with SQL Server transactional replication or any non-Oracle CDC implementation. Allows SQL Server replication to manage the secondary truncation point. If using this parameter with at least one Extract in a multi-Extract configuration for the same database, it must be used for all of the Extract groups.
Sybase usage: Use `NOMANAGESECONDARYTRUNCATIONPOINT` when you do not want to truncate the Sybase transaction log. Extract will not manage the secondary truncation point. You can use this option when Extract must re-read the Sybase transaction log from a previous log position for debugging purposes.

`ALLOWTABLECOMPRESSION`
(DB2 LUW version 9.5 and 9.7)
Enables Oracle GoldenGate to support tables created with row compression, as long as the tables do not contain LOBs. When this parameter is set, LOB columns are not supported, whether or not the table is compressed. To capture from a source where some tables have row compression and some do not, process the compression-enabled tables with one Extract group and the non-compressed tables with another Extract group.

`ALTARCHIVEDLOGFORMAT` ***`string`*** **`[INSTANCE`** ***`instance`*** **`] [THREADID`** ***`id`*** **`]`**
(Oracle) Valid for Extract in classic capture mode.
Specifies a string that overrides the archive log format of the source database.
In an Oracle RAC environment, use the `ALTARCHIVEDLOGFORMAT` parameter on each node. To ensure that Extract can differentiate between the log streams, use the `INSTANCE` or `THREADID` option. The default log format that is queried from the database for one RAC thread is assumed for all of the other threads if Extract cannot find a log format and nothing is specified with `INSTANCE` or `THREADID`.
The `TRANLOGOPTIONS` statement that includes `ALTARCHIVEDLOGFORMAT` cannot contain any other `TRANLOGOPTIONS` options. Use a separate `TRANLOGOPTIONS` statement to specify other options.

`string`
Accepts the same specifier as Oracle's parameter `LOG_ARCHIVE_FORMAT`. Extract uses the supplied format specifier to derive the log file name. Example:

```
arch_%T.arc
```

`INSTANCE` ***`instance`***
For use with Oracle RAC. Applies `ALTARCHIVEDLOGFORMAT` to a specific Oracle instance. Extract verifies the supplied input against the database catalog.
Example:

```
TRANLOGOPTIONS ALTARCHIVEDLOGFORMAT &
INSTANCE rac1 log_%t_%s_%r.arc
```

`THREADID` ***`id`***
For use with Oracle RAC. Specifies the thread number of the instance that has the specified log format.
Example:

```
TRANLOGOPTIONS ALTARCHIVEDLOGFORMAT &
THREADID 2 log_%t_%s_%r.arc
```

ALTARCHIVELOGDEST [PRIMARY] [INSTANCE *instance*] [THREADID *id*] *path*
(SQL Server) Valid for Extract in classic capture mode.
Points Extract to the archived or backup Oracle transaction logs when they reside somewhere other than the default location. Extract first checks the specified location and then checks the default location.

path
Specifies the fully qualified path to the archived logs in the alternate directory. This directory must be NFS mounted to the node where Oracle GoldenGate is running. Use that mount point for `ALTARCHIVELOGDEST`.

PRIMARY
Prevents Extract from checking the default log location if it does not find the log in the alternate location. Only the `ALTARCHIVELOGDEST` path is checked. `PRIMARY` is the default for an Extract that is running in Archived Log Only (ALO) mode; otherwise, it is optional.

INSTANCE *instance*
Applies the specified `ALTARCHIVELOGDEST` behavior to a specific Oracle instance. On RAC, if this option is used, you must specify the `ALTARCHIVELOGDEST` parameter on each node.

THREADID *id*
Applies the specified `ALTARCHIVELOGDEST` behavior to a specific thread number.

ALTARCHIVELOGONLY ("*path*" [FILESPEC "*file_pattern*"] [[NOT] RECURSIVE])
(Oracle)
Extract reads from Oracle transaction log backups out of this location instead of querying the msdb tables for the log backup location. Use this parameter if the log backups have been moved from their original destination.
Enclose the parameter arguments within parentheses.

"path"
Specifies the path name, in double quotes, to the log backups. You can use wildcard symbols after the last backslash (\ ) delimiter. An asterisk (*) matches zero or more characters. A question mark (?) matches exactly one character.
Do not use this option if using `NOT RECURSIVE`.

FILESPEC "*file_pattern*"
Specifies a file pattern within the backup path specified by *"path"*. Enclose the file pattern within double quotes. An asterisk (*) matches zero or more characters. A question mark (?) matches exactly one character.
Do not use a backslash (\ ) delimiter. A backslash allows another path to be specified, which is invalid.

[NOT] RECURSIVE
Specifies whether or not the files specified by *"path"* are searched recursively (all sub-directories also searched).

ALTARCHIVELOGDEST ("*path*” [[NOT] RECURSIVE])
(SQL Server)
By default, Extract queries the MSDB database to determine the name and location on disk of any needed transaction log backups (not if using

`ACTIVESECONDARYTRUNCATIONPOINT`). If for some reason the log backups have been moved from their original location or need to be referenced as a path to a remote share (for an Extract running on a remote server in ALO mode), use the `ALTARCHIVELOGDEST` option to specify a new transaction log naming convention or file extension if either of those have changed.
Enclose the parameter arguments within parentheses. There can be only one `TRANLOGOPTIONS ALTARCHIVELOGDEST` entry in a SQL Server Extract parameter file. If there are multiple entries, only the last one will be used.

> ***"path"***
> Specifies the path name, in double quotes, to the log backups. You can use wildcard symbols after the last backslash (\ ) delimiter. An asterisk (*) matches zero or more characters. A question mark (?) matches exactly one character. Do not use this option if using `NOT RECURSIVE`.
>
> **[NOT] RECURSIVE**
> Specifies whether or not the files specified by *"path"* are searched recursively (all sub-directories also searched).

ALTLOGDEST *path*
(MySQL)
Specifies the location of the MySQL log index file. Extract looks for the log files in this location instead of the database default location. `ALTLOGDEST` can be used when the database configuration does not include the full path name to the logs or when there are multiple MySQL installations on the machine. Extract reads the log index file to find the binary log file that it needs to read. When `ALTLOGDEST` is used, Extract assumes that the logs and the index are in the same location.
Supply the full path name to the directory. On Windows, enclose the path within double quotes if the path contains any spaces, such as in the following example.

```
TRANLOGOPTIONS  ALTLOGDEST "C:\Program Files\MySQL\MySQL Server 5.1\log\test.index"
```

ARCHIVEDLOGONLY
(SQL Server) Valid for Extract in classic capture mode.
`ARCHIVEDLOGONLY` causes Extract to read from the transaction log backups exclusively. This parameter puts Extract into Archived Log Only mode (ALO) and allows the ability to run the Extract on a different Windows server, other than the database server. ALO mode is incompatible with the `ACTIVESECONDARYTRUNCSTIONPOINT` parameter. For more information about archived-log only mode, see *Installing and Configuring Oracle GoldenGate for SQL Server*.
(Oracle) Valid for Extract in classic capture mode.
`ARCHIVEDLOGONLY` causes Extract to read from the archived logs exclusively, without querying or validating the logs from system views such as `v$log` and `v$archived_log`. This parameter puts Extract into Archived Log Only mode (ALO). By default, Extract does not use archived log-only mode even if the database that it connects to is a physical standby database. For more information about archived-log only mode, see *Installing and Configuring Oracle GoldenGate for Oracle Database*.

ASMBUFSIZE *size*
(Oracle) Valid for Extract in classic capture mode.
Controls the maximum size, in bytes, of a read operation into the internal buffer that holds the results of each read of the transaction log. Use this option instead of the `DBLOGREADERBUFSIZE` option if the source Oracle version is one that is:

- 11g that is earlier than 11.2.0.2

- any Oracle 11*g* R1 version

These versions do not support the newer API that is available in Oracle versions that are supported by the `DBLOGREADER` option. It is recommended that you use the `DBLOGREADER` option together with the `DBLOGREADERBUFSIZE` option if supported by your Oracle version.
Higher values increase extraction speed but cause Extract to consume more memory. Low values reduce memory usage but increase I/O because Extract must store data that exceeds the cache size to disk.
The following are the valid ranges and default sizes, in bytes:

- Minimum: size of one block in the redo log
- Maximum: 4 MB
- Default: 2 MB (2097152)

The value of the `BUFSIZE` option must always be at least equal to, or greater than, the value of `DBLOGREADERBUFSIZE`.

`ASMUSER SYS@`*`ASM_instance`*`, ASMPASSWORD`*`password [algorithm`* `ENCRYPTKEY {`*`key_name`* `| DEFAULT}]`
(Oracle) Valid for Extract in classic capture mode.
Specifies credentials for logging in to an ASM instance to read the transaction logs. Can be used instead of `ASMUSERALIAS` if an Oracle GoldenGate credential store is not being used.

`SYS@`*`ASM_instance`*
Specifies the ASM instance for the connection string. The user must be `SYS`.

`password`
Is the encrypted password that is copied from the `ENCRYPT PASSWORD` command results.

`algorithm`
Specifies the encryption algorithm that was used to encrypt the password: `AES128`, `AES192`, `AES256`, or `BLOWFISH`.

`ENCRYPTKEY` ***`key_name`***
Specifies the logical name of a user-created encryption key in the `ENCKEYS` lookup file. Use if `ENCRYPT PASSWORD` was used with the `KEYNAME` *`key_name`* option.

`ENCRYPTKEY DEFAULT`
Directs Oracle GoldenGate to use a random key. Use if `ENCRYPT PASSWORD` was used with the `KEYNAME DEFAULT` option.

Note:

This parameter does *not* replace the standard `USERID` parameter. Both are required in an ASM environment. `ASMUSER` is not needed if using the `DBLOGREADER` option to read the logs.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about password security features.

`ASMUSERALIAS` ***`alias`*** **`[DOMAIN`** ***`domain`*****`]`**
(Oracle) Valid for Extract in classic capture mode.
Specifies credentials for logging in to an ASM instance to read the transaction logs. Can be used instead of `ASMUSER` if an Oracle GoldenGate credential store is being used.

`alias`
Specifies the alias of the login credential that will be used to log into the ASM instance. This credential must exist in the Oracle GoldenGate credential store. If you are not sure what alias to use, you can inspect the content of the credential store by issuing the `INFO CREDENTIALSTORE` command. See "INFO CREDENTIALSTORE".

`DOMAIN` ***`domain`***
Specifies the domain that is assigned to the specified alias in the credential store. For more information about the credential store, see *Administering Oracle GoldenGate for Windows and UNIX*.

Note:

This parameter does *not* replace the standard `USERIDALIAS` parameter. Both are required in an ASM environment. `ASMUSERALIAS` is not needed if using the `DBLOGREADER` option to read the logs.

`ASYNCTRANSPROCESSING` ***`buffer_size`*** **`| NOASYNCTRANSPROCESSING`**
(Oracle) Valid for Extract in integrated capture mode.
Controls whether integrated capture runs in asynchronous or synchronous processing mode, and controls the buffer size when Extract is in asynchronous mode.

`ASYNCTRANSPROCESSING` ***`buffer_size`***
The default. In asynchronous transaction processing mode, there are two threads of control:

- One thread groups logical change records (LCR) into transactions, does object-level filtering, and does partial rollback processing,
- The other thread formats committed transactions, performs any user-specified transformations, and writes to the trail file.

The transaction buffer is the buffer between these two threads and is used to transfer work from one thread to the other. The default transaction buffer size is 300 committed transactions, but is adjusted downward by the Oracle GoldenGate memory manager if its cache memory is close to being exhausted.

`NOASYNCTRANSPROCESSING`
Disables asynchronous processing and causes Extract to operate in synchronous mode. In this mode, one thread performs all capture work.

`BUFSIZE` ***`size`***
(DB2 LUW, DB2 z/OS, Oracle)
Controls the maximum size, in bytes, of the buffers that are allocated to contain the data that is read from the transaction log.

- For an Oracle source where Extract is processing file-based redo, this parameter also controls the maximum size, in bytes, of a read operation into the buffer.
- For an Oracle source where Extract is processing ASM redo, `TRANLOGOPTIONS` with either `ASMBUFSIZE` or `DBLOGREADERBUFSIZE` controls the read size, and in both cases `BUFSIZE` controls the buffer size. This parameter must be equal to, or greater than, the value that is set for `ASMBUFSIZE` or `DBLOGREADERBUFSIZE` (depending on which is in use.)

High values increase capture speed but cause Extract to consume more memory. Low values reduce memory usage but increase I/O because Extract must store data that exceeds the cache size to disk.
The following are the valid ranges and default sizes, in bytes:
Oracle:

- Minimum: 8,192
- Maximum: 10,000,000

The default buffer size is determined by the source of the redo data:

- For file-based redo, the default is 1000KB (1024000).
- For ASM redo, the default is 1000KB (1024000).
- For `DBLOGREADER` redo, the default is 2MB (2097152).
- For Extract in integrated capture mode, the default is 1000KB (1024000).

DB2 LUW:

- Minimum: 40,960
- Maximum: 33,554,432
- Default: 131,072
- The preceding values must be in multiples of the 4096 page size. Extract will truncate to a multiple if a given value does not meet this requirement.
- Check with the Systems Administrator to make sure that there is enough ECSA space to support the new buffer size.

`CHECKPOINTRETENTIONTIME` ***`days`***
(Oracle) Valid for Extract in integrated mode only.
Controls the number of days that Extract retains checkpoints before they are purged. Partial days can be specified using decimal values. For example, 8.25 specifies 8 days and 6 hours. When the checkpoint of an Extract in integrated capture mode is purged, LogMiner data dictionary information for the archived redo log file that corresponds to the checkpoint is purged, and the `first_scn` value of the capture process is reset to the SCN value corresponding to the first change in the next archived redo log file. The default is seven days. For more information about capture checkpoints, see *Oracle Database XStream Guide*.

`CHECKTABLELEVELSUPPLOG`
(Oracle) Valid for Extract in classic capture mode.
Causes Extract to send a warning to the report file if it encounters a table for which the `ADD TRANDATA` command was not issued to create an Oracle GoldenGate supplemental log group. `CHECKTABLELEVELSUPPLOG` also verifies whether the key columns in any user-defined log groups for the table are the same as, or a superset of, the key columns of the log group that was created with the `ADD TRANDATA` command. Without

key columns, Extract may abend or try to fetch the missing column or columns. By default, `CHECKTABLELEVELSUPPLOG` verification is disabled.

`COMPLETEARCHIVEDLOGONLY | NOCOMPLETEARCHIVEDLOGONLY`
(Oracle) Valid for Extract in classic capture mode.
Overrides the default Extract processing of archived logs. This parameter applies when copying production (source) archive logs to a secondary database where they will serve as the data source. Some Oracle programs do not build the archive log from the first byte to the last byte in sequential order, but instead may copy the first 500MB, then the last 500MB, and finally the middle 1000MB, for example. If Extract begins reading at the first byte, it will abend when it reaches the break in the byte sequencing. Waiting for the whole file to be written prevents this problem.
Note that Extract starts to read an archive file before it is completely written to disk, but whether or not it starts to capture data before the file is complete depends on whether `COMPLETEARCHIVEDLOGONLY` or `NOCOMPLETEARCHIVEDLOGONLY` is used.

`COMPLETEARCHIVEDLOGONLY`
This is the default in ALO (archived log only) mode. It forces Extract to wait for the archived log to be written to disk completely before starting to process redo data. In regular mode, use it to override the default of `NOCOMPLETEARCHIVEDLOGONLY`.

`NOCOMPLETEARCHIVEDLOGONLY`
This is the default in regular mode. Extract starts processing redo data from an archived log immediately when it becomes available, without waiting for it to be written completely to disk. In ALO mode, use it to override the default of `COMPLETEARCHIVEDLOGONLY`.

`COMPLETEARCHIVEDLOGTIMEOUT` *`seconds`*
(Oracle) Valid for Extract in classic capture mode.
Controls the number of seconds that Extract waits, when in `COMPLETEARCHIVEDLOGONLY` mode, to try again if it cannot validate that a redo log is being completely written to disk. Use this option in conjunction with the `COMPLETEARCHIVEDLOGONLY` option of `TRANLOGOPTIONS`. This option is disabled by default, and Extract will abend after ten seconds if it cannot validate that the file is being written to disk. This check is performed by reading the block header from the last block and verifying against the expected sequence number to determine if the last block has been written out. For *`seconds`* use any value greater than 0.

`DBLOGREADER`
(Oracle) Valid for Extract in classic capture mode.
Causes Extract to use a newer API that is available as of Oracle 11.2.0.2 and later 11*g* R2 versions. This API uses the database server to access the redo and archive logs. `DBLOGREADER` can be used to mine logs on regular disks and raw disks, and can be used instead of connecting directly to an Oracle ASM instance. The database system must contain the libraries that contain the API modules and must be running. To use this feature, the Extract database user must have `SELECT ANY TRANSACTION` privilege.
When used, `DBLOGREADER` enables Extract to use a read size of up to 4 MB in size. This is controlled with the `DBLOGREADERBUFSIZE` option. The maximum read size when using the default OCI buffer is 28672 bytes. This is controlled by the `ASMBUFSIZE` option. A larger buffer may improve the performance of Extract when redo rate is high.
When using `DBLOGREADER` with ASM, do not use the `ASMUSER` or `ASMUSERALIAS` and `ASMPASSWORD` options of `TRANLOGOPTIONS`. The API uses the user and password specified with the `USERID` or `USERIDALIAS` parameter. For more information about using Oracle

GoldenGate with ASM, see *Installing and Configuring Oracle GoldenGate for Oracle Database*.

> **Note:**
>
> `DBLOGREADER` also can be used when the redo and archive logs are on regular disk or on a raw device.

`DBLOGREADERBUFSIZE` ***`size`***
(Oracle) Valid for Extract in classic capture mode.
Controls the maximum size, in bytes, of a read operation into the internal buffer that holds the results of each read of the transaction log in ASM. High values increase capture speed but cause Extract to consume more memory. Low values reduce memory usage but increase I/O because Extract must store data that exceeds the cache size to disk.
Use `DBLOGREADERBUFSIZE` together with the `DBLOGREADER` option if the source ASM instance is Oracle 11.2.0.2 and later 11*g* R2 versions. The newer ASM API in those versions provides better performance than the older one. If the Oracle version is not one of those versions, then `ASMBUFSIZE` must be used.
The following are the valid ranges and default sizes, in bytes:

- Minimum: size of one block in the redo log
- Maximum: 4 MB

  On AIX, the maximum buffer size is 1048576; any attempt to read more than this maximum will result in error.
- Default: 2 MB (2097152)

The default should be sufficient in most cases.
The value of the `BUFSIZE` option must always be at least equal to, or greater than, the value of `DBLOGREADERBUFSIZE`.

`[EXCLUDETAG [`*`tag`*` | NULL] | [EXCLUDETAG +]`
(Oracle) Valid for Extract in integrated or classic mode; primary or data pump.
Use `EXCLUDETAG` *`tag`* to direct the Extract process to ignore the individual records that are tagged with the specified redo tag. There is no database release limitation for this parameter though not all releases of Oracle Database support tagging. Compare with older versions, new trail file contains tag tokens, which would not introduce problems for older trail readers.
Use `EXCLUDETAG +` to direct the Extract process to ignore the individual records that are tagged with any redo tag.
To tag the individual records, use the `DBOPTIONS` parameter with the `SETTAG` option in the Replicat parameter file. Use these parameters to prevent cycling (loop-back) of Replicat the individual records in a bi-directional configuration or to filter other transactions from capture. The default `SETTAG` value is 00. Valid value is any single Oracle Streams tag or a plus sign (`+`). A tag value can be up to 2000 hexadecimal digits (0-9 A-F) long. The dbms_streams.set_tag operation is supported by EXCLUDETAG. For more information about Streams tags, see *Oracle Streams Replication Administrator's Guide*.

`EXCLUDETRANS` ***`transaction`***
(Oracle for Integrated Extract, Sybase, SQL Server)

Specifies the transaction name of the Replicat database user or any other user so that those transactions are not captured by Extract. Use for bi-directional processing to prevent data looping between the databases.
The default transaction name used by Replicat is `ggs_repl`, but any transaction can be specified with `EXCLUDETRANS`. For more information about bidirectional synchronization, see *Administering Oracle GoldenGate for Windows and UNIX*.

`EXCLUDEUSER` ***`user`***
(DB2 LUW, DB2 z/OS, Oracle, Sybase)
Specifies the name of the Replicat database user, or of any other user, to be used as a filter that identifies transactions that will be subject to the rules of the `GETREPLICATES` or `IGNOREREPLICATES` parameter. Typically, this option is used to identify Replicat transactions in a bi-directional or cascading processing configuration, for the purpose of excluding or capturing them. However, it can be used to identify transactions by any other user, such as those of a specific business application.
You can use `EXCLUDEUSER` and `EXCLUDEUSERID` in the same parameter file. Do not use wildcards in either parameter.
The user name must be valid. Oracle GoldenGate queries the database to get the associated user ID and maps the numeric identifier back to the user name. For this reason, if the specified user is dropped and recreated while name resolution is set to the default of `DYNAMICRESOLUTION`, `EXCLUDEUSER` remains valid. If the same transaction is performed when name resolution is set to `NODYNAMICRESOLUTION`, `EXCLUDEUSER` becomes invalid, and Extract must be stopped and then started to make `EXCLUDEUSER` take effect. See "DYNAMICRESOLUTION | NODYNAMICRESOLUTION" for more information.

- **DB2 z/OS considerations:** In DB2 for z/OS, the user is always the primary authorization ID of the transaction, which is typically that of the original RACF user who logged on, but also could be a different authorization ID if changed by a transaction processor or by DB2 exits.
- **Oracle considerations:** For an Oracle database, multiple `EXCLUDEUSER` statements can be used. All specified users are considered the same as the Replicat user, in the sense that they are subject to the rules of `GETREPLICATES` or `IGNOREREPLICATES`. You must include the `IGNOREAPPLOPS` parameter for `EXCLUDEUSER` to operate correctly unlike all other supported databases.

`EXCLUDEUSERID` ***`Database_uid`***
(Informix, Oracle) Valid for Extract.
Specifies the database user ID (`uid`) of the Replicat database user, or of any other user, to be used as a filter that identifies transactions that will be subject to the rules of the `GETREPLICATES` or `IGNOREREPLICATES` parameter. The `GETREPLICATES` or `IGNOREREPLICATES` parameters are not supported on Informix
Usage is the same as that of `EXCLUDEUSER`.
`Oracle_uid` is a non-negative integer with a maximum value of 2147483638. There are several system views that can be queried to get the user ID. The simplest one is the `ALL_USERS` view. Oracle GoldenGate does not validate the user ID. If the user that is associated with the specified user ID is dropped and recreated, a new user ID is assigned; therefore, `EXCLUDEUSERID` becomes invalid for that user.

`FAILOVERTARGETDESTID` ***`n`***
(Oracle) Valid for Extract.
Identifies which standby database the Oracle GoldenGate Extract process must remain behind, with regard to not extracting redo data that has not yet been applied to the Oracle Data Guard standby database. To determine the correct value

`for_FAILOVERTARGETDESTID`, the `archive_log_destdatabase` initialization parameter is used with *n* being the correct archive log destination identifier.

`FETCHLOBIFERROR`
(Oracle) Valid for Extract in classic capture mode.
Overrides the Extract default of abending if LOB capture from the redo log results in an error, such as incomplete data. It forces Extract to fetch the LOB from the database if there is an error when reading it from the redo log.

Caution:

If a value gets deleted before the fetch occurs, Extract writes a null to the trail. If a value gets updated before a fetch, Extract writes the updated value. To prevent these inaccuracies, try to keep Extract latency low. See *Administering Oracle GoldenGate for Windows and UNIX* guidelines for tuning process performance. Also, see "FETCHOPTIONS" for instructions on setting fetch options.

See also the `FORCEFETCHLOB` option.

`FETCHPARTIALLOB`
(Oracle) Valid for Extract in integrated capture mode.
Use this option when replicating to a non-Oracle target or in other conditions where the full LOB image is required. It causes Extract to fetch the full LOB object, instead of using the partial change object from the redo record. By default, the database logmining server sends Extract a whole or partial LOB, depending on whether all or part of the source LOB was updated. To ensure the correct snapshot of the LOB, the Oracle Flashback feature must be enabled for the table and Extract must be configured to use it. The Extract `FETCHOPTIONS` parameter controls fetching and must be set to `USESNAPSHOT` (the default in the absence of `NOUSESNAPSHOT`). Without a Flashback snapshot, Extract fetches the LOB from the table, which may be a different image from the point in time when the redo record was generated.

`FETCHPARTIALXML`
(Oracle) Valid for Extract in integrated capture mode.
Use this option when replicating to a non-Oracle target or in other conditions where the full LOB image is required. It causes Extract to fetch the full XML document, instead of using the partial change image from the redo record. By default, the database logmining server sends Extract a whole or partial XML document, depending on whether all or part of the source XML was updated. To ensure the correct snapshot of the XML, the Oracle Flashback feature must be enabled for the table and Extract must be configured to use it. The Extract `FETCHOPTIONS` parameter controls fetching and must be set to `USESNAPSHOT` (the default in the absence of `NOUSESNAPSHOT`). Without a Flashback snapshot, Extract fetches the XML document from the table, which may be a different image from the point in time when the redo record was generated.

`ADGAPPLYCHECKFREQ` ***seconds***
Valid for Integrated Extract for Oracle. Specifies the number of seconds that Extract waits between each fetch check for the ADG to catch up. A low number improves latency though increases the number of queries of `current_scn from v$database`. The default is 3 seconds; the maximum is 120 seconds.

ADGCRETRYCOUNT *number*
Valid for Integrated Extract for Oracle. Specifies the number of times that Extract tries before it reports ADG progress or the reason for no progress when waiting for the ADG to catch up. This value is multiplied with `FETCHCHECKFREQ` to determine approximately how often the ADG progress is reported.

FILTERTABLE *table*
(Extract for MySQL and SQL/MX)
Use this option to specify the fully qualified name of the checkpoint table being used by Replicat. Operations on the checkpoint table will be ignored by the local Extract as a means of preventing data from looping back to the source. For information about creating a checkpoint table, see *Administering Oracle GoldenGate for Windows and UNIX*. To specify object names and wildcards correctly, see *Administering Oracle GoldenGate for Windows and UNIX*.

FORCEFETCHLOB
(Oracle) Valid for Extract in classic and integrated capture modes.
Overrides the default behavior of capturing LOB data from the redo log. Causes LOBs to be fetched from the database by default.

Caution:

If a value gets deleted before the fetch occurs, Extract writes a null to the trail. If a value gets updated before a fetch, Extract writes the updated value. To prevent these inaccuracies, try to keep Extract latency low. The Oracle GoldenGate documentation provides guidelines for tuning process performance. Also, see *Installing and Configuring Oracle GoldenGate for Oracle Database* for instructions on setting fetch options.

GETCTASDML | NOGETCTASDML
Enables Create Table As Select (CTAS) functionality. When `GETCTASDML` is enabled, CTAS DMLs are sent from LogMiner and replicated on the target. Execution of the CTAS DDL is suppressed on the target. This parameter cannot be enabled while using the DDL metadata trigger. Trail files produced with the CTAS functionality enabled cannot be consumed by a Replicat version lower than 12.1.2.1.0.
Use `GETCTASDML` to allow CTAS to replay the inserts of the CTAS thus preserving OIDs during replication. This parameter is only supported with Integrated Dictionary and any downstream Replicat must be 12.1.2.1 or greater to consume the trail otherwise, there may be divergence.

HANDLEDLFAILOVER
(Oracle) Valid for integrated Extract only.
Controls whether Extract will throttle its writing of trail data based on the apply progress of the Fast Start Failover standby database. It is intended to keep Extract at a safe point behind any data loss failover. When using this for data loss in a Data Guard configuration with Fast Start Failover (FSFO), after a role transition you must set the `FAILOVERTARGETDESTID` Extract parameter to identify the archive log destination ID to where the standby can be connected.

IGNOREDATACAPTURECHANGES | NOIGNOREDATACAPTURECHANGES
(DB2 LUW)
Controls whether or not Extract captures tables for which `DATA CAPTURE CHANGES` is not set. `IGNOREDATACAPTURECHANGES` ignores tables for which `DATA CAPTURE CHANGES` is not set.

Use if tables were specified with a wildcard to ensure that processing continues for tables that do have change capture set. A warning is issued to the error log for tables that were skipped. The default is `NOIGNOREDATACAPTURECHANGES`.

`IGNOREDIRECTLOADINSERTS`
(Oracle) Valid for Extract in classic capture mode.
Causes Extract to ignore all Oracle direct-load `INSERT`s. The default behavior (without this parameter) is to capture Oracle direct-load `INSERT`s. This option applies to Oracle logs with log compatibility of Oracle 10g or later.

`INCLUDEAUX (`*`AUX_specification`*`)`
Directs the Oracle GoldenGate `VAMSERV` component to capture only the specified AUX trails when reading the audit trail. This parameter can improve performance when you know that some AUX trails will not contain data that is to be captured and can be ignored. With this parameter, you specify only the AUX trails that are to be captured. *`AUX_specification`* is a number that represents the AUX trails to be captured. To specify multiple AUX trails, use a comma-delimited list. For example, the following statement includes AUX trails BB & CC = 1, 2.

```
TRANLOGOPTIONS INCLUDEAUX (1, 2)
```

To only include MAT or to exclude all AUX trails, place one space between the parentheses, for example:

```
TRANLOGOPTIONS INCLUDEAUX ( )
```

`INCLUDEREGIONID | INCLUDEREGIONIDWITHOFFSET`
(Oracle) Valid for Extract in either capture mode.
These options support the Oracle data type `TIMESTAMP WITH TIME ZONE` specified as `TZR` (which represents the time zone region, such as `US/Pacific`). By default, Extract abends on `TIMESTAMP WITH TIME ZONE` if it includes a time zone region. These options enable you to handle this timestamp based on the target database type.
When Extract detects that the source data type is `TIMESTAMP` and there is a region ID mapping token, Replicat applies the timestamp as follows:

- A `TIMESTAMP WITH TIME ZONE` with `TZR` is applied if the target Oracle version supports it.
- A timestamp with a UTC offset is applied to a non-Oracle database, or to an earlier version of Oracle that does not support `TIMESTAMP WITH TIME ZONE` with `TZR`.

  `INCLUDEREGIONID`
  Use when replicating from an Oracle source to an Oracle target of the same version or later. When `INCLUDEREGIONID` is specified, Extract adds a column index and the two-byte `TMZ` value as a time-zone mapping token and outputs it to the trail in the UTC format of `YYYY-MM-DD HH:MI.SS.FFFFFF +00:00`.

  `INCLUDEREGIONIDWITHOFFSET`
  Use when replicating `TIMESTAMP WITH TIME ZONE` as `TZR` from an Oracle source that is v10*g* or later to an Oracle target that is earlier than 10*g*, or from an Oracle source to a target that is not an Oracle database. When `INCLUDEREGIONIDWITHOFFSET` is specified, Extract converts the time zone region value to a time offset that takes Daylight Saving Time into account based on the date and time. The timestamp data is written to the trail in local time in the format of `YYYY-MM-DD HH:MI.SS.FFFFFF TZH:TZM`, where `TZH:TZM` is the region ID converted time offset.

`INTEGRATEDPARAMS (`*`parameter value`*` [, ...])`
(Oracle) Valid for Extract in integrated capture mode (Oracle Standard or Enterprise Edition 11.2.0.3 or later)
Passes parameters and values to the Oracle database logmining server when Extract is in integrated capture mode. The input must be in the form of *`parameter value`*, as in:

```
TRANLOGOPTIONS INTEGRATEDPARAMS (downsream_real_time_mine Y)
```

Valid *`parameter`* specifications and their values are the following:

> **`max_sga_size`**
> Specifies the amount of SGA memory that is used by the database logmining server. Can be a positive integer in megabytes. The default is 1 GB if `streams_pool_size` is greater than 1 GB; otherwise, it is 75% of `streams_pool_size`.
>
> **`parallelism`**
> Specifies the number of processes supporting the database logmining server. Can be a positive integer. The default is 2.
>
> **`downstream_real_time_mine`**
> Specifies whether or not integrated capture mines a downstream mining database in real-time mode. A value of `Y` specifies real-time capture and requires standby redo logs to be configured at the downstream mining database. A value of `N` specifies capture from archived logs shipped to the downstream mining database. The default is `N`.

`LOGRETENTION [ENABLED [DAYS `*`n`*`] | SR | DISABLED]`
(Oracle Enterprise Edition) Valid for Extract in classic capture mode.
Specifies whether or not Oracle Recovery Manager (RMAN) retains the log files that Extract needs for recovery. When you use the `REGISTER EXTRACT` command, the logs are retained from the time that the command is issued, based on the current database SCN. The logs are retained until manually deleted. This parameter does not enable or disable RMAN within the database itself.
Other information about `LOGRETENTION`:

- If the Oracle flash recovery storage area is full, RMAN will purge the archive logs even when needed by Extract. This limitation exists so that the requirements of Extract (and other Oracle replication components) do not interfere with the availability of redo to the database.
- The database user that is assigned to Extract and specified with the `USERID` or `USERIDALIAS` parameter must have certain privileges, which are the same as those required for the `DBLOGIN` parameter. See "DBLOGIN" for more information.
- `LOGRETENTION` makes use of an underlying (but non-functioning) Oracle Streams Capture process; thus, it requires the database to be the Enterprise Edition of Oracle version 11g or higher. Oracle Standard Edition and Express Edition do not support this feature. The `LOGRETENTION` feature can operate concurrently with other Streams installations.

> **Note:**
>
> To support RMAN log retention on Oracle RAC, you must download and install the database patch that is provided in BUGFIX 11879974, before you add the Extract groups.

`ENABLED [DAYS` *`n`*`]`
Enables the log-retention feature. This is the default, except when Extract for an Oracle database is in Archived Log Only (ALO) mode. Extract must be registered with the database by using the `REGISTER EXTRACT` command with the `LOGRETENTION` option.
By default, `ENABLED` honors the SCN of the Bounded Recovery checkpoint and retains the logs up to and including that point. This checkpoint represents the log file of the oldest open *non-persisted* transaction. In the unlikely event that a problem with Bounded Recovery affects the persisted data, the logs that are required to reprocess the oldest open transaction must be available.
You can use the `DAYS` option to retain the logs for a specific number of days, from 1 to 365 days as a whole number. The default for `DAYS` is 7 days.
To be more conservative, you can use the `SR` option instead. See "BR" for more information about the Bounded Recovery feature.

`SR`
Enables the log-retention feature, but retains logs up to and including the SCN of the log that is required for Extract to revert to standard (normal) recovery mode. In normal mode, Extract needs access to the log that contains the oldest open transaction that it had in memory. Using `SR` is a conservative measure that retains more logs than would be retained in Bounded Recovery mode (the default), but it ensures data availability in case Bounded Recovery fails. Extract must be registered with the database by using the `REGISTER EXTRACT` command with the `LOGRETENTION` option.

`DISABLED`
Disables the log-retention feature. This is the default setting when Extract for an Oracle source is operating in Archived Log Only (ALO) mode, but you can override this if needed. If you used the `REGISTER EXTRACT` command to register Extract, use the `UNREGISTER EXTRACT` command to unregister the associated Extract group from the database after disabling log retention. See "UNREGISTER EXTRACT" for more information.

`LOGSOURCE` *`platform`*`, [PATHMAP` *`path`*`]`
(Oracle) Valid for Extract in classic capture mode.
Specifies the operating system and (optionally) the path name when the redo and/or archived logs are stored on a platform other than the one which is hosting the database. When `LOGSOURCE` is used, put the entire `TRANLOGOPTIONS` statement on one line. Do not use ampersand (&) line terminators to split it into multiple lines.

`platform`
Specifies the platform that hosts the redo or archived logs. Valid values are:

- `AIX`
- `HPUX`

- `LINUX`
- `MVS`
- `SOLARIS`
- `VMS`
- `WINDOWS`
- S390

To maintain correct data alignment, the specified *`platform`* and the platform that Extract is running on must have the same endian order and bit width (as in 32-bit or 64-bit). The following are compatible endian platforms:

- Big endian: AIX, HPUX, MVS, SOLARIS, S290
- Little endian: LINUX, VMS, WINDOWS

For example when running Extract on HPUX, a `LOGSOURCE` *`platform`* setting of `AIX` is valid but `LINUX` is not.

`PATHMAP` ***`path`***
Specifies the path to the logs.

`MAXREADSIZE` ***`records`***
Valid for Sybase.
Specifies how many records Extract will read from the transaction log at one time. Can be used to improve performance. Valid values are integers from 1 through 50000. The default is 256 records. Be careful when adjusting this parameter to very high values. It will reduce the frequency at which Extract adjusts the secondary truncation point, and log data can accumulate. Start with 10000 and evaluate performance before adjusting upward.

`MAXWARNEOF` ***`seconds`***
(Oracle) Valid for Extract in classic capture mode.
Specifies the number of seconds that Extract waits for a new log file to become available before generating a warning message. Extract generates only one warning message for a given sequence number. If `MAXWARNEOF` is not specified, Extract waits for one hour by default. A value of 0 omits the warning no matter how long Extract waits.

`MINEFROMACTIVEDG`
(Oracle) Valid for Extract in classic capture mode.
Specifies that Extract is allowed to mine redo from an Active Data Guard instance. Without this parameter set, Extract will abend with an error. Supports Extract in classic capture mode when capturing in an Oracle Data Guard environment. `MINEFROMACTIVEDG` does not support `DBLOGREADER`, it only supports `ASMUSER` for reading the redo logs in the ASM storage.

`MININGUSER {/ |` ***`user`*** **`} [, MININGPASSWORD`** ***`password]`***
`[`*`algorithm`* `ENCRYPTKEY {`*`key_name`* `| DEFAULT}] [SYSDBA]]`
(Oracle) Valid for Extract in integrated capture mode.
Specifies login credentials for Extract to log in to a downstream Oracle mining database to interact with the logmining server. Can be used instead of the `MININGUSERALIAS` option if an Oracle GoldenGate credential store is not being used. This user must:

- Have the privileges granted in `dbms_goldengate_auth.grant_admin_privilege`.

- Be the user that issues the `MININGDBLOGIN` or `MININGDBLOGINALIAS` and `REGISTER EXTRACT` or `UNREGISTER EXTRACT` commands for the Extract group that is associated with this `MININGUSERALIAS`.
- Not be changed while Extract is in integrated capture mode.

`/`
Directs Oracle GoldenGate to use an operating-system login for Oracle, not a database user login. Use this argument only if the database allows authentication at the operating-system level. Bypassing database-level authentication eliminates the need to update Oracle GoldenGate parameter files if application passwords frequently change.
To use this option, the correct user name must exist in the database, in relation to the value of the Oracle `OS_AUTHENT_PREFIX` initialization parameter. The value set with `OS_AUTHENT_PREFIX` is concatenated to the beginning of a user's operating system account name and then compared to the database name. Those two names must match.
When `OS_AUTHENT_PREFIX` is set to `' '` (a null string), the user name must be created with `IDENTIFIED EXTERNALLY`. For example, if the OS user name is `ogg`, you would use the following to create the database user:

```
CREATE USER ogg IDENTIFIED EXTERNALLY;
```

When `OS_AUTHENT_PREFIX` is set to `OPS$` or another string, the user name must be created in the format of:

```
OS_AUTHENT_PREFIX_value OS_user_name
```

For example, if the OS user name is `ogg`, you would use the following to create the database user:

```
CREATE USER ops$ogg IDENTIFIED BY oggpassword;
```

`user`
Specifies the name of the mining database user or a SQL*Net connect string.

`password`
The user's password. Use when database authentication is required to specify the password for the database user. If the password was encrypted by means of the `ENCRYPT PASSWORD` command, supply the encrypted password; otherwise, use the clear-text password. If the password is case-sensitive, type it that way. If either the user ID or password changes, the change must be made in the Oracle GoldenGate parameter files, including the re-encryption of the password if necessary.

`algorithm`
Specifies the encryption algorithm that was used to encrypt the password with `ENCRYPT PASSWORD`. Can be one of:

```
AES128
AES192
AES256
BLOWFISH
```

`ENCRYPTKEY {`*`key_name`*` | DEFAULT}`
Specifies the encryption key that was specified with `ENCRYPT PASSWORD`.

- `ENCRYPTKEY` *`key_name`* specifies the logical name of a user-created encryption key in the `ENCKEYS` lookup file. Use if `ENCRYPT PASSWORD` was used with the `KEYNAME` *`key_name`* option.
- `ENCRYPTKEY DEFAULT` directs Oracle GoldenGate to use a random key. Use if `ENCRYPT PASSWORD` was used with the `KEYNAME DEFAULT` option.

`SYSDBA`
Specifies that the user logs in as `sysdba`.

For more information about Oracle GoldenGate security options, see *Administering Oracle GoldenGate for Windows and UNIX*.

`MINEFROMSNAPSHOTSTBY | NOMINEFROMSNAPSHOTSTBY`
(Oracle) Controls whether or not Oracle GoldenGate can capture from redo that is archived by a snapshot standby database. `MINEFROMSNAPSHOTSTBY` enables Extract to run on a snapshot standby in classic capture mode or in integrated capture mode in an upstream configuration; running in a downstream configuration is not supported because the snapshot standby database does not ship its redo logs to another database.
The default is `NOMINEFROMSNAPSHOTSTBY`, which prevents Extract from capturing from a database that is a snapshot. Extract cannot run on a physical standby database and will abend if its source snapshot database is converted to a physical database.

`MININGUSERALIAS` ***`alias`***
(Oracle) Valid for Extract in integrated capture mode.
Specifies the alias for the login credentials that Extract uses to log in to a downstream Oracle mining database to interact with the logmining server. Can be used instead of `MININGUSER` if an Oracle GoldenGate credential store is being used.
This alias must be:

- Associated with a database user login credential that is stored in the local Oracle GoldenGate credential store. For more information about the credential store, see *Administering Oracle GoldenGate for Windows and UNIX*. This user must have the privileges granted in `dbms_goldengate_auth.grant_admin_privilege`.
- The user that issues the `MININGDBLOGIN` or `MININGDBLOGINALIAS` and `REGISTER EXTRACT` or `UNREGISTER EXTRACT` commands for the Extract group that is associated with this `MININGUSERALIAS`.

This alias and user must not be changed while Extract is in integrated capture mode.

`NODDLCHANGEWARNING`
(SQL Server)
Forces Extract not to log a warning when a DDL operation is made to a source object for which Extract is capturing data. The default is to report a warning, so that the problem can be corrected. Oracle GoldenGate does not support DDL capture and replication for SQL Server, so it expects source and target metadata to remain constant. Some DDL changes do not cause Extract to abend, but the warning still will be logged whenever such changes occur. `NODDLCHANGEWARNING` prevents those messages from accumulating in the Oracle GoldenGate log.

`NOFLUSH`
(DB2 z/OS)
Inhibits the flushing of log buffers.

PATHMAP *NFS_mount_point log_path*
(Oracle) Valid for Extract in classic capture mode.
Specifies the location of the redo and/or archived logs when they are stored on a system other than the one which is hosting the database. More than one PATHMAP statement can be used. When PATHMAP is used, put the entire TRANLOGOPTIONS statement on one line. Do not use ampersand (&) line terminators to split it into multiple lines.
PATHMAP can be used with the LOGSOURCE option if the system is a different platform from the one that hosts the database.

NFS_mount_point
Specifies the NFS mount point of the remote system where the logs are stored.

log_path
The path to the logs on the remote system. The path must follow the mount point specification.

PREPAREFORUPGRADETOIE | NOPREPAREFORUPGRADETOIE
(Oracle) Valid when upgrading from Classic to Integrated Extract on Oracle RAC.
When upgrading on Oracle RAC from Classic to Integrated Extract, you must set the PREPAREFORUPGRADETOIE option before stopping Classic Extract for the upgrade then wait for the information message in the report file that indicates that the parameter has taken effect before proceeding with the upgrade. For detailed upgrade instructions, see *Upgrading Oracle GoldenGate for Windows and UNIX*.

PREPAREFORUPGRADETOIE
Set PREPAREFORUPGRADETOIE in the Extract parameter file, which requires a restart of Extract, or you can set it dynamically for a running extract from GGSCI using this command:

```
SEND EXTRACT extract_name TRANLOGOPTIONS PREPAREFORUPGRADETOIE
```

NOPREPAREFORUPGRADETOIE
Dynamically turns off the PREPAREFORUPGRADETOIE option if necessary. The default is NOPREPAREFORUPGRADETOIE.

PURGEORPHANEDTRANSACTIONS | NOPURGEORPHANEDTRANSACTIONS
(Oracle) Valid for Extract in classic capture mode.
Controls the purging of orphaned transactions that occur when an Oracle RAC node fails and Extract cannot capture the rollback.

PURGEORPHANEDTRANSACTIONS
Purges orphaned transactions. A transaction is verified as orphaned before purging by comparing its startup time with the node's startup time; if the transaction started earlier, it is purged.

NOPURGEORPHANEDTRANSACTIONS
The default. Orphaned transactions are not purged.

QUERYRETRYCOUNT *number*
(Extract for SQL Server)
Specifies how many times to retry a query to obtain table metadata after timeouts. Timeouts can occur for a long-running transaction that has created any table. The system tables become locked and prevent Extract's query from completing.
The default is one retry after a 30-second wait, after which the process abends if the retry fails. QUERYRETRYCOUNT can be specified to retry multiple times at 30-second

intervals, according to the input value that is supplied. If all of the retries fail, Extract abends with the normal connection error message.
The following example causes Extract to attempt its query four times at 30-second intervals:

```
TRANLOGOPTIONS QUERYRETRYCOUNT 4
```

`READQUEUESIZE` ***`size`***
Valid for MySQL and Sybase.
Specifies the internal queue size, in bytes, for transaction data. It can be increased to improve performance. Valid values are integers from 3 through 1500. The default is 256 bytes; start with the default and evaluate performance before adjusting upward.

`REQUIRELONGDATACAPTURECHANGES | NOREQUIRELONGDATACAPTURECHANGES`
(DB2 LUW)
Controls the response of Extract when `DATA CAPTURE` is set to `NONE` or to `CHANGES` without `INCLUDE LONGVAR COLUMNS` and the parameter file includes any of the following Oracle GoldenGate parameters that require the presence of before images for some or all column values: `GETBEFOREUPATES`, `NOCOMPRESSUPDATES`, and `NOCOMPRESSDELETES`. Both of those `DATA CAPTURE` settings prevent the logging of before values for `LONGVAR` columns. If those columns are not available to Extract, it can affect the integrity of the target data.

`REQUIRELONGDATACAPTURECHANGES`
Extract abends with an error.

`NOREQUIRELONGDATACAPTURECHANGES`
Extract issues a warning but continues processing the data record.

`[TSLOOKUPBEGINLRI | TSLOOKUPENDLRI]`
(DB2 LUW v10.1 and later)
When you specify an LRI range using these parameters, Extract looks for the timestamp specified in the `ADD` or `ALTER EXTRACT` command within this range. This helps Extract to optimize the look up process for a particular timestamp in the database transaction log. The `TSLOOKUPBEGINLRI` parameter is mandatory while `TSLOOKUPENDLRI` is optional. Specifying only `TSLOOKUPENDLRI` without `TSLOOKUPBEGINLRI` is invalid. For example:

```
TRANLOGOPTIONS TSLOOKUPBEGINLRI 75200.666197, TSLOOKUPENDLRI  75207.666216
TRANLOGOPTIONS TSLOOKUPBEGINLRI 75200.666197
```

If the provided timestamp falls between the given LRI ranges or the provided timestamp falls after the `TSLOOKUPBEGINLRI` LRI timestamp then Extract starts from a record with timestamp equal to or nearest less than the provided timestamp.
If the provided timestamp falls before `TSLOOKUPBEGINLRI` LRI timestamp, Extract is started from the specified `TSLOOKUPBEGINLRI` LRI. If the provided timestamp falls after `TSLOOKUPENDLRI` timestamp, then Extract abends. If you only specify `TSLOOKUPENDLRI`, then an informational message is displayed and Extract starts from a record with timestamp equal or nearest less than the provided timestamp.

`TRANSCLEANUPFREQUENCY` ***`minutes`***
(Oracle) Valid for Extract in classic capture mode.
Specifies an interval, in minutes, after which Oracle GoldenGate scans for orphaned transactions, and then scans again to delete them. The initial scan marks transactions considered to be orphaned. The second scan confirms they are orphaned, and they are deleted. Valid values are from 1 to 43200 minutes. Default is 10 minutes.

`USENATIVEOBJSUPPORT | NOUSENATIVEOBJSUPPORT`
(Oracle) Valid for Extract in integrated capture mode.
Integrated Capture adds redo-based capture for User Defined Type (UDT) and `ANYDATA` data types. It is enabled by default and can only be enabled if the source database version is 12.1.0.1 or greater and the source database compatibility is 12.0.0.0.0 or greater. Replicat from Oracle GoldenGate release 12.1.2.1.0 must be used. If a source or target database of release 12.1.0.1 is used, the Streams patch for bug 18038108 must be installed on the database. To use Native Support, all of your Oracle databases and Oracle GoldenGate instances must be release 12.1.0.1 or greater to be compatible.
If redo-based capture is enabled but a UDT contains an unsupported attribute, Integrated Capture retries to capture the UDT using fetch. For limitations of support for capture, see *Installing and Configuring Oracle GoldenGate for Oracle Database*. If you create object tables by using a `CREATE TABLE AS SELECT` (CTAS) statement, Integrated Capture must be configured to capture DML from CTAS operation in order to fully support object tables. For CTAS use information, see*Installing and Configuring Oracle GoldenGate for Oracle Database*
The default is `USENATIVEOBJSUPPORT` if supported.

`USE_ROOT_CONTAINER_TIMEZONE`
This parameter is for a CDB environment. Each PDB in a CDB can use a different database time zone. If the database time zone is available, Extract tries to get the time zone of a PDB from Integrated Dictionary. The time zone extraction requires a patch on the mining database. If the patch is not available, Extract sends a query to the PDB to get the time zone. If the database patch or a connection to the PDB is not available, and this parameter is specified, Extract assumes that the PDB database time zone is the same as the root container database time zone.

`USEPREVRESETLOGSID | NOUSEPREVRESETLOGSID`
(Oracle) Valid for Extract in classic capture mode.
Specifies that Extract will take the previous `RESETLOG` id as the current branch. The default is `NOUSEPREVRESETLOGSID`. Supports Extract in classic capture mode when capturing in an Oracle Data Guard environment.

`VAMCOMPATIBILITY {3}`
(MySQL, SQL M/X, SQL Server, Sybase, Teradata)
Ensures the VAM module and the VAM API are using the same version of the column metadata structure. As new features are added to the VAM API, the column metadata needs enhancing with new attributes. When this occurs a new version is created, adding the new column metadata attributes to the existing ones. All database implementations other than Teradata are required to update to the latest version after a new version is added.

1
A value of one means the original VAM API metadata structure is being used. This structure was originally created for Teradata, which is a separate implementation from the other databases, and only Teradata still uses this level. To maintain backwards compatibility with Extract, it may be necessary to manually set `VAMCOMPATIBILITY` to 1 if running an earlier version of a TAM module against later releases of Extract that contain VAM versioning. Extract abends with a message to the report file if `VAMCOMPATIBILITY` 1 is required and not set.

2
This VAM version added column metadata attributes for SQL Server. This value is set internally by the VAM module, so setting it manually with `TRANLOGOPTIONS` is not required.

3
This is the current version level. All databases other than Teradata (including SQL Server) use this level and set it internally in the VAM module, so setting it manually with `TRANLOGOPTIONS` is not required.

Examples

Example 1
The following specifies the location of the Oracle archived logs.

```
TRANLOGOPTIONS ALTARCHIVELOGDEST /fs1/oradata/archive/log2
```

Example 2
The following Oracle example filters for two users (one by name and one by user ID). The transactions generated by these users will be handled according to the `GETREPLICATES` or `IGNOREREPLICATES` rules, and a new transaction buffer size is specified.

```
TRANLOGOPTIONS EXCLUDEUSER ggsrep, EXCLUDEUSERID 90, BUFSIZE 100000
```

Example 3
The following excludes the Replicat transaction name in a SQL Server or Sybase environment.

```
TRANLOGOPTIONS EXCLUDETRANS ggs_repl
```

Example 4
The following shows how to deal with transaction logs that are on a platform other than the one which hosts the database.

Note:

The following statement spans multiple lines only because of space constraints in this documentation.

```
TRANLOGOPTIONS, LOGSOURCE VMS, PATHMAP DKA200:[RDBMS.ORACLE.ORA9201I.
64.ADMIN.GGS.ARCH]
/net/deltan/uservol1/RDBMS.DIR/ORACLE.DIR/ORA9201I.DIR/
64.DIR/admin.DIR/ggs.DIR/ARCH.dir PATHMAP DKA200:[RDBMS.ORACLE.ORA9201I.
64.ORADATA.GGS]
/net/deltan/uservol1/rdbms.dir/oracle.dir/ora9201I.DIR/
64.dir/oradata.dir/ggs.dir
```

Example 5
The following example supplies ASM credentials by specifying the alias `asm1` in the `asmdomain` domain in the Oracle GoldenGate credential store.

```
TRANLOGOPTIONS ASMUSERALIAS asm1 DOMAIN asmdomain
```

Example 6
The following is an example of how to specify the padding width when Extract forms the archive log name using the format specifiers `%T`, `%S`, and `%R` in the `ALTARCHIVELOGFORMAT` parameter.

```
TRANLOGOPTIONS ALTARCHIVELOGFORMAT ARC_%S_%R.%T
TRANLOGOPTIONS SEQPADLEN 12, RESETLOGSIDPADLEN 12, THREADPADLEN 5
```

Example 7
The following are examples of how to use tag specifiers with `EXCLUDETAG`.

```
TRANLOGOPTIONS EXCLUDETAG 00
TRANLOGOPTIONS EXCLUDETAG +
TRANLOGOPTIONS EXCLUDETAG 0952
```

Example 8
The following is an example of how to use the `TRANLOGOPTIONS FAILOVERTARGETDESTID` Extract parameter.

```
TRANLOGOPTIONS FAILOVERTARGETDESTID 2

SQL> show parameters log_archive_dest

NAME TYPE VA
LUE
------------------------------------ ----------- --
----------------------------
log_archive_dest_1 string location=USE_DB_RECOVERY_FILE_DEST,
valid_for=(ALL_LOGFILES, ALL_ROLES)
.
log_archive_dest_2 string service="ggs2d", ASYNC NOAFFIRM delay=0 optional
compression =disable max_failure=0 max_connections=1 reopen=300
db_unique_name="GGS2D" net_timeout=30,
valid_for=(online_logfile,all_roles)
```

It would be set to `2` because that is the Standby database Oracle GoldenGate should stay behind. The first entry (`log_archive_dest_1`) is for the local archive logs for that database, and the second is for the standby database.00

Example 9
The following is an example of how to set the transaction log backup path to a network share for a remote Extract capturing in ALO mode for SQL Server.

```
TRANLOGOPTIONS ALTARCHIVELOGDEST ("\\RemoteServerName\SQLBackups")
```

3.188 TRANSACTIONTIMEOUT

Valid For

Replicat

Description

Use the `TRANSACTIONTIMEOUT` parameter to prevent an uncommitted Replicat target transaction from holding locks on target tables and consuming database resources unnecessarily. You can change the value of this parameter so that Replicat can work within existing application timeouts and other database requirements on the target.

`TRANSACTIONTIMEOUT` limits the amount of time that Replicat will hold a target transaction open if it has not received the end-of-transaction record for the last source transaction in that transaction. By default, Replicat groups multiple source transactions into one target transaction to improve performance, but it will not commit a partial source transaction and will wait indefinitely for that last record. The Replicat parameter `GROUPTRANSOPS` controls the minimum size of a grouped target transaction. The range is 1–604800.

The following events could last long enough to trigger `TRANSACTIONTIMEOUT`:

- Network problems prevent trail data from being delivered to the target system.
- Running out of disk space on any system, preventing trail data from being written.
- Collector abends (a rare event).
- Extract abends or is terminated in the middle of writing records for a transaction.
- An Extract data pump abends or is terminated.
- There is a source system failure, such as a power outage or system crash.

How TRANSACTIONTIMEOUT Works

During normal operations, Replicat remembers the position in the trail of the beginning of the first source transaction in the current target transaction, in case the transaction must be abended and retried. When `TRANSACTIONTIMEOUT` is enabled, Replicat also saves the position of the first record of the current source transaction and will use that position as the logical end-of-file (EOF) if `TRANSACTIONTIMEOUT` is triggered.

When triggered, `TRANSACTIONTIMEOUT` does the following:

1. Aborts the current target transaction
2. Repositions to the beginning of the first source transaction in the aborted target transaction.
3. Processes all of the trail records up to the logical end-of-file position (the beginning of the last, incomplete source transaction).
4. Commits the transaction at logical EOF point.
5. Waits for new trail data before processing any more trail records.

`TRANSACTIONTIMEOUT` can be triggered multiple times for the same source transaction, depending on the nature of the problem that is causing the trail data to arrive slowly enough to trigger `TRANSACTIONTIMEOUT`.

Detecting a TRANSACTIONTIMEOUT Condition

To determine whether or not Replicat is waiting for the rest of a source transaction when `TRANSACTIONTIMEOUT` is enabled, issue the `SEND REPLICAT` command with the `STATUS` option. The following statuses indicate this condition:

```
Performing transaction timeout recovery
Waiting for data at logical EOF after transaction timeout recovery
```

Default

Disabled

Syntax

```
TRANSACTIONTIMEOUT n units
```

n
An integer that specifies the wait interval. Valid values are from one second to one week (seven days). This value should be greater than that set with the `EOFDELAY` parameter in both the primary Extract and any associated data pumps.

units
One of the following: `S`, `SEC`, `SECS`, `SECOND`, `SECONDS`, `MIN`, `MINS`, `MINUTE`, `MINUTES`, `HOUR`, `HOURS`, `DAY`, `DAYS`.

Example

```
TRANSACTIONTIMEOUT 5 S
```

3.189 TRANSMEMORY

Valid For

Extract for DB2 on z/OS

Description

Use the `TRANSMEMORY` parameter to control the amount of memory and temporary disk space available for caching uncommitted transaction data. Because Oracle GoldenGate sends only committed transactions to the target database, it requires sufficient system memory to store transaction data on the source system until either a commit or rollback indicator is received.

This parameter is for use with a DB2 database on z/OS database. For all other databases, use the `CACHEMGR` parameter.

About Memory Management With TRANSMEMORY

`TRANSMEMORY` enables you to tune the Oracle GoldenGate transaction cache size and define a temporary location on disk for storing data that exceeds the size of the cache. Options are available for defining the total cache size, the per-transaction memory size, the initial and incremental memory allocation, and disk storage space.

Transactions are added to the memory pool specified by `RAM`, and each is flushed to disk when `TRANSRAM` is reached. An initial amount of memory is allocated to each transaction based on `INITTRANSRAM` and is increased by the amount specified by `RAMINCREMENT` as needed, up to the maximum set with `TRANSRAM`. Consequently, the value for `TRANSRAM` should be evenly divisible by the sum of (`INITTRANSRAM + RAMINCREMENT`).

To view current `TRANSMEMORY` settings, use the `VIEW REPORT` command in GGSCI.

Special z/OS Considerations

On a z/OS system, the `RAM` option not only controls the total virtual memory allocation for all cached transactions, but also controls the size of the heap memory that is allocated during startup. The large default value prevents fragmentation within the virtual memory pool, but in some installations it could cause virtual memory to be wasted, especially if the applications primarily generate small transactions. Allocating a large amount of heap memory also can cause Extract to be unresponsive at startup until z/OS completes the allocation.

On z/OS, set `RAM` just large enough to hold enough transaction activity without affecting the performance of Extract. If set too low, it can cause Extract to write transaction data to disk, causing Extract to run more slowly and to consume disk space. You might need to do some testing to determine the optimal value.

Default

None

Syntax

```
TRANSMEMORY
[RAM size]
[TRANSRAM size]
[TRANSALLSOURCES size]
[INITTRANSRAM size]
[RAMINCREMENT size]
[DIRECTORY (directory, max_size, max_file_size)]
```

`RAM` *`size`*
Specifies the total amount of memory to use for all cached transactions. On z/OS this also is the initial amount of memory to allocate *per transaction*. The default is 200 megabytes. The value can be specified in bytes or in terms of gigabytes, megabytes, or kilobytes in any of the following forms:
`GB | MB | KB | G | M | K | gb | mb | kb | g | m | k`

`TRANSRAM` *`size`*
Specifies the total amount of memory to use for a single transaction. The default is 50 megabytes. The value can be specified in bytes or in terms of gigabytes, megabytes, or kilobytes in any of the following forms:
`GB | MB | KB | G | M | K | gb | mb | kb | g | m | k`
`TRANSRAM` should be evenly divisible by both `INITTRANSRAM` and `RAMINCREMENT` for optimal results.

`TRANSALLSOURCES` *`size`*
Specifies the total amount of memory and disk space to use for a single transaction. The default is 50% of total available memory (memory and disk). The value can be specified in bytes or in terms of gigabytes, megabytes, or kilobytes in any of the following forms:
`GB | MB | KB | G | M | K | gb | mb | kb | g | m | k`

`INITTRANSRAM` *`size`*
(NonStop system only) Specifies the initial amount of memory to allocate for a transaction. The default is 500 kilobytes. The value can be specified in bytes or in terms of gigabytes, megabytes, or kilobytes in any of the following forms:
`GB | MB | KB | G | M | K | gb | mb | kb | g | m | k`

`RAMINCREMENT` *`size`*
Specifies the amount of memory to increment when a transaction requires more memory. The default is 500 kilobytes. The value can be specified in bytes or in terms of gigabytes, megabytes, or kilobytes in any of the following forms:
`GB | MB | KB | G | M | K | gb | mb | kb | g | m | k`

`DIRECTORY (`*`directory, max_size, max_file_size`*`)`
Specifies temporary disk storage for transaction data when its size exceeds the maximum specified with `TRANSRAM`. You can specify `DIRECTORY` more than once.

The directory size specified with *`max_size`* and the file size specified with *`max_file_size`* must be greater than the size of the memory specified with `RAM`.
The names of the files that are created take one of the following formats, depending on the process type:

- *`group_trans_`*`00001.mem` takes the name of the group and indicates that an online process created the file.
- *`PID_trans_`*`00001.mem` takes the name of a process ID (PID) and indicates that a one-time process (specified with the `SPECIALRUN` parameter) created the file.
- *`group_thread#_`*`00001.mem` takes a group name and a thread number, indicating that a threaded Extract created the file.

`directory`
The fully qualified path name of a directory. The default is the `dirtmp` sub-directory of the Oracle GoldenGate directory.

`max_size`
The maximum size of all files in the directory. The default is 2 gigabytes. If the space specified is not available, then 75% of available disk space is used. Values can be specified in bytes or in terms of gigabytes, megabytes, or kilobytes in any of the following forms:

```
GB | MB | KB | G | M | K | gb | mb | kb | g | m | k
```

`max_file_size`
The maximum size of each file in the directory. The default is 200 megabytes. Values can be specified in bytes or in terms of gigabytes, megabytes, or kilobytes in any of the following forms:

```
GB | MB | KB | G | M | K | gb | mb | kb | g | m | k
```

Examples

Example 1

The following example allows per-transaction memory to be incremented ten times before data is flushed to disk, once for the initial allocation specified with `INITTRANSRAM` and then nine more times as permitted by `RAMINCREMENT`.

```
TRANSMEMORY DIRECTORY(c:\test\dirtmp, 3000000000,
300000000), RAM 8000K, TRANSRAM 1000K, INITTRANSRAM 100K,
RAMINCREMENT 100K
```

Example 2

The following is the same as the preceding example, but with the addition of a second directory.

```
TRANSMEMORY DIRECTORY(c:\test\dirtmp, 3000000000,
300000000), DIRECTORY (c:\test\dirtmp2, 1000000000,
5000000), RAM 8000K, TRANSRAM 1000K, INITTRANSRAM 100K,
RAMINCREMENT 100K
```

Note:

In the previous examples, the parameter specification spans multiple lines because of space constraints. In an actual parameter file, multi-line parameter specifications must contain an ampersand (&) at the end of each line.

3.190 TRIMSPACES | NOTRIMSPACES

Valid For

Extract and Replicat

Description

Use the `TRIMSPACES` and `NOTRIMSPACES` parameters to control whether or not trailing spaces in a source `CHAR` column are truncated when applied to a target `CHAR` or `VARCHAR` column. `TRIMSPACES` and `NOTRIMSPACES` can be used at the root level of the parameter file as global `ON/OFF` switches for different sets of `TABLE` or `MAP` statements, and they can be used within an individual `TABLE` or `MAP` statement to override any global settings for that particular `MAP` or `TABLE` statement.

Note:

Sybase treats all `CHAR` types as `VARCHAR` types, and therefore `TRIMSPACES` will have no effect. For Sybase, use the `TRIMVARSPACES` parameter.

`TRIMSPACES` is applied only to single-byte white spaces (U+0020). Ideographic spaces (U+3000) are not supported.

For Extract, `TRIMSPACES` only has an effect if Extract is performing mapping within the `TABLE` statement (by means of a `TARGET` statement).

Default

```
TRIMSPACES
```

Syntax

```
TRIMSPACES | NOTRIMSPACES
```

Examples

Example 1

The following example uses `TRIMSPACES` and `NOTRIMSPACES` at the root level of the parameter file. The default of `TRIMSPACES` is in effect until the last `MAP` statement, to which `NOTRIMSPACES` applies.

```
MAP fin.src1, TARGET fin.tgt1;
MAP fin.src2, TARGET fin.tgt2;
MAP fin.src3, TARGET fin.tgt3;
NOTRIMSPACES
MAP fin.src4, TARGET fin.tgt4;
```

Example 2
The following example uses `NOTRIMSPACES` within a `MAP` statement to override the global default of `TRIMSPACES`. The default applies to the first two `MAP` statements, and then `NOTRIMSPACES` applies to the last two targets.

```
MAP fin.src1, TARGET fin.tgt1;
MAP fin.src1, TARGET fin.tgt2;
MAP fin.src1, TARGET fin.tgt3, NOTRIMSPACES;
MAP fin.src1, TARGET fin.tgt4, NOTRIMSPACES;
```

3.191 TRIMVARSPACES | NOTRIMVARSPACES

Valid For

Extract and Replicat

Description

Use the `TRIMVARSPACES` and `NOTRIMVARSPACES` parameters to control whether or not trailing spaces in a source `VARCHAR` column are truncated when applied to a target `CHAR` or `VARCHAR` column. `TRIMVARSPACES` and `NOTRIMVARSPACES` can be used at the root level of the parameter file as global `ON/OFF` switches for different sets of `TABLE` or `MAP` statements, and they can be used within an individual `TABLE` or `MAP` statement to override any global settings for that particular `MAP` or `TABLE` statement.

The default is `NOTRIMVARSPACES` because the spaces in a `VARCHAR` column can be part of the data. Before using `TRIMVARSPACES`, make certain that trailing spaces are not required as part of the target data.

For Extract, `TRIMVARSPACES` only has an effect if Extract is performing mapping within the `TABLE` statement (by means of a `TARGET` statement).

Default

`NOTRIMVARSPACES`

Syntax

```
TRIMVARSPACES | NOTRIMVARSPACES
```

Examples

Example 1
The following example uses `TRIMVARSPACES` and `NOTRIMVARSPACES` at the root level of the parameter file. The default of `NOTRIMVARSPACES` is in effect until the last `MAP` statement, to which `TRIMVARSPACES` applies.

```
MAP fin.src1, TARGET fin.tgt1;
MAP fin.src2, TARGET fin.tgt2;
MAP fin.src3, TARGET fin.tgt3;
TRIMVARSPACES
MAP fin.src4, TARGET fin.tgt4;
```

Example 2
The following example uses TRIMVARSPACES within a MAP statement to override the global default of NOTRIMVARSPACES. The default applies to the first two MAP statements, and then TRIMVARSPACES applies to the last two targets.

```
MAP fin.src1, TARGET fin.tgt1;
MAP fin.src1, TARGET fin.tgt2;
MAP fin.src1, TARGET fin.tgt3, TRIMVARSPACES;
MAP fin.src1, TARGET fin.tgt4, TRIMVARSPACES;
```

3.192 UPDATEDELETES | NOUPDATEDELETES

Valid For

Replicat

Description

Use the UPDATEDELETES parameter to convert delete operations to update operations for all MAP statements that are specified after it in the parameter file. Use NOUPDATEDELETES to turn off UPDATEDELETES. These parameters are table-specific. One remains in effect for subsequent MAP statements until the other is encountered.

Because you can selectively enable or disable these parameters between MAP statements, you can enable or disable them for different threads of a coordinated Replicat. Specify the UPDATEDELETES threads in one set of MAP statements, and specify the NOUPDATEDELETES threads in a different set of MAP statements.

When using UPDATEDELETES, use the NOCOMPRESSDELETES parameter. This parameter causes Extract to write all of the columns to the trail, so that they are available for updates.

Default

```
NOUPDATEDELETES
```

Syntax

```
UPDATEDELETES | NOUPDATEDELETES
```

Example

This example shows how you can apply UPDATEDELETES and NOUPDATEDELETES selectively to different MAP statements, each of which represents a different thread of a coordinated Replicat.

```
UPDATEDELETES
MAP sales.cust, TARGET sales.cust, THREAD (1);
MAP sales.ord, TARGET sales.ord, THREAD (2);
NOUPDATEDELETES
MAP sales.loc, TARGET sales.loc, THREAD (3);
```

3.193 UPDATEINSERTS | NOUPDATEINSERTS

Valid For

Replicat

Description

Use the `UPDATEINSERTS` parameter to convert insert operations to update operations for all `MAP` statements that are specified after it in the parameter file. Use `NOUPDATEINSERTS` to turn off `UPDATEINSERTS`.

Because you can selectively enable or disable these parameters between `MAP` statements, you can enable or disable them for different threads of a coordinated Replicat. Specify the `UPDATEINSERTS` threads in one set of `MAP` statements, and specify the `NOUPDATEINSERTS` threads in a different set of `MAP` statements.

Default

`NOUPDATEINSERTS`

Syntax

```
UPDATEINSERTS | NOUPDATEINSERTS
```

Example

This example shows how you can apply `UPDATEINSERTS` and `NOUPDATEINSERTS` selectively to different `MAP` statements, each of which represents a different thread of a coordinated Replicat.

```
UPDATEINSERTS
MAP sales.cust, TARGET sales.cust, THREAD (1);
MAP sales.ord, TARGET sales.ord, THREAD (2);
NOUPDATEINSERTS
MAP sales.loc, TARGET sales.loc, THREAD (3);
```

3.194 UPDATERECORDFORMAT

Valid For

Extract for all databases except Teradata.

Description

Use the `UPDATERECORDFORMAT` parameter to cause Extract to combine the before and after images of an `UPDATE` operation into a single record in the trail. It is valid for Extract in classic and integrated capture modes; it is valid for a master Extract though is not valid for pump Extract.

Before images are generated when the `GETUPDATEBEFORES`, `GETBEFORECOLS`, and `LOGALLSUPCOLS` parameters are used. (In the case of an update to a primary key, unique index, or user-specified `KEYCOLS` key, the before and after images are stored in the same record by default. `UPDATERECORDFORMAT` does not apply in these cases.) The `NOCOMPRESSUPDATES` parameter is required for non-Oracle databases.

When two records are generated for an update to a single row, it incurs additional disk I/O and processing for both Extract and Replicat. If supplemental logging is enabled on all columns, the unmodified columns may be repeated in both the before and after records. The overall size of the trail is larger, as well. This overhead is reduced by using `UPDATERECORDFORMAT`.

When `UPDATERECORDFORMAT` is used, Extract writes the before and after images to a single record that contains all of the information needed to process an `UPDATE` operation. In addition to improving the read performance of downstream processes, this enables column mapping functions to access the before and after column values at the same point in time, rather than having to cache the before image column values while reading the after values.

`UPDATERECORDFORMAT` takes effect for all `TABLE` statements in the parameter file.

If you specify both `UPDATERECORDFORMAT` and `FORMAT RELEASE 11.x` or earlier, then Extract will abend.

Note:

Many-columned tables can cause the trail record to reach its maximum size when `UPDATERECORDFORMAT` is used. The rest of the record is continued in one or more additional, chained record fragments. This has a minor effect on processing performance.

Default

`UPDATERECORDFORMAT COMPACT`

Syntax

`UPDATERECORDFORMAT [FULL | COMPACT]`

`FULL`
Generates one trail record that contains the before and after images of an `UPDATE`, where the before image includes all of the columns that are available in the transaction record for both the before and after images. When viewed in the Logdump utility, this record appears as `GGSUnifiedUpdate`.

`COMPACT`
Generates one trail record that contains the before and after images of an `UPDATE`, where the before image includes all of the columns that are available in the transaction record, but the after image is limited to the primary key columns and the columns that were modified in the `UPDATE`. `UPDATERECORDFORMAT COMPACT` is recommended for configurations that include an integrated Replicat. This is the default.
When either `FULL` or `COMPACT` are viewed in the Logdump utility, the record appears as `GGSUnifiedUpdate`. The record contains the following:

- a header
- the length of the before image
- the before values of each column
- the after values of the primary key, unique index, or `KEYCOLS` columns
- the after values of the modified columns
- internal token data

Example

```
UPDATERECORDFORMAT COMPACT
```

3.195 UPREPORT

Valid For

Manager

Description

Use the `UPREPORTMINUTES` or `UPREPORTHOURS` parameter to specify the frequency with which Manager reports Extract and Replicat processes that are running. Every time one of those processes starts or stops, events are generated. Those messages are easily overlooked in the error log because the log can be so large. `UPREPORTMINUTES` and `UPREPORTHOURS` report on a periodic basis to ensure that you are aware of the process status.

If `UPREPORT` is explicitly indicated and the value of the `CHECKMINUTES` parameter is greater than that of `UPREPORT`, then `CHECKMINUTES` acquires the value of `UPREPORT`.

To report on stopped processes, use the `DOWNREPORT` parameter. See "DOWNREPORT" for more information.

Default

Do not report running processes

Syntax

```
UPREPORTMINUTES minutes | UPREPORTHOURS hours
```

`UPREPORTMINUTES` ***`minutes`***
Sets the report frequency in minutes. The minimum is 0.

`UPREPORTHOURS` ***`hours`***
Sets the report frequency in hours. The minimum is 0.

Example

The following generates a report every 30 minutes.

```
UPREPORTMINUTES 30
```

3.196 USE_TRAILDEFS | NO_USE_TRAILDEFS

Valid For

Extract data pump and Replicat when used in a `GLOBALS` file

Description

Use the `USE_TRAILDEFS` and `NO_USE_TRAILDEFS` parameters to control where the data pump and Replicat processes obtain the table definitions when the trail files contain full table definitions.

`USE_TRAILDEFS` forces these processes to use the table definitions from the trail unless the `OVERRIDE` keyword is specified with `SOURCEDEFS` or `ASSUMETARGETDEFS`.

`NO_USE_TRAILDEFS` forces these processes to follow the old behavior when resolving the table definitions. Extract and pump will not generate trail files with full table definition.

Default

`USE_TRAILDEFS`

Syntax

```
[ USE_TRAILDEFS | NO_USE_TRAILDEFS ]
```

3.197 USEANSISQLQUOTES | NOUSEANSISQLQUOTES

Valid For

GLOBALS

Description

Use the `USEANSISQLQUOTES` and `NOANSISQLQUOTES` parameters to control how Oracle GoldenGate treats column names and literals that are enclosed within single or double quote marks.

> **Note:**
>
> When capturing and mapping object names, such as table names, Oracle GoldenGate always recognizes double-quoted strings as case-sensitive object names, regardless of whether `USEANSISQLQUOTES` or `NOUSEANSISQLQUOTES` is specified.

`USEANSISQLQUOTES` is the default behavior of Oracle GoldenGate. It directs Oracle GoldenGate to follow SQL-92 rules for using quotation marks. With `USEANSISQLQUOTES` enabled, Oracle GoldenGate treats a string within double quotes as a case-sensitive column name, and it treats a string within single quotes as a literal. For example, consider the behavior of the `@STRLEN` conversion function, which returns a string length. By default, Oracle GoldenGate interprets the double-quoted `"ABC"` as an upper-case column name, and `@STRLEN` returns the length of whatever the *value* is for column `"ABC"`.

```
COLMAP ( TGT1 = @STRLEN("ABC") )
```

If the double quotes are changed to single quotes in the preceding example, Oracle GoldenGate interprets `'ABC'` as a literal, and `@STRLEN` returns `3`.

```
COLMAP ( TGT1 = @STRLEN('ABC') )
```

`NOUSEANSISQLQUOTES` is intended for backward compatibility with the parameter files of Oracle GoldenGate versions that predate version 12c, where strings in double quotes are intended to be literals and case-sensitive column names are not supported (whether or not they are within quotes). For example, consider the behavior of the `@STRLEN` conversion function, which returns a string length. With `NOUSEANSISQLQUOTES`, the following `@STRLEN` specification returns a value of `3` because Oracle GoldenGate interprets the double-quoted `"ABC"` as a literal.

- `COLMAP ( TGT1 = @STRLEN("ABC") )`

When used, `NOUSEANSISQLQUOTES` affects all `TABLE` and `MAP` statements in the local Oracle GoldenGate instance.

Default

```
USEANSISQLQUOTES
```

Syntax

```
USEANSISQLQUOTES | NOUSEANSISQLQUOTES
```

Examples

Example 1

The following matrix shows the difference in the use of quote marks around input variables between the default of `USEANSIISQLQUOTES` and `NOUSEANSISQLQUOTES`.

Input Variable	**USEANSISQLQUOTES**	**NOUSEANSISQLQUOTES**
Literal text	`'text string'`	`"text string"`
Unquoted column names in database	`COLUMN1`	`COLUMN1`
Quoted column name (Case is preserved by Oracle GoldenGate.)	`"Column1"`	Not supported. All names are converted to upper case.

Example 2

The following matrix shows how to escape literal single or double quote marks that are part of literal input.

Input Variable	**USEANSISQLQUOTES**	**NOUSEANSISQLQUOTES**
Literal text is: *`John's Car`*	`'John''s' car` This example uses two apostrophes, one as the literal apostrophe and the other as the escape character. (The apostrophe is the same character as the single quote mark.)	`"John's car"` No escape character is needed.
Literal text is: *`Double quote (")`*	`'Double quote (")'` No escape character is needed.	`"Double quote ("")"` This example uses two double quotes, one as the literal double quote and the other as the escape character.

Input Variable	USEANSISQLQUOTES	NOUSEANSISQLQUOTES
Column name is: "Column"1	`"Column""1"` This example uses two double quotes, one as the literal double quote and the other as the escape character.	Not supported.

3.198 USEDEDICATEDCOORDINATIONTHREAD

Valid For

Replicat (coordinated mode)

Description

Use `USEDEDICATEDCOORDINATIONTHREAD` to force Replicat to maintain a dedicated coordination thread to apply barrier transactions. The thread ID of this thread is always 0.

By default, Replicat uses the thread with the lowest thread ID to apply barrier transactions, but that thread also includes work that is mapped to it explicitly. By using a dedicated thread for barrier transactions, you can get an accurate view in Oracle GoldenGate statistics of the number of barrier events and exposes the amount of work that is performed serially. Coordinated Replicat statistics are written to the report file and also can be viewed with the `STATS REPLICAT` command.

`USEDEDICATEDCOORDINATIONTHREAD` applies to the Replicat group as a whole, across all `MAP` statements.

Syntax

```
USEDEDICATEDCOORDINATIONTHREAD
```

Example

```
USEDEDICATEDCOORDINATIONTHREAD
MAP u1.t1, TARGET u2.t1 SQLEXEC &
(ID test2, QUERY 'delete from u2.t2 where col_val =100 ',  &
NOPARAMS)), THREAD(1), COORDINATED;
```

3.199 USEIPV4

Valid For

GLOBALS

Description

Use the `USEIPV4` parameter to force the use of Internet Protocol version 4 (IPv4) by Oracle GoldenGate for TCP/IP connections. By default, Oracle GoldenGate uses IPv6 in dual-stack mode and this parameter forces the use of IPv4 only.

When `USEIPV4` is used, the entire network in which Oracle GoldenGate operates must be IPv4 compatible.

Default

Disabled

Syntax

```
USEIPV4
```

3.200 USEIPV6

Valid For

GLOBALS

Description

Use the `USEIPV6` parameter to force the use of Internet Protocol version 6 (IPv6) by Oracle GoldenGate for TCP/IP connections. By default, Oracle GoldenGate uses IPv6 in dual-stack mode but falls back to IPv4, and only then to IPv6. `USEIPV6` eliminates the IPv4 fallback step. The order of socket selection becomes:

- IPv6 dual-stack
- IPv6

When `USEIPV6` is used, the entire network in which Oracle GoldenGate operates must be IPv6 compatible.

Default

Disabled

Syntax

```
USEIPV6
```

3.201 USERID | NOUSERID

Valid For

Manager, Extract, Replicat, DEFGEN

Supported for

DB2 for i

DB2 LUW

DB2 on z/OS

Oracle

MySQL

SQL/MX

SQL Server

Sybase

Teradata

TimesTen

Description

Use the `USERID` parameter to specify the type of authentication for an Oracle GoldenGate process to use when logging into a database, and to specify password encryption information. This parameter can be used instead of `USERIDALIAS` when an Oracle GoldenGate credential store is not being used.00

Always use `USERID` or `USERIDALIAS` for a primary Extract and for Replicat. Always use `USERID` or `USERIDALIAS` for Replicat. Use `USERID` or `USERIDALIAS` for Manager only if using parameters that require Manager to log into the source or target database.

USERID Compared to USERIDALIAS

`USERID` requires either specifying the clear-text password in the parameter file or encrypting it with the `ENCRYPT PASSWORD` command and, optionally, storing an encryption key in an `ENCKEYS` file. `USERID` supports a broad range of the databases that Oracle GoldenGate supports.

`USERIDALIAS` enables you to specify an alias, rather than a user ID and password, in the parameter file. The user IDs and encrypted passwords are stored in a credential store. `USERIDALIAS` supports databases running on Linux, UNIX, and Windows platforms.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about Oracle GoldenGate security features.

General Requirements for USERID

Specify `USERID` before any `TABLE` or `MAP` entries in an Extract or Replicat parameter file. Specify `USERID` in a Manager parameter file if Manager must access the database and a login is required.

`USERID` is not always required, nor is `PASSWORD` always required when `USERID` is required. In some cases, it is sufficient just to use `USERID` or even just to use the `SOURCEDB` or `TARGETDB` parameter, depending on how authentication for the database is configured.

See "SOURCEDB" and "TARGETDB" for more information.

> **Note:**
>
> The privileges that are required for the `USERID` user vary by database. See the appropriate Oracle GoldenGate installation guide for your database to determine the privileges that are required for the Oracle GoldenGate database users.

USERID Requirements Per Database Type

The usage of `USERID` varies depending on the database type.

DB2 for i

Use USERID with PASSWORD to specify the name and password of the user profile assigned to the Oracle GoldenGate process. Use SOURCEDB or TARGETDB with USERID to specify the default DB2 for i database that is identified by the system name (in upper case). See *Installing and Configuring Oracle GoldenGate for DB2 for i* for more information.

DB2 for LUW

Use USERID with PASSWORD and preceded by SOURCEDB or TARGETDB for all Oracle GoldenGate processes that connect to a DB2 LUW database using database authentication. You can omit USERID and PASSWORD (and only use SOURCEDB or TARGETDB) if the database is configured allow authentication at the operating-system level.

DB2 for z/OS database

Use USERID with PASSWORD if the user that is assigned to the Oracle GoldenGate process does not have the DB2 privileges that are required for the process to function properly.

MySQL

Use USERID with PASSWORD for all Oracle GoldenGate processes that connect to a MySQL database.

Oracle

Use USERID for Oracle GoldenGate processes that connect to an Oracle database as follows:

- To use an operating system login, use USERID with the / argument.
- To use a database user name and password, use USERID with PASSWORD.
- Optionally, you can specify the user to log in as sysdba.
- (*Oracle Enterprise Edition earlier than 11.2.0.2*) Special database privileges are required for the USERID user when Extract is configured to use LOGRETENTION. These privileges might have been granted when Oracle GoldenGate was installed. See the *Installing and Configuring Oracle GoldenGate for Oracle Database* for more information about LOGRETENTION.
- (*Oracle Standard or Enterprise Edition 11.2.0.2 or later*) To use USERID for an Extract group that is configured for integrated capture, the user must have the privileges granted in the dbms_goldengate_auth.grant_admin_privilege procedure, and the user must be the same one that issues DBLOGIN and REGISTER EXTRACT or UNREGISTER EXTRACT for the Extract group that is associated with this USERID.
- To support capture from an Oracle container database, the user that is specified with USERID must log into the root container and must be a common user. A connect string must be supplied for this user and must include the required C## prefix of the common user, such as C##GGADMIN@FINANCE. For more information, see *Installing and Configuring Oracle GoldenGate for Oracle Database*.

Use NOUSERID to allow Integrated Extract to run without a connection for fetching or metadata lookups, or any data dictionary calls. Essentially eliminating the need to connect to the source database at all. The NOUSERID option requires an Integrated Dictionary. We should also include that when NOUSERID is used, if the customer has an Active Data Guard Standby, they can set up fetching from that Standby database using the FETCHUSERID parameter. The two can be used in conjunction with NOUSERID. In the event where you are using downstream integrated extract (same caveats below) you can use FETCHUSERID to fetch from the ADG Standby database and NOUSERID to prevent the Extract from making a connection to the source database. This way, if Extract does need to fetch, it can do so.

SQL/MX

- For Oracle GoldenGate processes that connect to a source SQL/MX database, use the `SOURCEDB` or `TARGETDB` parameter to specify the catalog name, and in the same parameter statement use `USERID` without `PASSWORD` to specify the default schema.
- For Oracle GoldenGate processes that connect to a target SQL/MX database, use the `TARGETDB` parameter to specify the target ODBC data source, and in the same parameter statement use `USERID` with `PASSWORD`. Replicat uses ODBC/MX to connect to the SQL/MX database.

SQL Server

Use `USERID` with `PASSWORD` if the ODBC data source connection that will be used by the Oracle GoldenGate process is configured to supply database authentication. `USERID` can be a specific login that is assigned to the process or any member of an account in the `System Administrators` or `Server Administrators` fixed server role.

- On a source SQL Server system, also use the `SOURCEDB` parameter to specify the source ODBC data source.
- On a target SQL Server system, also use the `TARGETDB` parameter to specify the target ODBC data source.

Sybase

Use `USERID` and `PASSWORD` for Oracle GoldenGate processes that connect to a Sybase database.

Teradata

Use `USERID` with `PASSWORD` for Oracle GoldenGate processes that connect to a Teradata database.

- On a source Teradata system, also use the `SOURCEDB` parameter to specify the source ODBC data source.
- On a target Teradata system, also use the `TARGETDB` parameter to specify the target ODBC data source.

TimesTen

Use `USERID` with `PASSWORD` if the ODBC data source connection that will be used by Replicat is configured to supply database authentication. Also use the `TARGETDB` parameter to specify the target ODBC data source.

Default

None

Syntax

```
USERID {/ | user}[, PASSWORD password]
[algorithm ENCRYPTKEY {key_name | DEFAULT}] [SYSDBA]
[, THREADS (threadID[, threadID][, ...][, thread_range[, thread_range][, ...])]
```

`/`
Directs Oracle GoldenGate to use an operating-system login for Oracle, not a database user login. Use this argument only if the database allows authentication at the operating-system level. Bypassing database-level authentication eliminates the need to update Oracle GoldenGate parameter files if application passwords frequently change. To use this option, the correct user name must exist in the database, in relation to the value of the Oracle `OS_AUTHENT_PREFIX` initialization parameter, as follows:

- The value set with `OS_AUTHENT_PREFIX` is concatenated to the beginning of a user's operating system account name and then compared to the database name. Those two names must match.
- If `OS_AUTHENT_PREFIX` is set to `' '` (a null string), the user name must be created with `IDENTIFIED EXTERNALLY`. For example, if the OS user name is `ogg`, you would use the following to create the database user:

  ```
  CREATE USER ogg IDENTIFIED EXTERNALLY;
  ```

- If `OS_AUTHENT_PREFIX` is set to `OPS$` or another string, the user name must be created in the following format:

  ```
  OS_AUTHENT_PREFIX_value OS_user_name
  ```

  For example, if the OS user name is `ogg`, you would use the following to create the database user:

  ```
  CREATE USER ops$ogg IDENTIFIED BY oggpassword;
  ```

`user`
Specifies the name of a database user or a schema, depending on the database configuration. For Oracle, a SQL*Net connect string can be used. Refer to USERID Requirements Per Database Type for additional guidelines.

`password`
Use when database authentication is required to specify the password for the database user. If the password was encrypted by means of the `ENCRYPT PASSWORD` command, supply the encrypted password; otherwise, use the clear-text password. If the password is case-sensitive, type it that way.
If either the user ID or password changes, the change must be made in the Oracle GoldenGate parameter files, including the re-encryption of the password if necessary.

`algorithm`
Specifies the encryption algorithm that was used to encrypt the password with `ENCRYPT PASSWORD`.
Password encryption is *only* supported for SQL/MX using a `BLOWFISH` algorithm.
The algorithm can be one of:
`AES128`
`AES192`
`AES256`
`BLOWFISH`

`ENCRYPTKEY {`*`key_name`*` | DEFAULT}`
Specifies the encryption key that was specified with `ENCRYPT PASSWORD`.

- `ENCRYPTKEY` *`key_name`* specifies the logical name of a user-created encryption key in the `ENCKEYS` lookup file. Use if `ENCRYPT PASSWORD` was used with the *`KEYNAME`* *`key_name`* option.
- `ENCRYPTKEY DEFAULT` directs Oracle GoldenGate to use a random key. Use if `ENCRYPT PASSWORD` was used with the `KEYNAME DEFAULT` option.

`SYSDBA`
(Oracle) Specifies that the user logs in as `sysdba`.

`THREADS (`*`threadID`*`[, `*`threadID`*`][, ...][, `*`thread_range`*`[, `*`thread_range`*`][, ...])`
Valid for Replicat. Links the specified credential to one or more threads of a coordinated Replicat. Enables you to specify different logins for different threads.

> ***`threadID`*`[, `*`threadID`*`][, ...]`**
> Specifies a thread ID or a comma-delimited list of threads in the format of `threadID, threadID, threadID`.
>
> **`[, `*`thread_range`*`[, `*`thread_range`*`][, ...]`**
> Specifies a range of threads in the form of `threadIDlow-threadIDhigh` or a comma-delimted list of ranges in the format of `threadIDlow-threadIDhigh`, `threadIDlow-threadIDhigh`.

A combination of these formats is permitted, such as threadID, threadID, `threadIDlow-threadIDhigh`.

Examples

Example 1

```
USERID /
```

Example 2

```
USERID ogg
```

Example 3

```
USERID ogg@ora1.ora, &
PASSWORD AACAAAAAAAAAAAJAUEUGODSCVGJEEIUGKJDJTFNDKEJFFFTC AES128, &
ENCRYPTKEY securekey1
```

Example 4

```
USERID ogg, PASSWORD AACAAAAAAAAAAAJAUEUGODSCVGJEEIUGKJDJTFNDKEJFFFTC &
AES128, ENCRYPTKEY securekey1
```

Example 5

```
USERID ogg, PASSWORD AACAAAAAAAAAAAJAUEUGODSCVGJEEIUGKJDJTFNDKEJFFFTC &
BLOWFISH, ENCRYPTKEY DEFAULT
```

Example 6

```
USERID ogg, &
PASSWORD AACAAAAAAAAAAAJAUEUGODSCVGJEEIUGKJDJTFNDKEJFFFTC AES128, &
ENCRYPTKEY securekey1 SYSDBA
```

3.202 USERIDALIAS

Valid For

Manager, Extract, Replicat, DEFGEN

Supported for

DB2 for i

DB2 LUW

DB2 on z/OS

Informix

MySQL

Oracle

SQL/MX

SQL Server

Sybase

Teradata

TimesTen

Description

Use the `USERIDALIAS` parameter to specify authentication for an Oracle GoldenGate process to use when logging into a database. The use of `USERIDALIAS` requires the use of an Oracle GoldenGate credential store. Specify `USERIDALIAS` before any `TABLE` or `MAP` entries in the parameter file.

Note:

The privileges that are required for the `USERIDALIAS` user vary by database. See the appropriate Oracle GoldenGate installation guide for your database to determine the privileges that are required for the Oracle GoldenGate database users.

USERIDALIAS Compared to USERID

`USERIDALIAS` enables you to specify an alias, rather than a user ID and password, in the parameter file. The user IDs and encrypted passwords are stored in a credential store. `USERIDALIAS` supports databases running on Linux, UNIX, and Windows platforms.

`USERID` requires either specifying the clear-text password in the parameter file or encrypting it with the `ENCRYPT PASSWORD` command and, optionally, storing an encryption key in an `ENCKEYS` file. `USERID` supports a broad range of the databases that Oracle GoldenGate supports. In addition, it supports the use of an operating system login for Oracle databases.

See *Administering Oracle GoldenGate for Windows and UNIX* for more information about these parameters and Oracle GoldenGate security features.

USERIDALIAS Requirements Per Database Type

The usage of `USERIDALIAS` varies depending on the database type.

> **Note:**
>
> Logins that require a database user and password must be stored in the Oracle GoldenGate credential store. See *Administering Oracle GoldenGate for Windows and UNIX* for more information about the credential store.

DB2 for LUW

Use `USERIDALIAS` with the `SOURCEDB` or `TARGETDB` parameter for all Oracle GoldenGate processes that connect to a DB2 LUW database using database authentication. You can omit `USERIDALIAS` and only use `SOURCEDB` or `TARGETDB` if the database is configured allow authentication at the operating-system level. See "SOURCEDB" and "TARGETDB" for more information.

MySQL

Use `USERIDALIAS` for all Oracle GoldenGate processes that connect to a MySQL database. The `SOURCEDB` or `TARGETDB` parameter is not required.

Oracle

Use `USERIDALIAS` for Oracle GoldenGate processes that connect to an Oracle database.

- The `SOURCEDB` or `TARGETDB` parameter is not required.
- Specify the alias of a database credential that is stored in the Oracle GoldenGate credential store.
- (*Oracle Enterprise Edition earlier than 11.2.0.2*) Special database privileges are required for the `USERIDALIAS` user when Extract is configured to use `LOGRETENTION`. These privileges might have been granted when Oracle GoldenGate was installed. See the Installing and Configuring Oracle GoldenGate for Oracle Database for more information about `LOGRETENTION`.
- (*Oracle Standard or Enterprise Edition 11.2.0.2 or later*) To use `USERIDALIAS` for an Extract group that is configured for integrated capture, the user must have the privileges granted in the `dbms_goldengate_auth.grant_admin_privilege` procedure, and the user must be the same one that issues `DBLOGIN` and `REGISTER EXTRACT` or `UNREGISTER EXTRACT` for the Extract group that is associated with this `USERIDALIAS`.
- To support capture from an Oracle container database, the user that is specified with `USERID` must log on to the root container and must be a common database user. A connect string must be supplied for this user, for example: `C##GGADM@FINANCE`. For more information, see Installing and Configuring Oracle GoldenGate for Oracle Database.

SQL Server

Use `USERIDALIAS` if the ODBC data source connection that will be used by the Oracle GoldenGate process is configured to supply database authentication. `USERIDALIAS` can be a specific login that is assigned to the process or any member of an account in the `System Administrators` or `Server Administrators` fixed server role.

- On a source SQL Server system, also use the `SOURCEDB` parameter to specify the source ODBC data source.
- On a target SQL Server system, also use the `TARGETDB` parameter to specify the target ODBC data source.

Sybase

Use `USERIDALIAS` for Oracle GoldenGate processes that connect to a Sybase database.

Teradata

Use `USERIDALIAS` for Oracle GoldenGate processes that connect to a Teradata database.

- On a source Teradata system, also use the `SOURCEDB` parameter to specify the source ODBC data source.
- On a target Teradata system, also use the `TARGETDB` parameter to specify the target ODBC data source.

TimesTen

Use `USERIDALIAS` if the ODBC data source connection that will be used by Replicat is configured to supply database authentication. Also use the `TARGETDB` parameter to specify the target ODBC data source.

Default

None

Syntax

```
USERIDALIAS alias [DOMAIN domain] [SYSDBA]
[, THREADS (threadID[, threadID][, ...][, thread_range[, thread_range][, ...])]
```

`alias`
Specifies the alias of a database user credential that is stored in the Oracle GoldenGate credential store. Refer to USERID Requirements Per Database Type for additional guidelines.

`DOMAIN` ***`domain`***
Specifies the credential store domain for the specified alias. A valid domain entry must exist in the credential store for the specified alias.

`SYSDBA`
(Oracle) Specifies that the user logs in as `sysdba`.

`THREADS (`*`threadID`*`[, `*`threadID`*`][, ...][, `*`thread_range`*`[, `*`thread_range`*`][, ...])`
Valid for Replicat. Links the specified credential to one or more threads of a coordinated Replicat. Enables you to specify different logins for different threads.

`threadID``[, `***`threadID`***`][, ...]`
Specifies a thread ID or a comma-delimited list of threads in the format of `threadID, threadID, threadID`.

`[, `***`thread_range`***`[, `***`thread_range`***`][, ...]`
Specifies a range of threads in the form of `threadIDlow-threadIDhigh` or a comma-delimted list of ranges in the format of `threadIDlow-threadIDhigh`, `threadIDlow-threadIDhigh`.

A combination of these formats is permitted, such as threadID, threadID, `threadIDlow-threadIDhigh`.

Examples

Example 1
The following supplies a credential for the user in the credential store that has the alias of `tiger1` in the domain of `east`.

Example 2
The following supplies a credential for thread 3 of a coordinated Replicat.

```
USERIDALIAS tiger1 DOMAIN east THREADS (3)
```

3.203 VAM

Valid For

Extract

Description

Use the `VAM` parameter to specify that a Vendor Access Module (VAM) is being used to perform data capture functions for the Extract process and send it to the Extract API. This parameter supplies required input for the VAM API.

Default

None

Syntax

```
VAM library, PARAMS ('param' [, 'param'] [, ...])
```

`library`
The name of the library that is supplied by the database vendor as a Windows DLL or a UNIX shared object. Use the full path name if the library is in a directory other than the Oracle GoldenGate directory.

> **Note:**
>
> Teradata calls this library the *Teradata Access Module (TAM)*. This program or library communicates with the Oracle GoldenGate VAM API.

PARAMS ***'param'***
Any parameter, enclosed within single quotes, that is passed to the Oracle GoldenGate API. See the following database-specific parameter options.

ARLIBError ***error, action***
Valid for SQL/MX.
Specifies how TMFARLIB errors are handled by the VAM.

- *error* is an ARLIB error number.
- *action* can be ABEND | WARN | IGNORE.

The default is ABEND. Errors -1000 and -2000 will always result in ABEND, regardless of any other action that is specified.
Examples:

```
Vam Params (arliberror (-16,-14), Warn)
Vam Params (arliberror -2000, Abend)
Vam Params (arliberror -1000, Abend)
```

ARErrorReportInterval ***seconds***
Valid for SQL/MX.
Sets the interval, in seconds, in which the same TMFARLIB error is reported back to Extract. This reduces the amount of messages for each type of error that accumulate. *seconds* must be greater than, or equal to, zero. The default is 60 seconds.

inifile, ***ini_file*****, callbackLib, extract.exe**
Required parameter for Teradata.

- inifile indicates that the next parameter specifies the TAM initialization file.
- *ini_file* is the name of the TAM initialization file. Unless the file resides in the same directory where the Extract program is installed, specify the fully qualified path name.
- callbackLib indicates that the next parameter specifies the program that interfaces with the TAM. This parameter is case-sensitive and must be entered exactly as shown here.
- extract.exe is the Extract program, which is the callback program for the TAM.

CDCRECORDSFETCHCOUNT, CDCSESSIONTIMEOUT, CDCRECORDQUEUESIZE
Valid for Informix.

- CDCRECORDSFETCHCOUNT specifies the number of CDC records to be fetched in one call. For example, the CDC record batch size. The default number of records is 10. When there are not 10 records to fetch from transaction log the CDC API fetches old records, which causes duplication that may lead to either an Extract or Replicat abend. Also, it is possible that the Extract statistics may show incorrect output. To avoid this condition, use VAM PARAMS (CDCRECORDSFETCHCOUNT default 10 in the Extract parameter file.
- CDCSESSIONTIMEOUT specifies the CDC session timeout in seconds. The default is 2 seconds.

- `CDCRECORDQUEUESIZE` specifies the queue size used to store the transaction log records. The default is 256 records.

In a distributed environment with a very high number of transactions, you should configure these VAM parameters for optimum memory performance. For example, with 800+ tables the Extract memory consumption with the VAM parameters set to `CDCRECORDFETCHCOUNT 32` and `CDCRECORDQUEUESIZE 5120`) is 760 MB. Alternatively, with the same number tables and these parameters set to `CDCRECORDFETCHCOUNT 32` and `CDCRECORDQUEUESIZE 1024` the memory consumption is 300 MB. Configuring these parameters are trade off between Extract memory consumption and Extract performance rate.

`LOGICALLOGWARNINGTHRESHOLD`
Valid for Informix.
The input is the usage threshold given by percentage (%) of the current logical log file used by the Informix Dynamic Server. The default value is `50`, so 50%. If Oracle GoldenGate capture is positioned at the oldest logical log file and the current logical log file usage exceeds this specified threshold, then a warning message is written to the report file.

`SCANLOGPRIORITY`
By default, the priority of reader thread is not set. It runs in medium priority, which is the default for any connection, but you can reset the priority to `HIGH=1`, Medium=2 and Low=3. If this has to be set then the login user, which is used in the capture process should have SA privileges.

`SCANLOGPOLLMODE`
By default the capture process runs in flush mode. It can run with poll mode to poll and get the record instead of waiting.

`SCANLOGTIMEOUT`
It is used to timeout when the capture process is reading the transaction log record. If it does not find any record then it times out and wakes up once its given duration is over, to rescan and get the record from transaction log. By default, it is not enabled. It can be set to 5 sec or higher. However, if higher values are set then it may impact the performance.

Examples

```
VAM tam.dll, PARAMS (inifile, tam.ini, callbackLib, extract.exe)
VAM PARAMS(CDCRECORDSFETCHCOUNT 5)
VAM PARAMS(CDCRECORDSFETCHCOUNT 5 CDCSESSIONTIMEOUT 5)
VAM PARAMS (CDCRECORDQUEUESIZE 512)
VAM PARAMS (LOGICALLOGWARNINGTHRESHOLD 65)
VAM PARAMS (SCANLOGPRIORITY 1)
VAM PARAMS (SCANLOGPOLLMODE)
VAM PARAMS (SCANLOGTIMEOUT 5)
```

3.204 VARWIDTHNCHAR | NOVARWIDTHNCHAR

Valid For

Extract, Replicat, DEFGEN for Oracle

Description

Use the `VARWIDTHNCHAR` and `NOVARWIDTHNCHAR` parameters to control how `NCHAR` data is written to the trail and interpreted by Replicat.

- `VARWIDTHNCHAR` causes an `NCHAR`, `NVARCHAR2`, or `NCLOB` character set to be treated as a variable-length character set (UTF-8).
- `NOVARWIDTHNCHAR` causes an `NCHAR`, `NVARCHAR2`, or `NCLOB` character set to be treated as UTF-16.
- If neither option is specified, the `NLS_NCHAR_CHARACTERSET` property value from the database is used to determine how an `NCHAR`, `NVARCHAR2`, or `NCLOB` character set is treated.

Default

Use `NLS_NCHAR_CHARACTERSET` property from database

Syntax

```
VARWIDTHNCHAR | NOVARWIDTHNCHAR
```

3.205 VERIDATAREPORTAGE

Valid For

Manager

Description

Use the `VERIDATAREPORTAGE` parameter to purge old Veridata (`veriagt`)report files when they have reached the age limit.

Default

```
7 DAYS
```

Syntax

`VERIDATAREPORTAGE` *`number`* `[`*`time units`*`]`

`number`
A positive integer.

`time units`

```
DAYS|DAY|HOURS|HOUR|HRS|MINUTES|MINUTE|MIN|SECONDS|SECOND|SEC
```

Example

```
VERIDATAREPORTAGE 5 HOURS
```

3.206 WALLETLOCATION

Valid For

GLOBALS

Description

Use the `WALLETLOCATION` parameter to specify the location of the Oracle GoldenGate master-key wallet.

Default

The `dirwlt` subdirectory of the Oracle GoldenGate installation directory.

Syntax

```
WALLETLOCATION directory_path
```

`directory_path`
Specifies the full path name of the wallet location.

Example

```
WALLETLOCATION /home/ggadmin/walletdir
```

3.207 WARNLONGTRANS

Valid For

Extract

Description

Use the `WARNLONGTRANS` parameter to specify a length of time that a transaction can be open before Extract generates a warning message that the transaction is long-running. Also use `WARNLONGTRANS` to control the frequency with which Oracle GoldenGate checks for long-running transactions.

This parameter is valid for Oracle, SQL/MX, SQL Server, and Sybase.

When `WARNLONGTRANS` is specified, Oracle GoldenGate checks for transactions that satisfy the specified threshold, and it reports the first one that it finds to the Oracle GoldenGate error log, the Extract report file, and the system log. By default, Oracle GoldenGate repeats this check every five minutes.

To view a list of open transactions on demand, to output transaction details to a file, or to either cancel those transactions or force them to the trail, use the options of the `SEND EXTRACT` command. See "SEND EXTRACT" for more information.

Default

One hour (and check every five minutes using a separate processing thread)

Syntax

```
WARNLONGTRANS duration
[, CHECKINTERVAL interval]
[, NOUSETHREADS]
[, USELASTREADTIME]
```

duration
Sets a length of time after which an open transaction is considered to be long-running. The duration is specified as a whole number, followed by the unit of time in any of the following formats to indicate seconds, minutes, or hours. Do not put a space between the numeric value and the unit of time. The unit is not case-sensitive. The default is one hour.

```
S|SEC|SECS|SECOND|SECONDS
M|MIN|MINS|MINUTE|MINUTES
H|HOUR|HOURS
D|DAY|DAYS
```

The following are examples of valid durations:

```
WARNLONGTRANS 2HOUR
WARNLONGTRANS 2hours
WARNLONGTRANS 1DAY
WARNLONGTRANS 600sec
WARNLONGTRANS 40s
```

CHECKINTERVAL *interval*
Sets the frequency at which Oracle GoldenGate checks for transactions that satisfy WARNLONGTRANS and reports the longest running one. The interval is specified as a whole number, followed by the unit of time in any of the following formats to indicate seconds, minutes, or hours. Do not put a space between the numeric value and the unit of time. The unit is not case-sensitive. The default is five minutes, which is also the minimum valid value. The minimum value is 300 and the maximum is 20000000.

```
S|SEC|SECS|SECOND|SECONDS
M|MIN|MINS|MINUTE|MINUTES
H|HOUR|HOURS
D|DAY|DAYS
```

The following are examples of valid interval specifications:

```
CHECKINTERVAL 2h
CHECKINTERVAL 2HOURS
CHECKINTERVAL 1day
CHECKINTERVAL 600SEC
CHECKINTERVAL 2m
```

NOUSETHREADS
Valid for Oracle.
Specifies that the monitoring will be done by the main process thread. By default, it is done with a separate thread for performance reasons. NOUSETHREADS should only be used if the system does not support multi-threading.

USELASTREADTIME
Valid for Oracle.
Forces Extract to always use the time that it last read the Oracle redo log to determine whether a transaction is long-running or not. By default, Extract uses the timestamp of the last record that it read from the redo log. This applies to an Extract that is running in archive log only mode, as configured with TRANLOGOPTIONS using the ARCHIVEDLOGONLY option.

Example

```
WARNLONGTRANS 2h, CHECKINTERVAL 3m, NOUSETHREADS
```

3.208 WARNRATE

Valid For

Replicat

Description

Use the `WARNRATE` parameter to set a threshold for the number of SQL errors that can be tolerated on any target table before being reported to the process report and to the error log. The errors are reported as a warning. If your environment can tolerate a large number of these errors, increasing `WARNRATE` helps to minimize the size of those files.

When setting `WARNRATE` for a coordinated Replicat, take into account that the specified `WARNRATE` threshold is applied to each thread in the configuration, not as an aggregate threshold for Replicat as a whole. For example, if `WARNRATE 100` is specified, it is possible for each thread to return 99 errors without a warning from Replicat.

For Replicat running in an Oracle environment, this parameter is valid for nonintegrated mode only.

Default

100 errors

Syntax

```
WARNRATE number_of_errors
```

`number_of_errors`
The number of SQL errors after which a warning is issued.

Example

```
WARNRATE 1000
```

3.209 WILDCARDRESOLVE

Valid For

Extract and Replicat

Description

Use the `WILDCARDRESOLVE` parameter to alter the rules for processing wildcarded table specifications in a `TABLE`, `SEQUENCE`, or `MAP` statement. `WILDCARDRESOLVE` must precede the associated `TABLE`, `SEQUENCE`, or `MAP` statements in the parameter file.

The target objects must already exist in the target database when wildcard resolution is attempted. If a target object does not exist, Replicat abends.

Default

```
DYNAMIC
```

Syntax

```
WILDCARDRESOLVE {DYNAMIC | IMMEDIATE}
```

`DYNAMIC`
Source objects that satisfy the wildcard definition are resolved each time the wildcard rule is satisfied. The newly resolved object is included in the Oracle GoldenGate configuration upon resolution. This is the default. This is the required setting for Teradata.
Do not use this option when `SOURCEISTABLE` or `GENLOADFILES` is specified. `WILDCARDRESOLVE` will always be implicitly set to `IMMEDIATE` for these parameters.
`DYNAMIC` must be used when using wildcards to replicate Oracle sequences with the `SEQUENCE` parameter.
To keep the default of `DYNAMIC`, an explicit `WILDCARDRESOLVE` parameter is optional, but its presence helps make it clear to someone who is reviewing the parameter file which method is being used.

`IMMEDIATE`
Source objects that satisfy the wildcard definition are processed at startup. This option is not supported for Teradata. This is the forced default for `SOURCEISTABLE`.
This option does not support the Oracle interval partitioning feature. Dynamic resolution is required so that new partitions are found by Oracle GoldenGate.

Example

The following example resolves wildcards at startup.

```
WILDCARDRESOLVE IMMEDIATE
TABLE hq.acct_*;
```

3.210 XAGENABLE

Valid For

GLOBALS

Description

Use `XAGENABLE` to enable the Oracle GoldenGate Transparent Integration with Clusterware feature that allows you to continue using GGSCI to start and stop manager when GoldenGate instance is under the management of Oracle Grid Infrastructure Bundled Agents (XAG). You must set one of the following environment variables when using `XAGENABLE`:

```
CRS_HOME
ORA_CRS_HOME
GRID_HOME
```

You can use `INFO ALL` to view XAG related information.

Default

Disabled.

Syntax

```
XAGENABLE
```

3.211 Y2KCENTURYADJUSTMENT | NOY2KCENTURYADJUSTMENT

Valid For

Extract and Replicat

Description

Use the `Y2KCENTURYADJUSTMENT` and `NOY2KCENTURYADJUSTMENT` parameters to control the conversion of year values when the century portion consists of zeroes (such as 0055) or is not specified (such as in a two-digit, year-only specification).

With `Y2KCENTURYADJUSTMENT` enabled (the default), a two-digit year value that is greater than or equal to 50 is converted to a four-digit year in the 20th century (19xx). If a two-digit year value is less than 50, it is converted to a four-digit year in the 21st century (20xx).If the century portion of the year is non-zero, or if `NOY2KCENTURYADJUSTMENT` is specified, no conversion is performed.

Default

```
Y2KCENTURYADJUSTMENT
```

Syntax

```
Y2KCENTURYADJUSTMENT | NOY2KCENTURYADJUSTMENT
```

4 Collector Parameters

This chapter describes the parameters for the Collector process and includes the following topics:

- "Overview of the Collector Process"
- "Summary of Collector Parameters"

The Collector process operates on the target system to receive incoming data and write it to the trail. For more information about Collector, see *Administering Oracle GoldenGate for Windows and UNIX*.

4.1 Overview of the Collector Process

Typically, Oracle GoldenGate users do not interact with the Collector process. This is known as a *dynamic collector*. It is started dynamically by the Manager process, but parameters may be sent to Collector as options of certain Extract or Replicat parameters.

As an alternative to allowing Manager to run Collector, you can run a *static* Collector manually by running the `SERVER` program at the command line with the following syntax and input parameters as shown:

```
server parameter [parameter] [...]
```

Collector parameters are case-sensitive and must be preceded by a dash. For example, `-e` and `-E` are two different parameters, with entirely different results.

4.2 Summary of Collector Parameters

The following is a summary of available Collector parameters.

Table 4-1 Collector Parameters

Parameter	Description
-B	Directs the Collector to buffer files.
-b	Specifies the default the file buffer size.
-cp	Specifies the name of the checkpoint file that Collector maintains for an alias Extract group.
-d	Specifies the name of a local definitions file that was generated by the DEFGEN utility.
-E	Converts incoming header and data to EBCDIC format from ASCII.
-e	Directs Collector to respond to specific formatting error conditions in custom ways.

Table 4-1 (Cont.) Collector Parameters

Parameter	Description
-ENCRYPT	Specifies the type of encryption being passed from the Extract process, as specified with the `RMTHOST` parameter in the Extract parameter file.
-f	Forces all file writes to be flushed to disk before returning a success status to the Extract process.
-g	Supports files that are larger than 2GB (Solaris only).
-h	Specifies the name or IP address of the source system.
-k	Directs Collector to terminate when the Extract process that it is serving disconnects.
-KEYNAME	Specifies the name of a key that is defined in the local `ENCKEYS` lookup file.
-l	Logs output to the specified file.
-m	Specifies the Manager port
-P	Specifies a local file that contains Collector parameters.
-p	Specifies a TCP/IP port number.
-R	Replaces invalid numeric ASCII data with an alternate value.
-x	Specifies a discard file to store records that could not be processed by Oracle GoldenGate.

4.3 -B

Specifies the default file buffer size.

Syntax

```
-Bsize
```

There is no space between `-B` and the *`size`* value.

If *`size`* is not specified, then the default size is your C library default file buffer size (`BUFSIZ`). The minimum value is 16384 (16K) and the max is 16777216 (16MB).

Example

```
-B16384
```

4.4 -b

Specifies the default file buffer size.

Syntax:

```
-B size
```

If *`size`* is not specified, then the default size is your C library default file buffer size (`BUFSIZ`). The minimum value is 16 KB and the maximum is 16 MB; zero (0) indicates unbuffered.

4.5 -cp

Specifies the name of the checkpoint file that Collector maintains for an alias Extract group. The checkpoint file is used to determine whether the passive Extract is running or not. It is running when the checkpoint file is locked by Collector (shown as the `server` program in the Oracle GoldenGate installation directory).

`-cp` must be used with the `-h` and `-p` parameters.

For more information about using passive and alias Extract groups, see *Administering Oracle GoldenGate for Windows and UNIX*.

Syntax

```
-cp checkpoint_file
```

`cp`
Must be lower case.

`checkpoint_file`
The name of the file to which the passive Extract group writes its checkpoints. The name of the passive Extract group and the name of the checkpoint file are identical.

4.6 -d

Specifies the name of a local definitions file that was generated by the `DEFGEN` utility. The file contains the definitions of tables that reside on a remote system. For more information about definitions files, see *Administering Oracle GoldenGate for Windows and UNIX*.

Syntax

```
-d definitions_file
```

`d`
Must be lower case.

`definitions_file`
The name of the definitions file, exactly as specified when DEFGEN was run.

4.7 -E

Converts incoming header and data to EBCDIC format from ASCII. By default, Oracle GoldenGate does not convert the data.

Syntax

```
-E
```

`E`
Must be upper case.

4.8 -e

Directs Collector to respond to specific formatting error conditions in custom ways. Default values are almost always sufficient. To specify more than one error type, use `-e` multiple times. For example:

```
-e OLD CONTINUE -e NEW DISCARD.
```

Syntax

```
-e type action
```

`e`
Must be lower case.

`type`
Specifies the type of error that generates the response and can be one of the following:

> **`NEW`**
> Checks for records that contain more data than anticipated (more columns than the current definition). The Collector process may need an updated version of the source table (that is, DEFGEN must be run again). The default action is `ABEND`.
>
> **`OLD`**
> Checks for records that contain less data than anticipated. This usually indicates that a record has fewer columns than the table's current definition, which is considered a normal condition. The default action is `CONTINUE`.
>
> **`OUTOFSYNC`**
> Checks for records that cannot be converted according to the definition provided. The default action is `ABEND`.

`action`
Specifies the response to the error and can be one of the following:

> **`ABEND`**
> Discards the record and directs the Extract process to end immediately.
>
> **`CONTINUE`**
> Processes the record (if possible) regardless of the conversion error encountered.
>
> **`DISCARD`**
> Outputs the record to a discard file (if one is specified with `-x`). Collector sends a warning to the error file for the first discarded record and continues to process records.

4.9 -ENCRYPT

Specifies the type of encryption being passed from the Extract process, as specified with the `RMTHOST` parameter in the Extract parameter file. For more information about Oracle GoldenGate security, see *Administering Oracle GoldenGate for Windows and UNIX*.

Syntax

```
-ENCRYPT {NONE | BLOWFISH}
```

`ENCRYPT`
Must be upper case.

`NONE`
Specifies that the data will not be encrypted.

`BLOWFISH`
Specifies `BLOWFISH` encryption. If using `BLOWFISH`, also specify the `-KEYNAME` option.

4.10 -f

Forces all file writes to be flushed to disk before returning a success status to the Extract process. By default, the file system buffers the I/O because it is more efficient than flushing to disk with every operation. Generally, the performance benefits outweigh the small risk that data could be lost if the system fails after an I/O is confirmed successful, but before the buffer actually is flushed to disk. Use `-f` if this risk is unacceptable, with the understanding that it can compromise the performance of Oracle GoldenGate

Syntax

```
-f
```

`f`
Must be lower case.

4.11 -g

Supports files that are larger than 2GB (Solaris only).

Syntax

```
-g
```

`g`
Must be lower case.

4.12 -h

Specifies the name or IP address of the source system. Use this option when using an alias Extract on the target that is associated with an Extract running in `PASSIVE` mode on the source. It causes Collector to operate in connection mode. In this mode, it initiates a TCP/IP connection to the source Extract, instead of waiting for a connection request from Extract. Must be used with the `-p` Collector option. For more information about `PASSIVE` mode and Oracle GoldenGate security, see *Administering Oracle GoldenGate for Windows and UNIX*.

Syntax

```
-h {host_name | IP_address}
```

h
Must be lower case.

host_name
Specifies the source system by its DNS host name.

IP_address
Specifies the source system by its IP address.

4.13 -k

Directs Collector to terminate when the Extract process that it is serving disconnects. This option is used by the Manager process when starting the Collector process.

Syntax

```
-k
```

k
Must be lower case.

4.14 -KEYNAME

Specifies the name of a key that is defined in the local `ENCKEYS` lookup file. Use if `BLOWFISH` is specified for `-ENCRYPT`. For more information about the `ENCKEYS` file and Oracle GoldenGate security, see *Administering Oracle GoldenGate for Windows and UNIX*.

Syntax

```
-KEYNAME key_name
```

KEYNAME
Must be upper case.

key_name
The name of the key as it appears in the `ENCKEYS` file.

4.15 -l

Logs output to the specified file.

Syntax

```
-l file_name
```

l
Must be lower case.

file_name
The fully qualified name of the output file.

4.16 -m

Specifies the Manager port number.

Syntax

```
-m number
```

m
Must be lower case.

number
The Manager port number.

4.17 -P

Specifies a local file that contains Collector parameters. Parameters in this file override parameters sent from the Extract process.

Syntax

```
-P file_name
```

P
Must be upper case.

file_name
The fully qualified name of the parameter file.

4.18 -p

Specifies a TCP/IP port number as follows:

- For a regular Extract or regular data pump: the port on which the Collector process listens for connection requests from Extract.
- For an Extract or data pump running in `PASSIVE` mode: the port on which Extract or the data pump listens for connection requests from Collector. Must be used with the `-h` *`host`* parameter in this case. For more information about `PASSIVE` mode and Oracle GoldenGate security, see *Administering Oracle GoldenGate for Windows and UNIX*.

Syntax

```
-p port
```

p
Must be lower case.

port
The port number. The default is port 7819.

4.19 -R

Replaces invalid numeric ASCII data with an alternate value.

Syntax

```
-R value
```

R
Must be upper case.

value
The replacement value. The default is to replace with 0. Specify one of the following alternate values:

> ***number***
> Replaces invalid data with the specified number.
>
> **`NULL`**
> Replaces invalid data with `NULL` if the target column accepts `NULL` values. Otherwise, replaces with `0`.
>
> **`UNPRINTABLE`**
> Rejects any column with unprintable data. The process stops and reports the bad value.
>
> **`NONE`**
> Does not replace numeric data. Oracle GoldenGate attempts to replicate the data as-is.

4.20 -x

Specifies a discard file to store records that could not be processed by Oracle GoldenGate.

Syntax

```
-x discard_file
```

x
Must be lower case.

discard_file
The fully qualified name of the discard file.

5

Column Conversion Functions

The column conversion functions of Oracle GoldenGate enable you to manipulate source values into the appropriate format for target columns.You can manipulate numbers and characters, perform tests, extract parameter values, return environment information, and more. For more information about using these functions, see *Administering Oracle GoldenGate for Windows and UNIX*.

5.1 Summary of Column-Conversion Functions

This summary is organized according to the types of processing that can be performed with the Oracle GoldenGate functions.

Table 5-1 Performing Tests

Function	Description
CASE	Selects a value depending on a series of value tests.
EVAL	Selects a value based on a series of independent tests.
IF	Selects one of two values depending on whether a conditional statement returns `TRUE` or `FALSE`.

Table 5-2 Handling Missing Columns

Function	Description
COLSTAT	Returns an indicator that a column is `MISSING`, `NULL`, or `INVALID`.
COLTEST	Performs conditional calculations to test whether a column is `PRESENT`, `MISSING`, `NULL`, or `INVALID`.

Table 5-3 Working with Dates

Function	Description
DATE	Returns a date and time based on the format passed into the source column.
DATEDIFF	Returns the difference between two dates or datetimes.
DATENOW	Returns the current date and time.

Table 5-4 Performing Arithmetic Calculations

Function	Description
COMPUTE	Returns the result of an arithmetic expression.

Table 5-5 Working with Strings

Function	Description
NUMBIN	Converts a binary string into a number.
NUMSTR	Converts a string into a number.
STRCAT	Concatenates one or more strings.
STRCMP	Compares two strings.
STREXT	Extracts a portion of a string.
STREQ	Determines whether or not two strings are equal.
STRFIND	Finds the occurrence of a string within a string.
STRLEN	Returns the length of a string.
STRLTRIM	Trims leading spaces.
STRNCAT	Concatenates one or more strings to a maximum length.
STRNCMP	Compares two strings based on a specified number of characters.
STRNUM	Converts a number into a string.
STRRTRIM	Trims trailing spaces.
STRSUB	Substitutes one string for another.
STRTRIM	Trims leading and trailing spaces.
STRUP	Changes a string to uppercase.
VALONEOF	Compares a string or string column to a list of values.

Table 5-6 Other Functions

Function	Description
AFTER	Returns the after image of the specified column.
BEFORE	Returns the before image of the specified column.
BEFOREAFTER	Returns the before image of the specified column, if available, otherwise returns the after image.
BINARY	Maintains source binary data as binary data in the target column when the source column is defined as a character column.
BINTOHEX	Converts a binary string to a hexadecimal string.
GETENV	Returns environmental information.
GETVAL	Extracts parameters from a stored procedure as input to a `FILTER` or `COLMAP` clause.
HEXTOBIN	Converts a hexadecimal string to a binary string.
HIGHVAL | LOWVAL	Constrains a value to a high or low value.
RANGE	Divides rows into multiple groups of data for parallel processing.
TOKEN	Retrieves token data from a trail record header.
OGG_SHA1	Hashes some fields while replicating them to Operational Data Store.

5.2 AFTER

Use the `@AFTER` function to return the after image of the specified source column. This is the default behavior.

Syntax

```
@AFTER (column)
```

column
The name of the source column for which to return the after image.

Example

```
@AFTER (quantity)
```

5.3 BEFORE

Use the `@BEFORE` function to return the before image of the specified source column.

When using this parameter, use the `GETUPDATEBEFORES` parameter in the Extract parameter file to capture before images from the transaction record, or use it in the Replicat parameter file to use the before image in a column mapping or filter. If using the Conflict Resolution and Detection (CDR) feature, you can use the `GETBEFORECOLS` option of `TABLE`. To use these parameters, the specified column must be present in the transaction log.

If the database only logs values for changed columns, make certain the required column values are available by enabling supplemental logging for those columns. Alternatively, you can use the `FETCHCOLS` or `FETCHCOLSEXCEPT` option of the `TABLE` parameter. The fetch option involves additional processing overhead.

Syntax

```
@BEFORE (column)
```

`column`
The name of the source column for which to return the before image.

Example

```
@BEFORE (quantity)
```

5.4 BEFOREAFTER

Use the `@BEFOREAFTER` function to return the before image if available, or otherwise the after image.

When using this parameter, use the `GETUPDATEBEFORES` parameter in the Extract parameter file to capture before images from the transaction record, or use it in the Replicat parameter file to use the before image in a column mapping or filter. If using the Conflict Resolution and Detection (CDR) feature, you can use the `GETBEFORECOLS` option of `TABLE`. To use these parameters, all columns must be present in the transaction log.

If the database only logs values for changed columns, make certain the required column values are available by enabling supplemental logging for those columns. Alternatively, you can use the `FETCHCOLS` or `FETCHCOLSEXCEPT` option of the `TABLE` parameter. The fetch option involves additional processing overhead.

Syntax

```
@BEFOREAFTER (column)
```

`column`
The name of the source column for which to return the before image, if available, or otherwise the after image.

Example

```
@BEFOREAFTER (quantity)
```

5.5 BINARY

Use the `@BINARY` function when a source column referenced by a column-conversion function is defined as a character column but contains binary data that must remain binary on the target. By default, binary data in a character column is converted (if necessary) to ASCII and assumed to be a null-terminated string. The `@BINARY` function copies arbitrary binary data to the target column.

Syntax

```
@BINARY (column)
```

`column`
The name of the target column to which the data will be copied.

Example

The following shows how `@BINARY` can be used to copy the data from the source column `ACCT_CREATE_DATE` to the target column `ACCT_COMPLAINT`.

```
ACCT_COMPLAINT =
@IF ( @NUMBIN (ACCT_CREATE_DATE ) < 48633, 'xxxxxx',
@BINARY (ACCT_COMPLAINT))
```

5.6 BINTOHEX

Use the `@BINTOHEX` function to convert supplied binary data into its hexadecimal equivalent.

Syntax

```
@BINTOHEX (data)
```

`data`
Can be one of the following:

- The name of the source column that contains the data
- An expression
- A literal string that is enclosed within single quote marks

Example

`@BINTOHEX ('12345')` converts to `3132333435`.

5.7 CASE

Use the `@CASE` function to select a value depending on a series of value tests. There is no limit to the number of cases you can test with `@CASE`. If the number of cases is large, list the most frequently encountered conditions first for the best performance.

For this function, Oracle GoldenGate supports the use of an escape sequence to represent characters in a string column in Unicode or in the native character encoding of the Microsoft Windows, UNIX, and Linux operating systems. The target column must be a SQL Unicode data type if any argument is supplied as Unicode.

This function does not support `NCHAR` or `NVARCHAR` data types.

Syntax

```
@CASE (value, test_value1, test_result1
[, test_value2, test_result2] [, ...]
[, default_result]
```

value
A value to test, for example, a column name. Enclose literals within single quote marks.

test_value
A valid result for *value*. Enclose literals within single quote marks.

test_result
A value to return based on the value of *test_value*. Enclose literals within single quote marks.

default_result
A default value to return if *value* results in none of the *test_value* values. Enclose literals within single quote marks.

Examples

Example 1
The following returns A car if PRODUCT_CODE is CAR and A truck if PRODUCT_CODE is TRUCK. If PRODUCT_CODE fits neither of the first two cases, a FIELD_MISSING indication is returned because a default value was not specified.

```
@CASE (PRODUCT_CODE, 'CAR', 'A car', 'TRUCK', 'A truck')
```

Example 2
The following is similar to the previous example, except that it provides for a default value. If PRODUCT_CODE is neither CAR nor TRUCK, the function returns A vehicle.

```
@CASE (PRODUCT_CODE, 'CAR', 'A car', 'TRUCK', 'A truck', 'A vehicle')
```

5.8 COLSTAT

Use the @COLSTAT function to return an indicator to Extract or Replicat that a column is missing, null, or invalid. The indicator can be used as part of a larger manipulation formula that uses additional conversion functions.

Syntax

```
@COLSTAT ({MISSING | NULL | INVALID})
```

Examples

Example 1
The following example returns a NULL into target column ITEM.

```
ITEM = @COLSTAT (NULL)
```

Example 2
The following @IF calculation uses @COLSTAT to return NULL to the target column if PRICE and QUANTITY are less than zero.

```
ORDER_TOTAL = PRICE * QUANTITY, @IF (PRICE < 0 AND QUANTITY < 0, @COLSTAT(NULL))
```

5.9 COLTEST

Use the `@COLTEST` function to enable conditional calculations by testing for one or more column conditions. If a condition is satisfied, `@COLTEST` returns `TRUE`. To perform the conditional calculation, use the `@IF` function.

Syntax

```
@COLTEST (source_column, test_condition [, test_condition] [, ...])
```

`source_column`
The name of a source column.

`test_condition`
Valid values:

> **`PRESENT`**
> Indicates a column is present in the source record and not `NULL`. Column values can be missing if the database does not log values for columns that do not change, but that is not the same as `NULL`.
>
> **`NULL`**
> Indicates a column is present in the source record and `NULL`.
>
> **`MISSING`**
> Indicates a column is not present in the source record.
>
> **`INVALID`**
> Indicates a column is present in the source record but contains invalid data.

Examples

Example 1
The following example uses `@IF` to map a value to the `HIGH_SALARY` column only if the `BASE_SALARY` column in the source record was both present (and not `NULL`) and greater than 250000. Otherwise, `NULL` is returned.

```
HIGH_SALARY =
@IF (@COLTEST (BASE_SALARY, PRESENT) AND
BASE_SALARY > 250000,
BASE_SALARY, @COLSTAT (NULL))
```

Example 2
In the following example, 0 is returned when the `AMT` column is missing or invalid; otherwise a value for `AMT` is returned.

```
AMOUNT = @IF (@COLTEST (AMT, MISSING, INVALID), 0, AMT)
```

5.10 COMPUTE

Use the `@COMPUTE` function to return the value of an arithmetic expression to a target column. The value returned from the function is in the form of a string.

You can omit the `@COMPUTE` phrase when returning the value of an arithmetic expression to another Oracle GoldenGate function, as in:

```
@STRNUM ((AMOUNT1 + AMOUNT2), LEFT)
```

The preceding returns the same result as:

```
@STRNUM ((@COMPUTE (AMOUNT1 + AMOUNT2), LEFT)
```

Arithmetic expressions can be combinations of the following elements.

- Numbers
- The names of columns that contain numbers
- Functions that return numbers
- Arithmetic operators:

  `+` (plus)

  `-` (minus)

  `*` (multiply)

  `/` (divide)

  `\` (remainder)
- Comparison operators:

  `>` (greater than)

  `>=` (greater than or equal)

  `<` (less than)

  `<=` (less than or equal)

  `=` (equal)

  `<>` (not equal)

  Results that are derived from comparisons can be zero (indicating `FALSE`) or non-zero (indicating `TRUE`).
- Parentheses (for grouping results in the expression)
- The conjunction operators `AND`, `OR`. Oracle GoldenGate only evaluates the necessary part of a conjunction expression. Once a statement is `FALSE`, the rest of the expression is ignored. This can be valuable when evaluating fields that may be missing or null. For example, if the value of `COL1` is `25` and the value of `COL2` is `10`, then the following are possible:

  `@COMPUTE (COL1 > 0 AND COL2 < 3)` returns `0`.

  `@COMPUTE (COL1 < 0 AND COL2 < 3)` returns `0`. `COL2 < 3` is never evaluated.

  `@COMPUTE ((COL1 + COL2)/5)` returns `7`.

Syntax

```
@COMPUTE (expression)
```

`expression`
A valid arithmetic expression. The numeric value plus the precision cannot be greater than 17 digits. If this limit is exceeded, `@COMPUTE` returns an error similar to the following.

```
2013-08-01 01:54:22  ERROR   OGG-01334  Error mapping data from column to column in
function COMPUTE.
```

Examples

Example 1

```
AMOUNT_TOTAL = @COMPUTE (AMT + AMT2)
```

Example 2

```
AMOUNT_TOTAL = @IF (AMT >= 0, AMT * 100, 0)
```

Example 3

```
ANNUAL_SALARY = @COMPUTE (MONTHLY_SALARY * 12)
```

5.11 DATE

Use the `@DATE` function to return dates and times in a variety of formats to the target column based on the format passed into the source column. `@DATE` converts virtually any type of input into a valid SQL date. `@DATE` also can be used to extract portions of a date column or to compute a numeric timestamp column based on a date.

Syntax

```
@DATE ('output_descriptor', 'input_descriptor', source_column
[, 'input_descriptor', source_column] [, ...])
```

'output_descriptor'
The output of the function. The valid value is a string that is composed of date descriptors and optional literal values, such as spaces or colons, that are required by the target column. Date descriptors can be strung together as needed. See Table 5-7 for descriptions of date descriptors. The format descriptor must match the `date/time/timestamp` format for the target. Oracle GoldenGate overrides the specified format to make it correct, if necessary.

'input_descriptor'
The source input. The valid value is a string that is composed of date descriptors and optional literal values, such as spaces or colons. Date descriptors can be strung together as needed. The following are examples:

- Descriptor string `'YYYYMMDD'` indicates that the source column specified with *`source_column`* contains (in order) a four-digit year (`YYYY`), month (`MM`), and day (`DD`).
- Descriptor string `'DD/MM/YY'` indicates that the source column specified with *`source_column`* contains the day, a slash, the month, a slash, and the two digit year.

See Table 5-7 for date descriptions.

source_column
The name of the numeric or character source column that supplies the input specified with *`input_descriptor`*.

Table 5-7 Date Descriptors

Descriptor	Description	Valid for...
`CC`	Century	Input/Output
`YY`	Two-digit year	Input/Output
`YYYY`	Four-digit year	Input/Output
`MM`	Numeric month	Input/Output
`MMM`	Alphanumeric month, such as `APR`, `OCT`	Input/Output
`DD`	Numeric day of month	Input/Output
`DDD`	Numeric day of the year, such as `001` or `365`	Input/Output
`DOW0`	Numeric day of the week (Sunday = `0`)	Input/Output
`DOW1`	Numeric day of the week (Sunday = `1`)	Input/Output
`DOWA`	Alphanumeric day of the week, such as `SUN`, `MON`, `TUE`	Input/Output
`HH`	Hour	Input/Output
`MI`	Minute	Input/Output
`SS`	Seconds	Input/Output
`JTSLCT`	Use for a Julian timestamp that is already local time, or to keep local time when converting to a Julian timestamp.	Input/Output
`JTSGMT`	Julian timestamp, the same as `JTS`.	Input/Output
`JTS`	Julian timestamp. `JUL` and `JTS` produce numbers you can use in numeric expressions. The unit is microseconds. On a Windows machine, the value will be padded with zeros (0) because the granularity of the Windows timestamp is milliseconds.	Input/Output
`JUL`	Julian day. `JUL` and `JTS` produce numbers you can use in numeric expressions.	Input/Output
`TTS`	NonStop 48-bit timestamp	Input
`PHAMIS`	`PHAMIS` application date format	Input

Table 5-7 (Cont.) Date Descriptors

Descriptor	Description	Valid for...
`FFFFFF`	Fraction (up to microseconds)	Input/Output
`STRATUS`	`STRATUS` application timestamp	Input/Output
`CDATE`	C timestamp in seconds since the Epoch	Input/Output

Examples

Example 1

In an instance where a two-digit year is supplied, but a four-digit year is required in the output, several options exist to obtain the correct century.

- The century can be hard coded, as in:

  ```
  'CC', 19 or 'CC', 20
  ```

- The `@IF` function can be used to set a condition, as in:

  ```
  'CC', @IF (YY > 70, 19, 20)
  ```

  This causes the century to be set to 19 when the year is greater than 70; otherwise the century is set to 20.

- The system can calculate the century automatically. If the year is less than 50, the system calculates a century of 20; otherwise, a century of 19 is calculated.

Example 2

The following converts year, month and day columns into a date.

```
date_col = @DATE ('YYYY-MM-DD', 'YY', date1_yy, 'MM', date1_mm, 'DD', date1_dd)
```

Example 3

The following converts a date and time, defaulting seconds to zero.

```
date_col = @DATE ('YYYY-MM-DD HH:MI:00', 'YYMMDD', date1, 'HHMI', time1)
```

Example 4

The following converts a numeric column stored as `YYYYMMDDHHMISS` to a SQL date.

```
datetime_col = @DATE ('YYYY-MM-DD HH:MI:SS', 'YYYYMMDDHHMISS', numeric_date)
```

Example 5

The following converts a numeric column stored as `YYYYMMDDHHMISS` to a Julian timestamp.

```
julian_ts_col = @DATE ('JTS', 'YYYYMMDDHHMISS', numeric_date)
```

Example 6

The following converts a Julian timestamp column to two separate columns: a datetime column in the format `YYYY-MM-DD HH:MI:SS` and a fraction column that holds the microseconds portion of the timestamp.

```
datetime_col = @DATE ('YYYY-MM-DD HH:MI:SS', 'JTS', jts_field), fraction_col =
@DATE ('FFFFFF', 'JTS', jts_field)
```

Example 7
The following produces the time at which an order is filled. The inner `@DATE` expression changes the `order_taken` column into a Julian timestamp, then adds the `order_minutes` column converted into microseconds to this timestamp. The expression is passed back as a new Julian timestamp to the outer `@DATE` expression, which converts it back to a more readable date and time.

```
order_filled = @DATE ('YYYY-MM-DD HH:MI:SS', 'JTS', @DATE ('JTS',
'YYMMDDHHMISS', order_taken) + order_minutes * 60 * 1000000)
```

Example 8
The following does a full calculation of times. It goes from a source date column named `dt` to a target column named `dt5` that is to be converted to the date + 5 hours. The calculation also goes from a source timestamp column named `ts` to a target column named `ts5` that is to be converted to the timestamp + 5 hours.

```
MAP scratch.t4, TARGET scratch.t4_copy,
COLMAP ( USEDEFAULTS,
dt5 = @DATE ('YYYY-MM-DD HH:MI:SS', 'JTS',
@COMPUTE (@DATE ('JTS', 'YYYY-MM-DD HH:MI:SS', dt) + 18000000000 ) ),
ts5 = @DATE ('YYYY-MM-DD HH:MI:SS.FFFFFF', 'JTS',
@COMPUTE ( @DATE ('JTS', 'YYYY-MM-DD HH:MI:SS.FFFFFF', ts) + 18000000000 ) )
) ;
```

5.12 DATEDIFF

Use the `@DATEDIFF` function to calculate the difference between two dates or datetimes, in days or seconds.

Syntax

```
@DATEDIFF ('difference', 'date', 'date')
```

`difference`
The difference between the specified dates. Valid values can be:

- `DD`, which computes the difference in days.
- `SS`, which computes the difference in seconds.

`date`
A string within single quote marks, in the format of `'YYYY-MM-DD[*HH:MI[:SS]]'`, where * can be a colon (:) or a blank space, or the `@DATENOW` function without quotes to return the current date.

Examples

Example 1
The following calculates the number of days since the beginning of the year 2011.

```
YTD = @DATEDIFF ('DD', '2011-01-01', @DATENOW ())
```

Example 2
The following calculates the numerical day of the year. (`@DATEDIFF` returns 0 for `2011-01-01`):

```
todays_day = @COMPUTE (@DATEDIFF ('DD', '2011-01-01', @DATENOW ()) +1)
```

5.13 DATENOW

Use the `@DATENOW` function to return the current date and time in the format `YYYY-MM-DD HH:MI:SS`. The date and time are returned in local time, including adjustments for Daylight Saving Time. `@DATENOW` takes no arguments.

Syntax

```
@DATENOW ()
```

5.14 DDL

Use the `@DDL` function to return information about a DDL operation.

Syntax

```
@DDL ({TEXT | OPTYPE | OBJNAME | OBJTYPE | OBJOWNER})
```

`OBJNAME`
Returns the name of the object that is affected by the DDL.

`OBJOWNER`
Returns the name of the owner of the object that is affected by the DDL.

`OBJTYPE`
Returns the type of object that is affected by the DDL, such as `TABLE` or `INDEX`)

`OPTYPE`
Returns the operation type of the DDL, such as `CREATE` or `ALTER`.

`TEXT`
Returns the first 200 characters of the text of the DDL statement.

Example

The following example uses the output from `@DDL` in an `EVENTACTIONS` shell command.

```
DDL INCLUDE OBJNAME src.t* &
EVENTACTIONS (SHELL ('echo The DDL text is var1> out.txt ', &
VAR var1 = @DDL (TEXT)));
```

The redirected output file might contain a string like this:

```
The DDL text is CREATE TABLE src.test_tab (col1 int);
```

5.15 EVAL

Use the `@EVAL` function to select a value based on a series of independent tests. There is no limit to the number of conditions you can test. If the number of cases is large, list the most frequently encountered conditions first for best performance.

For this function, Oracle GoldenGate supports the use of an escape sequence to represent characters in a string column in Unicode or in the native character encoding of the Microsoft Windows, UNIX, and Linux operating systems. The target column must be a SQL Unicode data type if any argument is supplied as Unicode.

Syntax

```
@EVAL (condition, result
[condition, result] [, ....]
[, default_result])
```

condition
A conditional test using standard conditional operators. More than one condition can be specified.

result
A value or string to return based on the results of the conditional test. Enclose literals within single quote marks. Specify a result for each condition that is used.

default_result
A default result to return if none of the conditions is satisfied. A default result is optional.

Examples

Example 1
In the following example, if the `AMOUNT` column is greater than 10000, a result of `high amount` is returned. If `AMOUNT` is greater than 5000 (and less than or equal to 10000), a result of `somewhat high` is returned (unless the prior condition was satisfied). If neither condition is satisfied, a `COLUMN_MISSING` indication is returned because a default result is not specified.

```
AMOUNT_DESC = @EVAL (AMOUNT > 10000, 'high amount', AMOUNT > 5000, 'somewhat high')
```

Example 2
The following is a modification of the preceding example. It returns the same results, except that a default value is specified, and a result of `lower` is returned if `AMOUNT` is less than or equal to 5000.

```
@EVAL (AMOUNT > 10000, 'high amount', AMOUNT > 5000, 'somewhat high', 'lower')
```

5.16 GETENV

Use the `@GETENV` function to return information about the Oracle GoldenGate environment. You can use the information as input into the following:

- Stored procedures or queries (with `SQLEXEC`)
- Column maps (with the `COLMAP` option of `TABLE` or `MAP`)
- User tokens (defined with the `TOKENS` option of `TABLE` and mapped to target columns by means of the `@TOKEN` function)
- The `GET_ENV_VALUE` user exit function (see "GET_ENV_VALUE")

Note:

All syntax options must be enclosed within quotes as shown in the syntax descriptions.

Syntax

```
@GETENV (
'LAG' , 'unit' |
'LASTERR' , 'error_info' |
'JULIANTIMESTAMP' |
'JULIANTIMESTAMP_PRECISE' |
'RECSOUTPUT' |
{'STATS'|'DELTASTATS'}, ['TABLE', 'table'], 'statistic' |
'GGENVIRONMENT', 'environment_info' |
'GGFILEHEADER', 'header_info' |
'GGHEADER', 'header_info' |
'RECORD', 'location_info' |
'DBENVIRONMENT', 'database_info'
'TRANSACTION', 'transaction_info' |
'OSVARIABLE', 'variable' |
'TLFKEY', SYSKEY, unique_key
'RECORD_TIMESTAMP_PRECISE',
'TRANSACTION_TIMESTAMP_PRECISE',
'USERNAME',
'OSUSERNAME',
'MACHINENAME',
'PROGRAMNAME',
'CLIENTIDENTIFIER',
)
```

'LAG' , '*unit*'

Valid for Extract and Replicat.

Use the `LAG` option of `@GETENV` to return lag information. Lag is the difference between the time that a record was processed by Extract or Replicat and the timestamp of that record in the data source.

Syntax

```
@GETENV ('LAG', {'SEC'|'MSEC'|'MIN'})
```

'SEC'
Returns the lag in seconds. This is the default when a unit is not explicitly provided for `LAG`.

'MSEC'
Returns the lag in milliseconds.

'MIN'
Returns the lag in minutes.

'LASTERR' , '*error_info*'

Valid for Replicat.

Use the `LASTERR` option of `@GETENV` to return information about the last failed operation processed by Replicat.

Syntax

```
@GETENV ('LASTERR', {'DBERRNUM'|'DBERRMSG'|'OPTYPE'|'ERRTYPE'})
```

`'DBERRNUM'`
Returns the database error number associated with the failed operation.

`'DBERRMSG'`
Returns the database error message associated with the failed operation.

`'OPTYPE'`
Returns the operation type that was attempted. For a list of Oracle GoldenGate operation types, see *Administering Oracle GoldenGate for Windows and UNIX*.

`'ERRTYPE'`
Returns the type of error. Possible results are:

- `DB` (for database errors)
- `MAP` (for errors in mapping)

`'JULIANTIMESTAMP'` | `'JULIANTIMESTAMP_PRECISE'`

Valid for Extract and Replicat.

Use the `JULIANTIMESTAMP` option of `@GETENV` to return the current time in Julian format. The unit is microseconds (one millionth of a second). On a Windows machine, the value is padded with zeros (0) because the granularity of the Windows timestamp is milliseconds (one thousandth of a second). For example, the following is a typical column mapping:

```
MAP dbo.tab8451, Target targ.tabjts, COLMAP (USEDEFAULTS, &
JTSS = @GETENV ('JULIANTIMESTAMP')
JTSFFFFFF = @date ('yyyy-mm-dd hh:mi:ss.ffffff', 'JTS', &
@getenv ('JULIANTIMESTAMP') ) )
;
```

Possible values that the `JTSS` and `JTSFFFFFF` columns can have are:

```
212096320960773000 2010-12-17:16:42:40.773000
212096321536540000 2010-12-17:16:52:16.540000
212096322856385000 2010-12-17:17:14:16.385000
212096323062919000 2010-12-17:17:17:42.919000
212096380852787000 2010-12-18:09:20:52.787000
```

The last three digits (the microseconds) of the number all contain the padding of 0s .

Optionally, you can use the `'JULIANTIMESTAMP_PRECISE'` option to obtain a timestamp with high precision though this may effect performance.

Syntax

```
@GETENV ('JULIANTIMESTAMP')
@GETENV ('JULIANTIMESTAMP_PRECISE')
```

`'RECSOUTPUT'`

Valid for Extract.

Use the `RECSOUTPUT` option of `@GETENV` to retrieve a current count of the number of records that Extract has written to the trail file since the process started. The returned value is not unique to a table or transaction, but instead for the Extract session itself. The count resets to 1 whenever Extract stops and then is started again.

Syntax

```
@GETENV ('RECSOUTPUT')
```

`{'STATS'|'DELTASTATS'}, ['TABLE', '`*`table`*`'], '`*`statistic`*`'`

Valid for Extract and Replicat.

Use the `STATS` and `DELTASTATS` options of `@GETENV` to return the number of operations that were processed per table for any or all of the following:

- `INSERT` operations
- `UPDATE` operations
- `DELETE` operations
- `TRUNCATE` operations
- Total DML operations
- Total DDL operations
- Number of conflicts that occurred, if the Conflict Detection and Resolution (CDR) feature is used.
- Number of CDR resolutions that succeeded
- Number of CDR resolutions that failed

Any errors in the processing of this function, such as an unresolved table entry or incorrect syntax, returns a zero (0) for the requested statistics value.

Understanding How Recurring Table Specifications Affect Operation Counts

An Extract that is processing the same source table to multiple output trails returns statistics based on each localized output trail to which the table linked to `@GETENV` is written. For example, if Extract captures 100 inserts for table `ABC` and writes table `ABC` to three trails, the result for the `@GETENV` is 300

```
EXTRACT ABC
...
EXTTRAIL c:\ogg\dirdat\aa;
TABLE TEST.ABC;
EXTTRAIL c:\ogg\dirdat\bb;
TABLE TEST.ABC;
TABLE EMI, TOKENS (TOKEN-CNT = @GETENV ('STATS', 'TABLE', 'ABC', 'DML'));
EXTTRAIL c:\ogg\dirdat\cc;
TABLE TEST.ABC;
```

In the case of an Extract that writes a source table multiple times to a single output trail, or in the case of a Replicat that has multiple `MAP` statements for the same `TARGET` table, the statistics results are based on all matching `TARGET` entries. For example, if Replicat filters 20 rows for `REGION 'WEST`,' 10 rows for `REGION 'EAST`,' 5 rows for `REGION 'NORTH`,' and 2 rows for `REGION 'SOUTH`' (all for table `ABC`) the result of the `@GETENV` is 37.

```
REPLICAT ABC
...
```

```
MAP TEST.ABC, TARGET TEST.ABC, FILTER (@STREQ (REGION, 'WEST'));
MAP TEST.ABC, TARGET TEST.ABC, FILTER (@STREQ (REGION, 'EAST'));
MAP TEST.ABC, TARGET TEST.ABC, FILTER (@STREQ (REGION, 'NORTH'));
MAP TEST.ABC, TARGET TEST.ABC, FILTER (@STREQ (REGION, 'SOUTH'));
MAP TEST.EMI, TARGET TEST.EMI, &
    COLMAP (CNT = @GETENV ('STATS', 'TABLE', 'ABC', 'DML'));
```

Capturing Multiple Statistics

You can execute multiple instances of `@GETENV` to get counts for different operation types.

This example returns statistics only for `INSERT` and `UPDATE` operations:

```
REPLICAT TEST
..
..
MAP TEST.ABC, TARGET TEST.ABC, COLMAP (USEDEFAULTS, IU = @COMPUTE (@GETENV &
    ('STATS', 'TABLE', 'ABC', 'DML') - (@GETENV ('STATS', 'TABLE', &
    'ABC', 'DELETE'));
```

This example returns statistics for DDL and `TRUNCATE` operations:

```
REPLICAT TEST2
..
..
MAP TEST.ABC, TARGET TEST.ABC, COLMAP (USEDEFAULTS, DDL = @COMPUTE &
(@GETENV ('STATS', 'DDL') + (@GETENV ('STATS', 'TRUNCATE'));
```

Example Use Case

In the following use case, if all DML from the source is applied successfully to the target, Replicat suspends by means of `EVENTACTIONS` with `SUSPEND`, until resumed from GGSCI with `SEND REPLICAT` with `RESUME`.

`GETENV` used in Extract parameter file:

```
TABLE HR1.HR*;
TABLE HR1.STAT, TOKENS ('env_stats' = @GETENV ('STATS', 'TABLE', &
    'HR1.HR*', 'DML'));
```

`GETENV` used in Replicat parameter file:

```
MAP HR1.HR*, TARGET HR2.*;
MAP HR1.STAT, TARGET HR2.STAT, filter (
    @if (
    @token ('stats') =
    @getenv ('STATS', 'TABLE', 'TSSCAT.TCUSTORD', 'DML'), 1, 0 )
    ),
    eventactions (suspend);
```

Using Statistics in FILTER Clauses

Statistics returned by `STATS` and `DELTASTATS` are dynamic values and are incremented after mapping is performed. Therefore, when using CDR statistics in a `FILTER` clause in each of multiple `MAP` statements, you need to order the `MAP` statements in descending order of the statistics values. If the order is not correct, Oracle GoldenGate returns error OGG-01921. For detailed information about this requirement, see Document 1556241.1 in the Knowledge base of My Oracle Support at `http://support.oracle.com`.

Example 5-1 MAP statements containing statistics in FILTER clauses

In the following example, the `MAP` statements containing the filter for the `CDR_CONFLICTS` statistic are ordered in descending order of the statistic: `>3`, then `=3`, then `<3`.

```
MAP TEST.GG_HEARTBEAT_TABLE, TARGET TEST.GG_HEARTBEAT_TABLE COMPARECOLS (ON UPDATE
ALL),RESOLVECONFLICT(UPDATEROWEXISTS,(DEFAULT, OVERWRITE)),FILTER (@GETENV ("STATS",
"CDR_CONFLICTS") > 3),EVENTACTIONS (LOG INFO);MAP TEST.GG_HEARTBEAT_TABLE, TARGET
TEST.GG_HEARTBEAT_TABLE COMPARECOLS (ON UPDATE ALL),RESOLVECONFLICT(UPDATEROWEXISTS,
(DEFAULT, OVERWRITE)),FILTER (@GETENV ("STATS", "CDR_CONFLICTS") = 3),EVENTACTIONS
(LOG WARNING);MAP TEST.GG_HEARTBEAT_TABLE, TARGET TEST.GG_HEARTBEAT_TABLE
COMPARECOLS (ON UPDATE ALL),RESOLVECONFLICT(UPDATEROWEXISTS,(DEFAULT,
OVERWRITE)),FILTER (@GETENV ("STATS", "CDR_CONFLICTS") < 3),EVENTACTIONS (LOG
WARNING);
```

Syntax

`@GETENV ({'STATS' | 'DELTASTATS'}, ['TABLE', '`*`table`*`'], '`*`statistic`*`')`

`{'STATS' | 'DELTASTATS'}`
`STATS` returns counts since process startup, whereas `DELTASTATS` returns counts since the last execution of a `DELTASTATS`.
The execution logic is as follows:

- When Extract processes a transaction record that satisfies `@GETENV` with `STATS` or `DELTASTATS`, the table name is matched against resolved source tables in the `TABLE` statement.
- When Replicat processes a trail record that satisfies `@GETENV` with `STATS` or `DELTASTATS`, the table name is matched against resolved target tables in the `TARGET` clause of the `MAP` statement.

`'TABLE', '`*`table`*`'`
Executes the `STATS` or `DELTASTATS` only for the specified table or tables. Without this option, counts are returned for all tables that are specified in `TABLE` (Extract) or `MAP` (Replicat) parameters in the parameter file.
Valid *`table_name`* values are:

- '*`schema.table`*' specifies a table.
- *`'table'`* specifies a table of the default schema.
- '*`schema.`*`*`' specifies all tables of a schema.
- '`*`' specifies all tables of the default schema.

For example, the following counts DML operations only for tables in the `hr` schema:

```
MAP fin.*, TARGET fin.*;
MAP hr.*, TARGET hr.*;
MAP hq.rpt, TARGET hq.rpt, COLMAP (USEDEFAULTS, CNT = @GETENV ('STATS', 'TABLE',
'hr.*', 'DML'));
```

Likewise, the following counts DML operations only for the `emp` table in the `hr` schema:

```
MAP fin.*, TARGET fin.*;
MAP hr.*, TARGET hr.*;
MAP hq.rpt, TARGET hq.rpt, COLMAP (USEDEFAULTS, CNT = @GETENV ('STATS', 'TABLE',
'hr.emp', 'DML'));
```

By contrast, because there are no specific tables specified for `STATS` in the following example, the function counts all `INSERT`, `UPDATE`, and `DELETE` operations for all tables in all schemas that are represented in the `TARGET` clauses of `MAP` statements:

```
MAP fin.*, TARGET fin.*;
MAP hr.*, TARGET hr.*;
MAP hq.rpt, TARGET hq.rpt, COLMAP (USEDEFAULTS, CNT = &
@GETENV ('STATS', 'DML'));
```

'statistic'
The type of statistic to return. See Using Statistics in FILTER Clauses for important information when using statistics in `FILTER` clauses in multiple `TABLE` or `MAP` statements.

`'INSERT'`
Returns the number of `INSERT` operations that were processed.

`'UPDATE'`
Returns the number of `UPDATE` operations that were processed.

`'DELETE'`
Returns the number of `DELETE` operations that were processed.

`'DML'`
Returns the total of `INSERT`, `UPDATE`, and `DELETE` operations that were processed.

`'TRUNCATE'`
Returns the number of `TRUNCATE` operations that were processed. This variable returns a count only if Oracle GoldenGate DDL replication is not being used. If DDL replication is being used, this variable returns a zero.

`'DDL'`
Returns the number of DDL operations that were processed, including `TRUNCATES` and DDL specified in `INCLUDE` and `EXCLUDE` clauses of the `DDL` parameter, all scopes (`MAPPED`, `UNMAPPED`, `OTHER`). This variable returns a count only if Oracle GoldenGate DDL replication is being used. This variable is not valid for `'DELTASTATS'`.

`'CDR_CONFLICTS'`
Returns the number of conflicts that Replicat detected when executing the Conflict Detection and Resolution (CDR) feature.
Example for a specific table:

```
@GETENV ('STATS','TABLE','HR.EMP','CDR_CONFLICTS')
```

Example for all tables processed by Replicat:

```
@GETENV ('STATS','CDR_CONFLICTS')
```

`'CDR_RESOLUTIONS_SUCCEEDED'`
Returns the number of conflicts that Replicat resolved when executing the Conflict Detection and Resolution (CDR) feature.
Example for a specific table:

```
@GETENV ('STATS','TABLE','HR.EMP', 'CDR_RESOLUTIONS_SUCCEEDED')
```

Example for all tables processed by Replicat:

```
@GETENV ('STATS','CDR_RESOLUTIONS_SUCCEEDED')
```

'CDR_RESOLUTIONS_FAILED'
Returns the number of conflicts that Replicat could not resolve when executing the Conflict Detection and Resolution (CDR) feature.
Example for a specific table:

```
@GETENV ('STATS','TABLE','HR.EMP', 'CDR_RESOLUTIONS_FAILED')
```

Example for all tables processed by Replicat:

```
@GETENV ('STATS','CDR_RESOLUTIONS_FAILED')
```

'GGENVIRONMENT' , '*environment_info*'

Valid for Extract and Replicat.

Use the GGENVIRONMENT option of @GETENV to return information about the Oracle GoldenGate environment.

Syntax

```
@GETENV ('GGENVIRONMENT', {'DOMAINNAME'|'GROUPDESCRIPTION'|'GROUPNAME'|

'GROUPTYPE'|'HOSTNAME'|'OSUSERNAME'|'PROCESSID'|'USERNAME'|'MACHINENAME'|'PROGRAMNAME
'|'CLIENTIDENTIFIER'})
```

'DOMAINNAME'
(Windows only) Returns the domain name associated with the user that started the process.

'GROUPDESCRIPTION'
Returns the description of the group, taken from the checkpoint file. Requires that a description was provided with the DESCRIPTION parameter when the group was created with the ADD command in GGSCI.

'GROUPNAME'
Returns the name of the process group.

'GROUPTYPE'
Returns the type of process, either EXTRACT or REPLICAT.

'HOSTNAME'
Returns the name of the system running the Extract or Replicat process.

'OSUSERNAME'
Returns the operating system user name that started the process.

'PROCESSID'
Returns the process ID that is assigned to the process by the operating system.

‘USERNAME’
Database login user name.

‘MACHINENAME’
Name of the host, machine, or server where database is running

‘PROGRAMNAME’
Name of the program or application that started the transaction or session.

`‘CLIENTIDENTIFIER’`
Value set by using `DBMS_SESSION_.set_identifier()`.

`'GGHEADER' , 'header_info'`

Valid for Extract and Replicat.

Use the `GGHEADER` option of `@GETENV` to return information from the header portion of an Oracle GoldenGate trail record. The header describes the transaction environment of the record. For more information on record headers and record types, see *Administering Oracle GoldenGate for Windows and UNIX*.

Syntax

```
@GETENV ('GGHEADER', {'BEFOREAFTERINDICATOR'|'COMMITTIMESTAMP'|'LOGPOSITION'|
   'LOGRBA'|'OBJECTNAME'|'TABLENAME'|'OPTYPE'|'RECORDLENGTH'|
   'TRANSACTIONINDICATOR'})
```

`'BEFOREAFTERINDICATOR'`
Returns the before or after indicator showing whether the record is a before image or an after image. Possible results are:

- `BEFORE` (before image)
- `AFTER` (after image)

`'COMMITTIMESTAMP'`
Returns the transaction timestamp (the time when the transaction committed) expressed in the format of `YYYY-MM-DD HH:MI:SS.FFFFFF`, for example:

```
2011-01-24 17:08:59.000000
```

`'LOGPOSITION'`
Returns the position of the Extract process in the data source. (See the `LOGRBA` option.)

`'LOGRBA'`
`LOGRBA` and `LOGPOSITION` store details of the position in the data source of the record. For transactional log-based products, `LOGRBA` is the sequence number and `LOGPOSITION` is the relative byte address. However, these values will vary depending on the capture method and database type.

`'OBJECTNAME' | 'TABLENAME'`
Returns the table name or object name (if a non-table object).

`'OPTYPE'`
Returns the type of operation. Possible results are:

```
INSERT
UPDATE
DELETE
ENSCRIBE COMPUPDATE
SQL COMPUPDATE
PK UPDATE
TRUNCATE
```

If the operation is not one of the above types, then the function returns the word `TYPE` with the number assigned to the type.

'RECORDLENGTH'
Returns the record length in bytes.

'TRANSACTIONINDICATOR'
Returns the transaction indicator. The value corresponds to the `TransInd` field of the record header, which can be viewed with the Logdump utility.
Possible results are:

- `BEGIN` (represents `TransInD` of 0, the first record of a transaction.)
- `MIDDLE` (represents `TransInD` of 1, a record in the middle of a transaction.)
- `END` (represents `TransInD` of 2, the last record of a transaction.)
- `WHOLE` (represents `TransInD` of 3, the only record in a transaction.)

'GGFILEHEADER' , ***'header_info'***

Valid for Replicat.

Use the `GGFILEHEADER` option of `@GETENV` to return attributes of an Oracle GoldenGate extract file or trail file. These attributes are stored as tokens in the file header.

Note:

If a given database, operating system, or Oracle GoldenGate version does not provide information that relates to a given token, a `NULL` value will be returned.

Syntax

```
@GETENV ('GGFILEHEADER', {'COMPATIBILITY'|'CHARSET'|'CREATETIMESTAMP'|
   'FILENAME'|'FILETYPE'|'FILESEQNO'|'FILESIZE'|'FIRSTRECCSN'|
   'LASTRECCSN'|'FIRSTRECIOTIME'|'LASTRECIOTIME'|'URI'|'URIHISTORY'|
   'GROUPNAME'|'DATASOURCE'|'GGMAJORVERSION'|'GGMINORVERSION'|
   'GGVERSIONSTRING'|'GGMAINTENANCELEVEL'|'GGBUGFIXLEVEL'|'GGBUILDNUMBER'|
   'HOSTNAME'|'OSVERSION'|'OSRELEASE'|'OSTYPE'|'HARDWARETYPE'|
   'DBNAME'|'DBINSTANCE'|'DBTYPE'|'DBCHARSET'|'DBMAJORVERSION'|
   'DBMINORVERSION'|'DBVERSIONSTRING'|'DBCLIENTCHARSET'|'DBCLIENTVERSIONSTRING'|
   'LASTCOMPLETECSN'|'LASTCOMPLETEXIDS'|'LASTCSN'|'LASTXID'|
   'LASTCSNTS'})
```

'COMPATIBILITY'
Returns the Oracle GoldenGate compatibility level of the trail file. The compatibility level of the current Oracle GoldenGate version must be greater than, or equal to, the compatibility level of the trail file to be able to read the data records in that file. Current valid values are 0 or 1.

- 1 means that the trail file is of Oracle GoldenGate version 10.0 or later, which supports file headers that contain file versioning information.
- 0 means that the trail file is of an Oracle GoldenGate version that is older than 10.0. File headers are not supported in those releases. The 0 value is used for backward compatibility to those Oracle GoldenGate versions.

'CHARSET'
Returns the global character set of the trail file. For example:

`WCP1252-1`

`'CREATETIMESTAMP'`
Returns the time that the trail was created, in local GMT Julian time in INT64.

`'FILENAME'`
Returns the name of the trail file. Can be an absolute or relative path, with a forward or backward slash depending on the file system.

`'FILETYPE'`
Returns a numerical value indicating whether the trail file is a single file (such as one created for a batch run) or a sequentially numbered file that is part of a trail for online, continuous processing. The valid values are:

- 0 - EXTFILE
- 1 - EXTTRAIL
- 2 - UNIFIED and EXTFILE
- 3 - UNIFIED and EXTTRAIL

`'FILESEQNO'`
Returns the sequence number of the trail file, without any leading zeros. For example, if a file sequence number is `aa000026`, `FILESEQNO` returns `26`.

`'FILESIZE'`
Returns the size of the trail file. It returns `NULL` on an active file and returns a size value when the file is full and the trail rolls over.

`'FIRSTRECCSN'`
Returns the commit sequence number (CSN) of the first record in the trail file.Value is `NULL` until the trail file is completed. For more information about the CSN, see *Administering Oracle GoldenGate for Windows and UNIX*.

`'LASTRECCSN'`
Returns the commit sequence number (CSN) of the last record in the trail file.Value is `NULL` until the trail file is completed. For more information about the CSN, see *Administering Oracle GoldenGate for Windows and UNIX*.

`'FIRSTRECIOTIME'`
Returns the time that the first record was written to the trail file. Value is `NULL` until the trail file is completed.

`'LASTRECIOTIME'`
Returns the time that the last record was written to the trail file. Value is `NULL` until the trail file is completed.

`'URI'`
Returns the universal resource identifier of the process that created the trail file, in the following format:

```
host_name:dir:[:dir][:dir_n]group_name
```

Where:

- `host_name` is the name of the server that hosts the process

- `dir` is a subdirectory of the Oracle GoldenGate installation path.
- `group_name` is the name of the process group that is linked with the process.

The following example shows where the trail was processed and by which process. This includes a history of previous runs.

```
sys1:home:oracle:v9.5:extora
```

`'URIHISTORY'`
Returns a list of the URIs of processes that wrote to the trail file before the current process.

- For a primary Extract, this field is empty.
- For a data pump, this field is `URIHistory` + `URI` of the input trail file.

`'GROUPNAME'`
Returns the name of the group that is associated with the Extract process that created the trail. The group name is the one that was supplied when the `ADD EXTRACT` command was issued.

`'DATASOURCE'`
Returns the data source that was read by the process. The return value can be one of the following:

- `DS_EXTRACT_TRAILS: The source was an Oracle GoldenGate extract file, populated with change data.`
- `DS_DATABASE:` The source was a direct select from database table written to a trail, used for `SOURCEISTABLE`-driven initial load.
- `DS_TRAN_LOGS: The source was the database transaction log.`
- `DS_INITIAL_DATA_LOAD: The source was a direct select from database tables for an initial load.`
- `DS_VAM_EXTRACT:` The source was a vendor access module (VAM).
- `DS_VAM_TWO_PHASE_COMMIT:` The source was a VAM trail.

`'GGMAJORVERSION'`
Returns the major version of the Extract process that created the trail, expressed as an integer. For example, if a version is 1.2.3, it returns 1.

`'GGMINORVERSION'`
Returns the minor version of the Extract process that created the trail, expressed as an integer. For example, if a version is 1.2.3, it returns 2.

`'GGVERSIONSTRING'`
Returns the maintenance (or patch) level of the Extract process that created the trail, expressed as an integer. For example, if a version is 1.2.3, it returns 3.

`'GGMAINTENANCELEVEL'`
Returns the maintenance version of the process (`xx.xx.xx`).

`'GGBUGFIXLEVEL'`
Returns the patch version of the process (`xx.xx.xx.xx`).

`'GGBUILDNUMBER'`
Returns the build number of the process.

`'HOSTNAME'`
Returns the DNS name of the machine where the Extract that wrote the trail is running. For example:

- `sysa`
- `sysb`
- `paris`
- `hq25`

`'OSVERSION'`
Returns the major version of the operating system of the machine where the Extract that wrote the trail is running. For example:

- `Version s10_69`
- `#1 SMP Fri Feb 24 16:56:28 EST 2006`
- `5.00.2195 Service Pack 4`

`'OSRELEASE'`
Returns the release version of the operating system of the machine where the Extract that wrote the trail is running. For example, release versions of the examples given for `OSVERSION` could be:

- `5.10`
- `2.6.9-34.ELsmp`

`'OSTYPE'`
Returns the type of operating system of the machine where the Extract that wrote the trail is running. For example:

- `SunOS`
- `Linux`
- `Microsoft Windows`

`'HARDWARETYPE'`
Returns the type of hardware of the machine where the Extract that wrote the trail is running. For example:

- `sun4u`
- `x86_64`
- `x86`

`'DBNAME'`
Returns the name of the database, for example `findb`.

`'DBINSTANCE'`
Returns the name of the database instance, if applicable to the database type, for example `ORA1022A`.

`'DBTYPE'`
Returns the type of database that produced the data in the trail file. Can be one of:

```
DB2 UDB
DB2 ZOS
CTREE
MSSQL
MYSQL
ORACLE
SQLMX
SYBASE
TERADATA
NONSTOP
ENSCRIBE
ODBC
```

`'DBCHARSET'`
Returns the character set that is used by the database that produced the data in the trail file. (For some databases, this will be empty.)

`'DBMAJORVERSION'`
Returns the major version of the database that produced the data in the trail file.

`'DBMINORVERSION'`
Returns the minor version of the database that produced the data in the trail file.

`'DBVERSIONSTRING'`
Returns the maintenance (patch) level of the database that produced the data in the trail file.

`'DBCLIENTCHARSET'`
Returns the character set that is used by the database client.

`'DBCLIENTVERSIONSTRING'`
Returns the maintenance (patch) level of the database client. (For some databases, this will be empty.)

`'LASTCOMPLETECSN'`
Returns recovery information for internal Oracle GoldenGate use.

`'LASTCOMPLETEXIDS'`
Returns recovery information for internal Oracle GoldenGate use.

`'LASTCSN'`
Returns recovery information for internal Oracle GoldenGate use.

`'LASTXID'`
Returns recovery information for internal Oracle GoldenGate use.

`'LASTCSNTS'`
Returns recovery information for internal Oracle GoldenGate use.

`'RECORD'` , **`'`*`location_info`*`'`**

Valid for a data-pump Extract or Replicat.

Use the `RECORD` option of `@GETENV` to return the location or Oracle rowid of a record in an Oracle GoldenGate trail file.

Syntax

```
@GETENV ('RECORD', {'FILESEQNO'|'FILERBA'|'ROWID'|'RSN'|'TIMESTAMP'})
```

'FILESEQNO'
Returns the sequence number of the trail file without any leading zeros.

'FILERBA'
Returns the relative byte address of the record within the `FILESEQNO` file.

'ROWID'
(Valid for Oracle) Returns the rowid of the record.

'RSN'
Returns the record sequence number within the transaction.

'TIMESTAMP'
Returns the timestamp of the record.

`'RECORD_TIMESTAMP_PRECISE' , 'location_info'`

Valid for a data-pump Extract or Replicat.

Use the `RECORD_TIMESTAMP_PRECISE` option of `@GETENV` to return the location or Oracle rowid of a record in an Oracle GoldenGate trail file, with fraction precision.

This option returns the timestamp from YEAR to MICROSECONDS. However, depending on the database, the value can be in MILLISECONDS with zero MICROSECONDS.

Syntax

```
@GETENV ('RECORD_TIMESTAMP_PRECISE',
{'FILESEQNO'|'FILERBA'|'ROWID'|'RSN'|'TIMESTAMP'})
```

'FILESEQNO'
Returns the sequence number of the trail file without any leading zeros.

'FILERBA'
Returns the relative byte address of the record within the `FILESEQNO` file.

'ROWID'
(Valid for Oracle) Returns the rowid of the record.

'RSN'
Returns the record sequence number within the transaction.

'TIMESTAMP'
Returns the timestamp of the record in microseconds or milliseconds, depending on the database type.

`'DBENVIRONMENT' , 'database_info'`

Valid for Extract and Replicat.

Use the `DBENVIRONMENT` option of `@GETENV` to return global environment information for a database.

Syntax

```
@GETENV ('DBENVIRONMENT', {'DBNAME'|'DBVERSION'|'DBUSER'|'SERVERNAME'})
```

'DBNAME'
Returns the database name.

'DBVERSION'
Returns the database version.

'DBUSER'
Returns the database login user. Note that SQL Server does not log the user ID.

'SERVERNAME'
Returns the name of the server.

'TRANSACTION' , '*transaction_info*

Valid for Extract.

Use the `TRANSACTION` option of `@GETENV` to return information about a source transaction. This option is valid for the Extract process.

Syntax

```
@GETENV ('TRANSACTION', {'TRANSACTIONID'|'XID'|'CSN'|'TIMESTAMP'|'NAME'|
   'USERID'|'USERNAME'|'PLANNAME' | 'LOGBSN' | 'REDOTHREAD')
```

'TRANSACTIONID' | 'XID'
Returns the transaction ID number. Either `TRANSACTIONID` or `XID` can be used. The transaction ID and the CSN are associated with the first record of every transaction and are stored as tokens in the trail record. For each transaction ID, there is an associated CSN. Transaction ID tokens have no zero-padding on any platform, because they never get evaluated as relative values. They only get evaluated for whether they match or do not match. Note that in the trail, the transaction ID token is shown as `TRANID`.

'CSN'
Returns the commit sequence number (CSN). The CSN is not zero-padded when returned for these databases: Oracle, DB2 LUW, and DB2 z/OS. For all other supported databases, the CSN is zero-padded. In the case of the Sybase CSN, each substring that is delimited by a dot (.) will be padded to a length that does not change for that substring.
Note that in the trail, the CSN token is shown as `LOGCSN`. See the `TRANSACTIONID | XID` environment value for additional information about the CSN token.
For more information about the CSN, see *Administering Oracle GoldenGate for Windows and UNIX*.

'TIMESTAMP'
Returns the commit timestamp of the transaction.

'NAME'
Returns the transaction name, if available.

'USERID'
(Oracle) Returns the Oracle user ID of the database user that committed the last transaction.

'USERNAME'
(Oracle) Returns the Oracle user name of the database user that committed the last transaction.

`'PLANNAME'`
(DB2 on z/OS) Returns the plan name under which the current transaction was originally executed. The plan name is included in the begin unit of recovery log record.

`'LOGBSN'`
Returns the begin sequence number (BSN) in the transaction log. The BSN is the native sequence number that identifies the beginning of the oldest uncommitted transaction that is held in Extract memory. For example, given an Oracle database, the BSN would be expressed as a system change number (SCN). The BSN corresponds to the current I/O checkpoint value of Extract. This value can be obtained from the trail by Replicat when `@GETENV ('TRANSACTION', 'LOGBSN')` is used. This value also can be obtained by using the `INFO REPLICAT` command with the `DETAIL` option. The purpose of obtaining the BSN from Replicat is to get a recovery point for Extract in the event that a system failure or file system corruption makes the Extract checkpoint file unusable. See *Administering Oracle GoldenGate for Windows and UNIX* for more information about recovering the Extract position.

`'REDOTHREAD'`
Returns the thread number of a RAC node extract; on non-RAC node extracts the value is always 1. For data pump and Replicat, the thread id used by Extract capture of a RAC node is returned; on non-RAC, `@GETENV()` returns an error. Logdump shows the token, `ORATHREADID`, in the token section if the transaction is captured by Extract on a RAC node.

`'TRANSACTION_TIMESTAMP_PRECISE' , '`*`transaction_info`*

Valid for Extract.

Use the `TRANSACTION_TIMESTAMP_PRECISE` option of `@GETENV` to return information about a source transaction, but with fraction precision. It returns the timestamp from YEAR to MICROSECONDS. This option is valid for the Extract process.

Syntax

```
@GETENV ('TRANSACTION_TIMESTAMP_PRECISE',
{'TRANSACTIONID'|'XID'|'CSN'|'TIMESTAMP'|'NAME'|
   'USERID'|'USERNAME'|'PLANNAME' | 'LOGBSN' | 'REDOTHREAD')
```

`'TRANSACTIONID' | 'XID'`
Returns the transaction ID number. Either `TRANSACTIONID` or `XID` can be used. The transaction ID and the CSN are associated with the first record of every transaction and are stored as tokens in the trail record. For each transaction ID, there is an associated CSN. Transaction ID tokens have no zero-padding on any platform, because they never get evaluated as relative values. They only get evaluated for whether they match or do not match. Note that in the trail, the transaction ID token is shown as `TRANID`.

`'CSN'`
Returns the commit sequence number (CSN). The CSN is not zero-padded when returned for these databases: Oracle, DB2 LUW, and DB2 z/OS. For all other supported databases, the CSN is zero-padded. In the case of the Sybase CSN, each substring that is delimited by a dot (.) will be padded to a length that does not change for that substring.
Note that in the trail, the CSN token is shown as `LOGCSN`. See the `TRANSACTIONID | XID` environment value for additional information about the CSN token.

For more information about the CSN, see *Administering Oracle GoldenGate for Windows and UNIX*.

`'TIMESTAMP'`
Returns the commit timestamp of the transaction.

`'NAME'`
Returns the transaction name, if available.

`'USERID'`
(Oracle) Returns the Oracle user ID of the database user that committed the last transaction.

`'USERNAME'`
(Oracle) Returns the Oracle user name of the database user that committed the last transaction.

`'PLANNAME'`
(DB2 on z/OS) Returns the plan name under which the current transaction was originally executed. The plan name is included in the begin unit of recovery log record.

`'LOGBSN'`
Returns the begin sequence number (BSN) in the transaction log. The BSN is the native sequence number that identifies the beginning of the oldest uncommitted transaction that is held in Extract memory. For example, given an Oracle database, the BSN would be expressed as a system change number (SCN). The BSN corresponds to the current I/O checkpoint value of Extract. This value can be obtained from the trail by Replicat when `@GETENV ('TRANSACTION', 'LOGBSN')` is used. This value also can be obtained by using the `INFO REPLICAT` command with the `DETAIL` option. The purpose of obtaining the BSN from Replicat is to get a recovery point for Extract in the event that a system failure or file system corruption makes the Extract checkpoint file unusable. See *Administering Oracle GoldenGate for Windows and UNIX* for more information about recovering the Extract position.

`'REDOTHREAD'`
Returns the thread number of a RAC node extract; on non-RAC node extracts the value is always 1. For data pump and Replicat, the thread id used by Extract capture of a RAC node is returned; on non-RAC, `@GETENV()` returns an error. Logdump shows the token, `ORATHREADID`, in the token section if the transaction is captured by Extract on a RAC node.

`'OSVARIABLE' , '`*`variable`*`'`

Valid for Extract and Replicat.

Use the `OSVARIABLE` option of `@GETENV` to return the string value of a specified operating-system environment variable.

Syntax

```
@GETENV ('OSVARIABLE', 'variable')
```

`'variable'`
The name of the variable. The search is an exact match of the supplied variable name. For example, the UNIX `grep` command would return all of the following variables, but `@GETENV ('OSVARIABLE', 'HOME')` would only return the value for `HOME`:

```
ANT_HOME=/usr/local/ant
JAVA_HOME=/usr/java/j2sdk1.4.2_10
HOME=/home/judyd
ORACLE_HOME=/rdbms/oracle/ora1022i/64
```

The search is case-sensitive if the operating system supports case-sensitivity.

'TLFKEY' , SYSKEY, '*unique_key*'

Valid for Extract and Replicat.

Use the `TLFKEY` option of `@GETENV` to associate a unique key with TLF/PTLF records in ACI's Base24 application. The 64-bit key is composed of the following concatenated items:

- The number of seconds since 2000.
- The block number of the record in the TLF/PTLF block multiplied by ten.
- The node specified by the user (must be between 0 and 255).

Syntax

```
@GETENV ('TLFKEY', SYSKEY, unique_key)
```

SYSKEY, *unique_key*
The NonStop node number of the source TLF/PTLF file. Do not enclose this syntax element in quotes.
Example:

```
GETENV ('TLFKEY', SYSKEY, 27)
```

'USERNAME' ,

Specifies the database login user name.

Syntax

```
@GETENV ('TLFKEY', SYSKEY, unique_key)
```

SYSKEY, *unique_key*
The NonStop node number of the source TLF/PTLF file. Do not enclose this syntax element in quotes.
Example:

```
GETENV ('TLFKEY', SYSKEY, 27)
```

5.17 GETVAL

Use the `@GETVAL` function to extract values from a stored procedure or query so that they can be used as input to a `FILTER` or `COLMAP` clause of a `MAP` or `TABLE` statement.

Whether or not a parameter value can be extracted with `@GETVAL` depends upon the following:

1. Whether or not the stored procedure or query executed successfully.
2. Whether or not the stored procedure or query results have expired.

When a value cannot be extracted, the `@GETVAL` function results in a "column missing" condition. Typically, this occurs for update operations if the database only logs values for columns that were changed.

Usually this means that the column cannot be mapped. To test for missing column values, use the `@COLTEST` function to test the result of `@GETVAL`, and then map an alternative value for the column to compensate for missing values, if desired. Or, to ensure that column values are available, you can use the `FETCHCOLS` or `FETCHCOLSEXCEPT` option of the `TABLE` or `MAP` parameter to fetch the values from the database if they are not present in the log. Enabling supplemental logging for the necessary columns also would work.

Syntax

```
@GETVAL (name.parameter)
```

name
The name of the stored procedure or query. When using `SQLEXEC` to execute the procedure or query, valid values are as follows:
For queries, use the logical name specified with the `ID` option of the `SQLEXEC` clause. `ID` is a required `SQLEXEC` argument for queries.
For stored procedures, use one of the following, depending on how many times the procedure is to be executed within a `TABLE` or `MAP` statement:

- For multiple executions, use the logical name defined by the `ID` clause of the `SQLEXEC` statement. `ID` is required for multiple executions of a procedure.
- For a single execution, use the actual stored procedure name.

parameter
Valid values are one of the following.

- The name of the parameter in the stored procedure or query from which the data will be extracted and passed to the column map.
- `RETURN_VALUE`, if extracting values returned by a stored procedure or query.

Alternate Syntax

With `SQLEXEC`, you can capture parameter results without explicitly using the `@GETVAL` keyword. Simply refer to the procedure name (or logical name if using a query or multiple instances of a procedure) and parameter in the following format:

```
{procedure_name | logical_name}.parameter
```

Examples, Standard Syntax

Example 1
The following enables each map statement to call the stored procedure `lookup` by referencing the logical names `lookup1` and `lookup2` within the `@GETVAL` function and refer appropriately to each set of results.

```
MAP schema.srctab, TARGET schema.targtab,
SQLEXEC (SPNAME lookup, ID lookup1, PARAMS (param1 = srccol)),
COLMAP (targcol1 = @GETVAL (lookup1.param2));
MAP schema.srctab, TARGET schema.targtab2,
SQLEXEC (SPNAME lookup, ID lookup2, PARAMS (param1 = srccol)),
COLMAP (targcol2= @GETVAL (lookup2.param2));
```

Example 2
The following shows a single execution of the stored procedure `lookup`. In this case, the actual name of the procedure is used. A logical name is not needed.

```
MAP schema.tab1, TARGET schema.tab2,
SQLEXEC (SPNAME lookup, PARAMS (param1 = srccol)),
COLMAP (targcol = @GETVAL (lookup.param1));
```

Example 3
The following shows the execution of a query from which values are mapped with `@GETVAL`.

```
MAP sales.account, TARGET sales.newacct,
SQLEXEC (ID lookup,
QUERY ' select desc_col into desc_param from lookup_table '
' where code_col = :code_param ',
PARAMS (code_param = account_code)),
COLMAP (newacct_id = account_id, newacct_val = @GETVAL (lookup.desc_param));
```

Examples, Alternate Syntax

Example 1
In the following example, `@GETVAL` is called implicitly for the phrase `proc1.p2` without the `@GETVAL` keyword.

```
MAP test.tab1, TARGET test.tab2,
SQLEXEC (SPNAME proc1, ID myproc, PARAMS (p1 = sourcecol1)),
COLMAP (targcol1 = proc1.p2);
```

Example 2
In the following example, the `@GETVAL` function is called implicitly for the phrase `lookup.desc_param` without the `@GETVAL` keyword.

```
MAP sales.account, TARGET sales.newacct,
SQLEXEC (ID lookup,
QUERY ' select desc_col into desc_param from lookup_table '
' where code_col = :code_param ',
PARAMS (code_param = account_code)),
COLMAP (newacct_id = account_id, newacct_val = lookup.desc_param);
```

5.18 HEXTOBIN

Use the `@HEXTOBIN` function to convert a supplied string of hexadecimal data into raw format.

Syntax

```
@HEXTOBIN (data)
```

`data`
The name of the source column, an expression, or a literal string that is enclosed within double quote marks.

Example

`@HEXTOBIN ('414243')` converts to three bytes: `0x41 0x42 0x43`.

5.19 HIGHVAL | LOWVAL

Use the `@HIGHVAL` and `@LOWVAL` functions when you need to generate a value, but you want to constrain it within an upper or lower limit. These functions emulate the COBOL functions of the same names.

Use `@HIGHVAL` and `@LOWVAL` only with string and binary data types. When using them with strings, only `@STRNCMP` is valid. Using them with decimal or date data types or with `SQLEXEC` operations can cause errors. `DOUBLE` data types result in `-1` or `0` (Oracle `NUMBER`, no precision, no scale).

Syntax

```
@HIGHVAL ([length]) | @LOWVAL ([length])
```

length
Optional. Specifies the binary output length in bytes. The maximum value of *length* is the length of the target column.

Example

The following example assumes that the size of the `group_level` column is 5 bytes.

Function statement	Result
`group_level = @HIGHVAL ()`	`{0xFF, 0xFF, 0xFF, 0xFF, 0xFF}`
`group_level = @LOWVAL ()`	`{0x00, 0x00, 0x00, 0x00, 0x00}`
`group_level = @HIGHVAL (3)`	`{0xFF, 0xFF, 0xFF}`
`group_level = @LOWVAL (3)`	`{0x00, 0x00, 0x00}`

5.20 IF

Use the `@IF` function to return one of two values, based on a condition. You can use the `@IF` function with other Oracle GoldenGate functions to begin a conditional argument that tests for one or more exception conditions. You can direct processing based on the results of the test. You can nest `@IF` statements, if needed.

Syntax

```
@IF (condition, value_if_non-zero, value_if-zero)
```

condition
A valid conditional expression or Oracle GoldenGate function. Use numeric operators (such as =, > or <) only for numeric comparisons. For character comparisons, use one of the character-comparison functions.

value_if_non-zero
Non-zero is considered `true`.

`value_if_zero`
Zero (0) is considered `false`.

Examples

Example 1
The following returns an amount only if the `AMT` column is greater than zero; otherwise zero is returned.

```
AMOUNT_COL = @IF (AMT > 0, AMT, 0)
```

Example 2
The following returns `WEST` if the `STATE` column is `CA`, `AZ` or `NV`; otherwise it returns `EAST`.

```
REGION = @IF (@VALONEOF (STATE, 'CA', 'AZ', 'NV'), 'WEST', 'EAST')
```

Example 3
The following returns the result of the `PRICE` column multiplied by the `QUANTITY` column if both columns are greater than 0. Otherwise, the `@COLSTAT (NULL)` function creates a `NULL` value in the target column.

```
ORDER_TOTAL = @IF (PRICE > 0 AND QUANTITY > 0, PRICE * QUANTITY,
@COLSTAT (NULL))
```

5.21 NUMBIN

Use the `@NUMBIN` function to convert a binary string of eight or fewer bytes into a number. Use this function when the source column defines a byte stream that actually is a number represented as a string.

Syntax

```
@NUMBIN (source_column)
```

`source_column`
The name of the source column that contains the string to be converted.

Example

The following combines `@NUMBIN` and `@DATE` to transform a 48-bit column to a 64-bit Julian value for local time.

```
DATE = @DATE ('JTSLCT', 'TTS' @NUMBIN (DATE))
```

5.22 NUMSTR

Use the `@NUMSTR` function to convert a string (character) column or value into a number. Use `@NUMSTR` to do either of the following:

- Map a string (character) to a number.
- Use a string column that contains only numbers in an arithmetic expression.

Syntax

```
@NUMSTR (input)
```

input
Can be either of the following:

- The name of a character column.
- A literal string that is enclosed within single quote marks.

Example

```
PAGE_NUM = @NUMSTR (ALPHA_PAGE_NO)
```

5.23 OGG_SHA1

Use the `OGG_SHA1` function to return the SHA-1 160 bit / 20 bytes hash value.

Syntax

```
OGG_SHA1(expression)
```

expression
The name of a column, literal string, other column mapping function.

Example

```
OGG_SHA1(col_name)
```

5.24 RANGE

Use the `@RANGE` function to divide the rows of any table across two or more Oracle GoldenGate processes. It can be used to increase the throughput of large and heavily accessed tables and also can be used to divide data into sets for distribution to different destinations. Specify each range in a `FILTER` clause in a `TABLE` or `MAP` statement.

`@RANGE` is safe and scalable. It preserves data integrity by guaranteeing that the same row will always be processed by the same process group. To ensure that rows do not shift partitions to another process group and that the DML is performed in the correct order, the column on which you base the `@RANGE` partitioning must not ever change during a process run. Updates to the partition column may result in "row not found" errors or unique-constraint errors.

`@RANGE` computes a hash value of the columns specified in the input. If no columns are specified, the `KEYCOLS` clause of the `TABLE` or `MAP` statement is used to determine the columns to hash, if a `KEYCOLS` clause exists. Otherwise, the primary key columns are used.

Oracle GoldenGate adjusts the total number of ranges to optimize the even distribution across the number of ranges specified.

Because any columns can be specified for this function, rows in tables with relational constraints to one another must be grouped together into the same process or trail to preserve referential integrity.

Note:

Using Extract to calculate the ranges is more efficient than using Replicat. Calculating ranges on the target side requires Replicat to read through the entire trail to find the data that meets each range specification.

Syntax

```
@RANGE (range, total_ranges [, column] [, column] [, ...])
```

`range`
The range assigned to the specified process or trail. Valid values are `1`, `2`, `3`, and so forth, with the maximum value being the value defined by *`total_ranges`*.

`total_ranges`
The total number of ranges allocated. For example, to divide data into three groups, use the value `3`.

`column`
The name of a column on which to base the range allocation. This argument is optional. If not used, Oracle GoldenGate allocates ranges based on the table's primary key.

Examples

Example 1
In the following example, the replication workload is split into three ranges (between three Replicat processes) based on the `ID` column of the source `acct` table.
(Replicat group 1 parameter file)

```
MAP sales.acct, TARGET sales.acct, FILTER (@RANGE (1, 3, ID));
```

(Replicat group 2 parameter file)

```
MAP sales.acct, TARGET sales.acct, FILTER (@RANGE (2, 3, ID));
```

(Replicat group 3 parameter file)

```
MAP sales.acct, TARGET sales.acct, FILTER (@RANGE (3, 3, ID));
```

Example 2
In the following example, one Extract process splits the processing load into two trails. Since no columns were defined on which to base the range calculation, Oracle GoldenGate will use the primary key columns.

```
RMTTRAIL /ggs/dirdat/aa
TABLE fin.account, FILTER (@RANGE (1, 2));
RMTTRAIL /ggs/dirdat/bb
TABLE fin.account, FILTER (@RANGE (2, 2));
```

Example 3
In the following example, two tables have relative operations based on an `order_ID` column. The `order_master` table has a key of `order_ID`, and the `order_detail` table has a key of `order_ID` and `item_number`. Because the key `order_ID` establishes relativity, it is

used in @RANGE filters for both tables to preserve referential integrity. The load is split into two ranges.
(Parameter file #1)

```
MAP sales.order_master, TARGET sales.order_master,
FILTER (@RANGE (1, 2, order_ID));
MAP sales.order_detail, TARGET sales.order_detail,
FILTER (@RANGE (1, 2, order_ID));
```

(Parameter file #2)

```
MAP sales.order_master, TARGET sales.order_master,
FILTER (@RANGE (2, 2, order_ID));
MAP sales.order_detail, TARGET sales.order_detail,
FILTER (@RANGE (2, 2, order_ID));
```

5.25 STRCAT

Use the `@STRCAT` function to concatenate one or more strings or string (character) columns. Enclose literal strings within single quote marks.

For this function, Oracle GoldenGate supports the use of an escape sequence to represent characters in a string column in Unicode or in the native character encoding of the Microsoft Windows, UNIX, and Linux operating systems. The target column must be a SQL Unicode data type if any argument is supplied as Unicode.

Syntax

```
@STRCAT (string1, string2 [, ...])
```

string1
The first column or literal string to be concatenated.

string2
The next column or literal string to be concatenated.

Example

The following creates a phone number from three columns and includes the literal formatting values.

```
PHONE_NO = @STRCAT (AREA_CODE, PREFIX, '-', PHONE)
```

5.26 STRCMP

Use the `@STRCMP` function to compare two character columns or literal strings. Enclose literals within single quote marks.

`@STRCMP` returns the following:

- `-1` if the first string is less than the second.
- `0` if the strings are equal.
- `1` if the first string is greater than the second.

Trailing spaces are truncated before comparing the strings.

For this function, Oracle GoldenGate supports the use of an escape sequence to represent characters in a string column in Unicode or in the native character encoding of the Microsoft Windows, UNIX, and Linux operating systems.

This function does not support `NCHAR` or `NVARCHAR` data types.

Syntax

```
@STRCMP (string1, string2)
```

`string1`
The first column or literal string to be compared.

`string2`
The second column or literal string to be compared.

Example

The following example compares two literal strings and returns `1` because the first string is greater than the second one.

```
@STRCMP ('JOHNSON', 'JONES')
```

5.27 STREQ

Use the `@STREQ` function to determine whether or not two string (character) columns or literal strings are equal. Enclose literals within single quote marks. `@STREQ` returns the following:

- `1` (true) if the strings are equal.
- `0` (false) if the strings are not equal.

For this function, Oracle GoldenGate supports the use of an escape sequence to represent characters in a string column in Unicode or in the native character encoding of the Microsoft Windows, UNIX, and Linux operating systems.

Trailing spaces are truncated before comparing the strings.

This function does not support `NCHAR` or `NVARCHAR` data types.

Syntax

```
@STREQ (string1, string2)
```

`string1`
The first column or literal string to be compared.

`string2`
The second column or literal string to be compared.

Example

The following compares the value of the `region` column to the literal value `EAST`. If `region` = `EAST`, the record passes the filter.

```
FILTER (@STREQ (region, 'EAST'))
```

You could use `@STREQ` in a comparison to determine a result, as shown in the following example. If the state is `NY`, the expression returns `East Coast`. Otherwise, it returns `Other`.

```
@IF (@STREQ (state, 'NY'), 'East Coast', 'Other')
```

5.28 STREXT

Use the `@STREXT` function to extract a portion of a string.

For this function, Oracle GoldenGate supports the use of an escape sequence to represent characters in a string column in Unicode or in the native character encoding of the Microsoft Windows, UNIX, and Linux operating systems. The target column must be a SQL Unicode data type if any argument is supplied as Unicode.

This function does not support `NCHAR` or `NVARCHAR` data types.

Syntax

```
@STREXT (string, begin_position, end_position)
```

string
The string from which to extract. The string can be either the name of a character column or a literal string. Enclose literals within single quote marks.

begin_position
The character position at which to begin extraction.

end_position
The character position at which to end extraction. The end position is included in the extraction.

Example

The following example uses three `@STREXT` functions to extract a phone number into three different columns.

```
AREA_CODE = @STREXT (PHONE, 1, 3),
PREFIX = @STREXT (PHONE, 4, 6),
PHONE_NO = @STREXT (PHONE, 7, 10)
```

5.29 STRFIND

Use the `@STRFIND` function to determine the position of a string within a string column or else return zero if the string is not found. Optionally, `@STRFIND` can accept a starting position within the string.

For this function, Oracle GoldenGate supports the use of an escape sequence to represent characters in a string column in Unicode or in the native character encoding of the Microsoft Windows, UNIX, and Linux operating systems. The target column must be a SQL Unicode data type if any argument is supplied as Unicode.

This function does not support `NCHAR` or `NVARCHAR` data types.

Syntax

```
@STRFIND (string, 'search_string' [,  begin_position])
```

string
The string in which to search. This can be either the name of a character column or a literal string that is within single quote marks.

'search_string'
The string for which to search. Enclose the search string within single quote marks.

begin_position
The byte position at which to begin searching.

Example

Assuming the string for the `ACCT` column is `ABC123ABC`, the following are possible results.

Function statement	Result
`@STRFIND (ACCT, '23')`	5
`@STRFIND (ACCT, 'ZZ')`	0
`@STRFIND (ACCT, 'ABC', 2)`	7 (because the search started at the second byte)

5.30 STRLEN

Use the `@STRLEN` function to return the length of a string, expressed as the number of characters.

For this function, Oracle GoldenGate supports the use of an escape sequence to represent characters in a string column in Unicode or in the native character encoding of the Microsoft Windows, UNIX, and Linux operating systems. The target column must be a SQL Unicode data type if any argument is supplied as Unicode.

This function does not support `NCHAR` or `NVARCHAR` data types.

Syntax

```
@STRLEN (string)
```

string
The name of a string (character) column or a literal string. Enclose literals within single quote marks.

Examples

```
@STRLEN (ID_NO)
```

```
@STRLEN ('abcd')
```

5.31 STRLTRIM

Use the `@STRLTRIM` function to trim leading spaces.

For this function, Oracle GoldenGate supports the use of an escape sequence to represent characters in a string column in Unicode or in the native character encoding of the Microsoft Windows, UNIX, and Linux operating systems. The target column must be a SQL Unicode data type if any argument is supplied as Unicode.

Syntax

```
@STRLTRIM (string)
```

`string`
The name of a character column or a literal string that is enclosed within single quote marks.

Example

```
birth_state = @strltrim (state)
```

5.32 STRNCAT

Use the `@STRNCAT` function to concatenate one or more strings to a maximum length.

For this function, Oracle GoldenGate supports the use of an escape sequence to represent characters in a string column in Unicode or in the native character encoding of the Microsoft Windows, UNIX, and Linux operating systems. The target column must be a SQL Unicode data type if any argument is supplied as Unicode.

This function does not support `NCHAR` or `NVARCHAR` data types.

Syntax

```
@STRNCAT (string, max_length [, string, max_length] [, ...] )
```

`string`
The name of a string (character) column or a literal string that is enclosed within single quote marks.

`max_length`
The maximum string length, in characters.

Example

The following concatenates two strings and results in `ABC123`.

```
PHONE_NO = @STRNCAT ('ABCDEF', 3, '123456', 3)
```

5.33 STRNCMP

Use the `@STRNCMP` function to compare two strings based on a specific number of bytes. The string can be either the name of a string (character) column or a literal string that is enclosed within single quote marks. The comparison starts at the first byte in the string.

`@STRNCMP` returns the following:

- `-1` if the first string is less than the second.
- `0` if the strings are equal.
- `1` if the first string is greater than the second.

This function does not support `NCHAR` or `NVARCHAR` data types.

Syntax

`@STRNCMP (string1, string2, max_length)`

`string1`
The first string to be compared.

`string2`
The second string to be compared.

`max_length`
The maximum number of bytes in the string to compare.

Example

The following example compares the first two bytes of each string, as specified by a *`max_length`* of 2, and it returns `0` because both sets are the same.

```
@STRNCMP ('JOHNSON', 'JONES', 2)
```

5.34 STRNUM

Use the `@STRNUM` function to convert a number into a string and specify the output format and padding.

Syntax

`@STRNUM (column, {LEFT | LEFTSPACE, | RIGHT | RIGHTZERO} [length] )`

`column`
The name of a source numeric column.

`LEFT`
Left justify, without padding.

`LEFTSPACE`
Left justify, fill the rest of the target column with spaces.

`RIGHT`
Right justify, fill the rest of the target column with spaces. If the value of a column is a negative value, the spaces are added before the minus sign. For example, `strnum(Col1, right)` used for a column value of -1.27 becomes ###-1.27, assuming the target column allows 7 digits. The minus sign is not counted as a digit, but the decimal is.

`RIGHTZERO`
Right justify, fill the rest of the target column with zeros. If the value of a column is a negative value, the zeros are added after the minus sign and before the numbers. For example, `strnum(Col1, rightzero)` used for a column value of -1.27 becomes -0001.27, assuming the target column allows 7 digits. The minus sign is not counted as a digit, but the decimal is.

`length`
Specifies the output length, when any of the options are used that specify padding (all but `LEFT`). For example:

- `strnum(Col1, right, 6)` used for a column value of -1.27 becomes ##-1.27. The minus sign is not counted as a digit, but the decimal is.
- `strnum(Col1, rightzero, 6)` used for a column value of -1.27 becomes -001.27. The minus sign is not counted as a digit, but the decimal is.

Example

Assuming a source column named `NUM` has a value of 15 and the target column's maximum length is 5 characters, the following examples show the different types of results obtained with formatting options.

Function statement	Result (# denotes a space)
`CHAR1 = @STRNUM (NUM, LEFT)`	`15`
`CHAR1 = @STRNUM (NUM, LEFTSPACE)`	`15###`
`CHAR1 = @STRNUM (NUM, RIGHTZERO)`	`00015`
`CHAR1 = @STRNUM (NUM, RIGHT)`	`###15`

If an output *`length`* of 4 is specified in the preceding example, the following shows the different types of results.

Function statement	Result (# denotes a space)
`CHAR1 = @STRNUM (NUM, LEFTSPACE, 4)`	`15##`
`CHAR1 = @STRNUM (NUM, RIGHTZERO, 4)`	`0015`
`CHAR1 = @STRNUM (NUM, RIGHT, 4)`	`##15`

5.35 STRRTRIM

Use the `@STRRTRIM` function to trim trailing spaces.

For this function, Oracle GoldenGate supports the use of an escape sequence to represent characters in a string column in Unicode or in the native character encoding of the Microsoft Windows, UNIX, and Linux operating systems. The target column must be a SQL Unicode data type if any argument is supplied as Unicode.

Syntax

```
@STRRTRIM (string)
```

`string`
The name of a character column or a literal string that is enclosed within single quote marks.

Example

```
street_address = @strrtrim (address)
```

5.36 STRSUB

Use the `@STRSUB` function to substitute strings within a string (character) column or constant. Enclose literal strings within single quote marks.

For this function, Oracle GoldenGate supports the use of an escape sequence to represent characters in a string column in Unicode or in the native character encoding of the Microsoft Windows, UNIX, and Linux operating systems. The target column must be a SQL Unicode data type if any argument is supplied as Unicode.

Any single byte code value 1 to 255 can be used in hexadecimal or octal format for the string arguments. Hex values A to F are case insensitive and the leading '`x`' must be lower case. Value zero (0) (`\x00` and `\000`) is not allowed because it is a string terminator. No multibyte character set value or UNICODE values are supported.

This function does not support `NCHAR` or `NVARCHAR` data types.

Syntax

```
@STRSUB
(source_string, search_string, substitute_string
[, search_string, substitute_string] [, ...])
```

`source_string`
A source string, within single quotes, or the name of a source column that contains the characters for which substitution is to occur.

`search_string`
The string, within single quotes, for which substitution is to occur.

`substitute_string`
The string, within single quotes, that will be substituted for the search string.

Examples

Example 1
The following returns `xxABCxx`.

```
@STRSUB ('123ABC123', '123', 'xx')
```

Example 2
The following returns `023zBC023`.

```
@STRSUB ('123ABC123', 'A', 'z', '1', '0')
```

Example 3
The following is an example of replacing `^Z`, using a hexadecimal string argument, with a space.

```
@strsub (col1,'\x1A',' '));
```

5.37 STRTRIM

Use the @STRTRIM function to trim leading and trailing spaces.

For this function, Oracle GoldenGate supports the use of an escape sequence to represent characters in a string column in Unicode or in the native character encoding of the Microsoft Windows, UNIX, and Linux operating systems. The target column must be a SQL Unicode data type if any argument is supplied as Unicode.

Syntax

```
@STRTRIM (string)
```

string
The name of a character column or a literal string that is enclosed within single quote marks.

Example

```
pin_no = @strtrim (custpin)
```

5.38 STRUP

Use the @STRUP function to change an alphanumeric string or string (character) column to upper case.

For this function, Oracle GoldenGate supports the use of an escape sequence to represent characters in a string column in Unicode or in the native character encoding of the Microsoft Windows, UNIX, and Linux operating systems. The target column must be a SQL Unicode data type if any argument is supplied as Unicode.

This function does not support NCHAR or NVARCHAR data types.

Syntax

```
@STRUP (string)
```

string
The name of a character column or a literal string that is enclosed within single quote marks.

Example

The following returns SALESPERSON.

```
@STRUP ('salesperson')
```

5.39 TOKEN

Use the @TOKEN function to retrieve token data that is stored in the user token area of the Oracle GoldenGate record header. You can map token data to a target column by using @TOKEN in the source expression of a COLMAP clause. As an alternative, you can use @TOKEN within a SQLEXEC statement, an Oracle GoldenGate macro, or a user exit.

To define token data, use the `TOKENS` clause of the `TABLE` parameter in the Extract parameter file. For more information about using tokens, see Administering Oracle GoldenGate for Windows and UNIX.

Syntax

```
@TOKEN ('token')
```

`'token'`
The name, enclosed within single quote marks, of the token for which data is to be retrieved.

Example

In the following example, 10 tokens are mapped to target columns.

```
MAP ora.oratest, TARGET ora.rpt,
COLMAP (
host = @token ('tk_host'),
gg_group = @token ('tk_group'),
osuser = @token ('tk_osuser'),
domain = @token ('tk_domain'),
ba_ind = @token ('tk_ba_ind'),
commit_ts = @token ('tk_commit_ts'),
pos = @token ('tk_pos'),
rba = @token ('tk_rba'),
tablename = @token ('tk_table'),
optype = @token ('tk_optype')
);
```

5.40 VALONEOF

Use the `@VALONEOF` function to compare a string or string (character) column to a list of values. If the value or column is in the list, `1` is returned; otherwise `0` is returned. This function trims trailing spaces before the comparison.

For this function, Oracle GoldenGate supports the use of an escape sequence to represent characters in a string column in Unicode or in the native character encoding of the Microsoft Windows, UNIX, and Linux operating systems. The target column must be a SQL Unicode data type if any argument is supplied as Unicode.

This function does not support `NCHAR` or `NVARCHAR` data types.

Syntax

```
@VALONEOF (expression, value [, value] [, ...])
```

`expression`
The name of a character column or a literal enclosed within single quote marks.

`value`
A criteria value.

Example

In the following example, if `STATE` is `CA` or `NY`, the expression returns `COAST`, which is the response returned by `@IF` when the value is non-zero (`true`). Otherwise, the expression returns `MIDDLE`.

```
@IF (@VALONEOF (STATE, 'CA', 'NY'), 'COAST', 'MIDDLE')
```

6

User Exit Functions

This chapter describes the Oracle GoldenGate user exit functions and their syntax and includes the following topics:

- Calling a User Exit
- Summary of User Exit Functions
- Using EXIT_CALL_TYPE
- Using EXIT_CALL_RESULT
- Using EXIT_PARAMS
- Using ERCALLBACK
- Function Codes

For more information about using Oracle GoldenGate user exits, see *Administering Oracle GoldenGate for Windows and UNIX*.

6.1 Calling a User Exit

Write the user exit routine in C programming code. Use the `CUSEREXIT` parameter to call the user exit from a Windows DLL or UNIX shared object at a defined exit point within Oracle GoldenGate processing. Your user exit routine must be able to accept different events and information from the Extract and Replicat processes, process the information as desired, and return a response and information to the caller (the Oracle GoldenGate process that called it). For more information and syntax for the `CUSEREXIT` parameter, see "CUSEREXIT".

6.2 Summary of User Exit Functions

Parameter	Description
`EXIT_CALL_TYPE`	Indicates when, during processing, the routine is called.
`EXIT_CALL_RESULT`	Provides a response to the routine.
`EXIT_PARAMS`	Supplies information to the routine.
`ERCALLBACK`	Implements a callback routine. Callback routines retrieve record and Oracle GoldenGate context information, and they modify the contents of data records.

6.3 Using EXIT_CALL_TYPE

Use `EXIT_CALL_TYPE` to indicate when, during processing, the Extract or Replicat process (the caller) calls a user exit routine. A process can call a routine with the following calls.

Table 6-1 User Exit Calls

Call type	Processing point
`EXIT_CALL_ABORT_TRANS`	Valid when the `RECOVERYOPTIONS` mode is `APPEND` (the default). Called when a data pump or Replicat reads a `RESTART ABEND` record from the trail, placed there by a writer process that abended. (The writer process can be the primary Extract writing to a local trail read by a data pump, or a data pump writing to a remote trail read by Replicat.) This call type enables the user exit to abort or discard the transaction that was left incomplete when the writer process stopped, and then to recover and resume processing at the start of the previous completed transaction.
`EXIT_CALL_BEGIN_TRANS`	Called just before either of the following: • a `BEGIN` record of a transaction that is read by a data pump • the start of a Replicat transaction
`EXIT_CALL_CHECKPOINT`	Called just before an Extract or Replicat checkpoint is written.
`EXIT_CALL_DISCARD_ASCII_RECORD`	Called during Extract processing before an ASCII input record is written to the discard file. The associated ASCII buffer can be retrieved and manipulated by the user exit using callback routines. This call type is not applicable for use with the Replicat process.
`EXIT_CALL_DISCARD_RECORD`	Called during Replicat processing before a record is written to the discard file. Records can be discarded for several reasons, such as when a value in the Oracle GoldenGate change record is different from the current version in the target table.The associated discard buffer can be retrieved and manipulated by the user exit using callback routines. This call type is not applicable for use with the Extract process.
`EXIT_CALL_END_TRANS`	Called just after either of the following: • an `END` record of a transaction that is read by a data pump • the last record in a Replicat transaction
`EXIT_CALL_FATAL_ERROR`	Called during Extract or Replicat processing just before Oracle GoldenGate terminates after a fatal error.
`EXIT_CALL_PROCESS_MARKER`	Called during Replicat processing when a marker from a NonStop server is read from the trail, and before writing to the marker history file.
`EXIT_CALL_PROCESS_RECORD`	• For Extract, called before a record buffer is output to the trail. • For Replicat, called just before a replicated operation is performed. This call is the basis of most user exit processing. When `EXIT_CALL_PROCESS_RECORD` is called, the record buffer and other record information are available to the user exit through callback routines. If source-target mapping is specified in the parameter file, the mapping is performed before the `EXIT_CALL_PROCESS_RECORD` event takes place. The user exit can map, transform, clean, or perform virtually any other operation with the record. The user exit can return a status indicating whether the caller should process or ignore the record.
`EXIT_CALL_START`	Called at the start of processing. The user exit can perform initialization work, such as opening files and initializing variables.
`EXIT_CALL_STOP`	Called before the process stops gracefully or ends abnormally. The user exit can perform completion work, such as closing files or outputting totals.
`EXIT_CALL_RESULT`	Set by the user exit routines to instruct the caller how to respond when each exit call completes.

6.4 Using EXIT_CALL_RESULT

Use EXIT_CALL_RESULT to provide a response to the routine.

Table 6-2 User Exit Responses

Call result	Description
EXIT_ABEND_VAL	Instructs the caller to terminate immediately.
EXIT_IGNORE_VAL	Rejects records for further processing. EXIT_IGNORE_VAL is appropriate when the user exit performs all the required processing for a record and there is no need to output or replicate the data record.
EXIT_OK_VAL	If the routine does nothing to respond to an event, EXIT_OK_VAL is assumed. If the exit call type is any of the following... • EXIT_CALL_PROCESS_RECORD • EXIT_CALL_DISCARD_RECORD • EXIT_CALL_DISCARD_ASCII_RECORD ... and EXIT_OK_VAL is returned, then Oracle GoldenGate processes the record buffer that was returned by the user exit.
EXIT_PROCESSED_REC_VAL	Instructs Extract or Replicat to skip the record, but update the statistics that are printed to the report file for that table and for that operation type.
EXIT_STOP_VAL	Instructs the caller to stop processing gracefully. EXIT_STOP_VAL or EXIT_ABEND_VAL may be appropriate when an error condition occurs in the user exit.

6.5 Using EXIT_PARAMS

Use EXIT_PARAMS to supply information to the user exit routine, such as the program name and user-defined parameters. You can process a single data record multiple times.

Table 6-3 User Exit Input

Exit parameter	Description
PROGRAM_NAME	Specifies the full path and name of the calling process, for example \ggs\extract or \ggs\replicat. Use this parameter when loading an Oracle GoldenGate callback routine using the Windows API or to identify the calling program when user exits are used with both Extract and Replicat processing.
FUNCTION_PARAM	• Allows you to pass a parameter that is a literal string to the user exit. Specify the parameter with the EXITPARAM option of the TABLE or MAP statement from which the parameter will be passed. See "EXITPARAM '*parameter*'". This is only valid during the exit call to process a specific record. • FUNCTION_PARAM can also be used at the exit call startup event to pass the parameters that are specified in the PARAMS option of the CUSEREXIT parameter. (See "CUSEREXIT".) This is only valid to supply a global parameter at exit startup.

Table 6-3 (Cont.) User Exit Input

Exit parameter	Description
`MORE_RECS_IND`	Set on return from an exit. For database records, determines whether Extract or Replicat processes the record again. This allows the user exit to output many records per record processed by Extract, a common function when converting Enscribe to SQL (data normalization). To request the same record again, set `MORE_RECS_IND` to `CHAR_NO_VAL` or `CHAR_YES_VAL`.

6.6 Using ERCALLBACK

Use `ERCALLBACK` to execute a callback routine. A user callback routine retrieves context information from the Extract or Replicat process and sets context values, including the record itself, when the call type is one of the following:

- `EXIT_CALL_PROCESS_RECORD`
- `EXIT_CALL_DISCARD_RECORD`
- `EXIT_CALL_DISCARD_ASCII_RECORD`

Syntax

```
ERCALLBACK (function_code, buffer, result_code );
```

`function_code`
The function to be executed by the callback routine. The user callback routine behaves differently based on the function code passed to the callback routine. While some functions can be used for both Extract and Replicat, the validity of the function in one process or the other is dependent on the input parameters that are set for that function during the callback routine. See Function Codes for a full description of available function codes.

`buffer`
A void pointer to a buffer containing a predefined structure associated with the specified function code.

`result_code`
The status of the function executed by the callback routine. The result code returned by the callback routine indicates whether or not the callback function was successful. A result code can be one of the values in Table 6-4.

Table 6-4 Result Codes

Code	Description
`EXIT_FN_RET_BAD_COLUMN_DATA`	Invalid data was encountered when retrieving or setting column data.
`EXIT_FN_RET_BAD_DATE_TIME`	A date, timestamp, or interval type `of` column contains an invalid date or time value.
`EXIT_FN_RET_BAD_NUMERIC_VALUE`	A numeric type of column contains an invalid numeric value.
`EXIT_FN_RET_COLUMN_NOT_FOUND`	The column was not found in a compressed update record (update by a database that only logs the values that were changed).
`EXIT_FN_RET_ENV_NOT_FOUND`	The specified environment value could not be found in the record.

Table 6-4 (Cont.) Result Codes

Code	Description
`EXIT_FN_RET_EXCEEDED_MAX_LENGTH`	The metadata could not be retrieved because the name of the table or column did not fit in the allocated buffer.
`EXIT_FN_RET_FETCH_ERROR`	The record could not be fetched. View the error message to see the reason.
`EXIT_FN_RET_INCOMPLETE_DDL_REC`	An internal error occurred when processing the DDL record. The record is probably incomplete.
`EXIT_FN_RET_INVALID_CALLBACK_FNC_CD`	An invalid callback function code was passed to the callback routine.
`EXIT_FN_RET_INVALID_COLUMN`	A non-existent column was referred to in the function call.
`EXIT_FN_RET_INVALID_COLUMN_TYPE`	The routine is trying to manipulate a data type that is not supported by Oracle GoldenGate for that purpose.
`EXIT_FN_RET_INVALID_CONTEXT`	The callback function was called at an improper time.
`EXIT_FN_RET_INVALID_PARAM`	An invalid parameter was passed to the callback function.
`EXIT_FN_RET_NO_SRCDB_INSTANCE`	The source database instance could not be found.
`EXIT_FN_RET_NO_TGTDB_INSTANCE`	The target database instance could not be found.
`EXIT_FN_RET_NOT_SUPPORTED`	This function is not supported for this process.
`EXIT_FN_RET_OK`	The callback function succeeded.
`EXIT_FN_RET_SESSION_CS_CNV_ERR`	A `ULIB_ERR_INVALID_CHAR_FOUND` error was returned to the character-set conversion routine. The conversion failed.
`EXIT_FN_RET_TABLE_NOT_FOUND`	An invalid table name was specified.
`EXIT_FN_RET_TOKEN_NOT_FOUND`	The specified user token could not be found in the record.

6.7 Function Codes

Function codes determine the output of the callback routine. The callback routine expects the contents of the data buffer to match the structure of the specified function code. The callback routine function codes and their data buffers are described in the following sections. The following is a summary of available functions.

Table 6-5 Summary of Oracle GoldenGate Function Codes

Function code	Description
COMPRESS_RECORD	Use the `COMPRESS_RECORD` function when some, but not all, of a target table's columns are present after mapping and the entire record must be manipulated, rather than individual column values.
DECOMPRESS_RECORD	Use the `DECOMPRESS_RECORD` function when some, but not all, of a target table's columns are present after mapping and the entire record must be manipulated, rather than individual column values.
GET_BASE_OBJECT_NAME	Use the `GET_BASE_OBJECT_NAME` function to retrieve the fully qualified name of the base object of an object in a record.
GET_BASE_OBJECT_NAME_ONLY	Use the `GET_BASE_OBJECT_NAME_ONLY` function to retrieve only the name of the base object of an object in a record.

Table 6-5 (Cont.) Summary of Oracle GoldenGate Function Codes

Function code	Description
GET_BASE_SCHEMA_NAME_ONLY	Use the `GET_BASE_SCHEMA_NAME_ONLY` function to retrieve only the name of the schema of the base object of an object in a record.
GET_BEFORE_AFTER_IND	Use the `GET_BEFORE_AFTER_IND` function to determine whether a record is a before image or an after image of the database operation.
GET_CATALOG_NAME_ONLY	Use the `GET_CATALOG_NAME_ONLY` function to return the name of the database catalog.
GET_COL_METADATA_FROM_INDEX	Use the `GET_COL_METADATA_FROM_INDEX` function to determine the column metadata that is associated with a specified column index.
GET_COL_METADATA_FROM_NAME	Use the `GET_COL_METADATA_FROM_NAME` function to determine the column metadata that is associated with a specified column name.
GET_COLUMN_INDEX_FROM_NAME	Use the `GET_COLUMN_INDEX_FROM_NAME` function to determine the column index associated with a specified column name.
GET_COLUMN_NAME_FROM_INDEX	Use the `GET_COLUMN_NAME_FROM_INDEX` function to determine the column name associated with a specified column index.
GET_COLUMN_VALUE_FROM_INDEX	Use the `GET_COLUMN_VALUE_FROM_INDEX` function to return the column value from the data record using the specified column index.
GET_COLUMN_VALUE_FROM_NAME	Use the `GET_COLUMN_VALUE_FROM_NAME` function to return the column value from the data record by using the specified column name.
GET_DATABASE_METADATA	Use the `GET_DATABASE_METADATA` function to return database metadata.
GET_DDL_RECORD_PROPERTIES	Use the `GET_DDL_RECORD_PROPERTIES` function to return information about a DDL operation.
GET_ENV_VALUE	Use the `GET_ENV_VALUE` function to return information about the Oracle GoldenGate environment.
GET_ERROR_INFO	Use the `GET_ERROR_INFO` function to return error information associated with a discard record.
GET_GMT_TIMESTAMP	Use the `GET_GMT_TIMESTAMP` function to return the operation commit timestamp in GMT format.
GET_MARKER_INFO	Use the `GET_MARKER_INFO` function to return marker information when posting data. Use markers to trigger custom processing within a user exit.
GET_OBJECT_NAME	Returns the fully qualified two- or three-part name of a table or other object that is associated with the record that is being processed.
GET_OBJECT_NAME_ONLY	Returns the unqualified name of a table or other object that is associated with the record that is being processed.
GET_OPERATION_TYPE	Use the `GET_OPERATION_TYPE` function to determine the operation type associated with a record.
GET_POSITION	Use the `GET_POSITION` function is obtain a read position of an Extract data pump or Replicat in the Oracle GoldenGate trail.
GET_RECORD_BUFFER	Use the `GET_RECORD_BUFFER` function to obtain information for custom column conversions.
GET_RECORD_LENGTH	Use the `GET_RECORD_LENGTH` function to return the length of the data record.
GET_RECORD_TYPE	Use the `GET_RECORD_TYPE` function to return the type of record being processed

Table 6-5 (Cont.) Summary of Oracle GoldenGate Function Codes

Function code	Description
GET_SCHEMA_NAME_ONLY	Use the `GET_SCHEMA_NAME_ONLY` function to return only the schema name of a table.
GET_SESSION_CHARSET	Use the `GET_SESSION_CHARSET` function to return the character set of the user exit session.
GET_STATISTICS	Use the `GET_STATISTICS` function to return the current processing statistics for the Extract or Replicat process.
GET_TABLE_COLUMN_COUNT	Use the `GET_TABLE_COLUMN_COUNT` function to return the total number of columns in a table.
GET_TABLE_METADATA	Use the `GET_TABLE_METADATA` function to return metadata for the table that associated with the record that is being processed.
GET_TABLE_NAME	Use the `GET_TABLE_NAME` function to return the fully qualified two- or three-part name of the source or target table that is associated with the record that is being processed.
GET_TABLE_NAME_ONLY	Use the `GET_TABLE_NAME_ONLY` function to return only the unqualified name of the table that is associated with the record that is being processed.
GET_TIMESTAMP	Use the `GET_TIMESTAMP` function to return the I/O timestamp associated with a source data record.
GET_TRANSACTION_IND	Use the `GET_TRANSACTION_IND` function to determine whether a data record is the first, last or middle operation in a transaction,
GET_USER_TOKEN_VALUE	Use the `GET_USER_TOKEN_VALUE` function to obtain the value of a user token from a trail record.
OUTPUT_MESSAGE_TO_REPORT	Use the `OUTPUT_MESSAGE_TO_REPORT` function to output a message to the report file.
RESET_USEREXIT_STATS	Use the `RESET_USEREXIT_STATS` function to reset the statistics for the Oracle GoldenGate process.
SET_COLUMN_VALUE_BY_INDEX	Use the `SET_COLUMN_VALUE_BY_INDEX` function to modify a single column value without manipulating the entire data record.
STRNCMP	Use the `SET_COLUMN_VALUE_BY_NAME` function to modify a single column value without manipulating the entire data record.
SET_OPERATION_TYPE	Use the `SET_OPERATION_TYPE` function to change the operation type associated with a data record.
SET_RECORD_BUFFER	Use the `SET_RECORD_BUFFER` function for compatibility with HP NonStop user exits, and for complex data record manipulation.
SET_SESSION_CHARSET	Use the `SET_SESSION_CHARSET` function to set the character set of the user exit session.
SET_TABLE_NAME	Use the `SET_TABLE_NAME` function to change the table name associated with a data record.

6.8 COMPRESS_RECORD

Valid For

Extract and Replicat

Description

Use the COMPRESS_RECORD function to re-compress records that have been decompressed with the DECOMPRESS_RECORD function. Call COMPRESS_RECORD only *after* using DECOMPRESS_RECORD.

The content of the record buffer is not converted to or from the character set of the user exit. It is passed as-is.

Syntax

```
#include "usrdecs.h"
short result_code;
compressed_rec_def compressed_rec;
ERCALLBACK (COMPRESS_RECORD, &compressed_rec, &result_code);
```

Buffer

```
typedef struct
{
char *compressed_rec;
long compressed_len;
char *decompressed_rec;
long decompressed_len;
short *columns_present;
short source_or_target;
char requesting_before_after_ind;
} compressed_rec_def;
```

Input

decompressed_rec
A pointer to the buffer containing the record before compression. The record is assumed to be in the default Oracle GoldenGate canonical format.

decompressed_len
The length of the decompressed record.

source_or_target
One of the following to indicate whether the source or target record is being compressed.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

requesting_before_after_ind
Used as internal input. Does not need to be set. If set, it will be ignored.

columns_present
An array of values that indicates the columns present in the compressed record. For example, if the first, third and sixth columns exist in the compressed record, and the total number of columns in the table is seven, the array should contain:

```
1, 0, 1, 0, 0, 1, 0
```

Use the GET_TABLE_COLUMN_COUNT function to get the number of columns in the table (see "GET_TABLE_COLUMN_COUNT").

Output

`compressed_rec`
A pointer to the record returned in compressed format. Typically, `compressed_rec` is a pointer to a buffer of type `exit_rec_buf_def`. The `exit_rec_buf_def` buffer contains the actual record about to be processed by Extract or Replicat. The buffer is supplied when the call type is `EXIT_CALL_DISCARD_RECORD`. Exit routines may change the contents of this buffer, for example to perform custom mapping functions. The caller must ensure that the appropriate amount of memory is allocated to `compressed_rec`.

`compressed_len`
The returned length of the compressed record.

Return Values

```
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_OK
EXIT_FN_RET_INVALID_PARAM
```

6.9 DECOMPRESS_RECORD

Valid For

Extract and Replicat

Description

Use the `DECOMPRESS_RECORD` function when you want to retrieve or manipulate an entire update record with the `GET_RECORD_BUFFER` (see "GET_RECORD_BUFFER") or `SET_RECORD_BUFFER` function (see "SET_RECORD_BUFFER") and the record is compressed. `DECOMPRESS_RECORD` makes compressed records easier to process and map by putting the record into its logical column layout. The columns that are present will be in the expected positions without the index and length indicators (see "Compressed Record Format"). The missing columns will be represented as zeroes. When used, `DECOMPRESS_RECORD` should be invoked before any manipulation occurs. After the user exit processing is completed, use the `COMPRESS_RECORD` function (see "COMPRESS_RECORD") to re-compress the record before returning it to the Oracle GoldenGate process.

This function is valid for processing `UPDATE` operations only. Deletes, inserts and updates appear in the buffer as full record images.

The content of the record buffer is not converted to or from the character set of the user exit. It is passed as-is.

Compressed Record Format

Compressed SQL updates have the following format:

```
index length value [index length value ][...]
```

where:

- *`index`* is a two-byte index into the list of columns of the table (first column is zero).
- *`length`* is the two-byte length of the table.

- `value` is the actual column value, including one of the following two-byte null indicators when applicable. `0` is not null. `-1` is null.

Syntax

```
#include "usrdecs.h"
short result_code;
compressed_rec_def compressed_rec;
ERCALLBACK (DECOMPRESS_RECORD, &compressed_rec, &result_code);
```

Buffer

```
typedef struct
{
char *compressed_rec;
long compressed_len;
char *decompressed_rec;
long decompressed_len;
short *columns_present;
short source_or_target;
char requesting_before_after_ind;
} compressed_rec_def;
```

Input

`compressed_rec`
A pointer to the record in compressed format. Use the `GET_RECORD_BUFFER` function to obtain this value (see "GET_RECORD_BUFFER").

`compressed_len`
The length of the compressed record. Use the `GET_RECORD_BUFFER` (see "GET_RECORD_BUFFER") or `GET_RECORD_LENGTH` (see "GET_RECORD_LENGTH") function to get this value.

`source_or_target`
One of the following to indicate whether the source or target record is being decompressed.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

`requesting_before_after_ind`
Used as internal input. Does not need to be set. If set, it will be ignored.

Output

`decompressed_rec`
A pointer to the record returned in decompressed format. The record is assumed to be in the Oracle GoldenGate internal canonical format. The caller must ensure that the appropriate amount of memory is allocated to `decompressed_rec`.

`decompressed_len`
The returned length of the decompressed record.

`columns_present`
An array of values that indicate the columns present in the compressed record. For example, if the first, third and sixth columns exist in the compressed record, and the total number of columns in the table is seven, the array should contain:

```
1, 0, 1, 0, 0, 1, 0
```

This array helps mapping functions determine when and whether a compressed column should be mapped.

Return Values

```
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_OK
EXIT_FN_RET_INVALID_PARAM
```

6.10 GET_BASE_OBJECT_NAME

Valid For

Extract and Replicat

Description

Use the `GET_BASE_OBJECT_NAME` function to retrieve the fully qualified name of the base object of a source or target object that is associated with the record being processed. This function is valid tables and other objects in a DDL operation.

To return only part of the base object name, see the following:

GET_BASE_OBJECT_NAME_ONLY GET_BASE_SCHEMA_NAME_ONLY

Database object names are returned exactly as they are defined in the hosting database, including the letter case.

Syntax

```
#include "usrdecs.h"
short result_code;
env_value_def env_value;
ERCALLBACK (GET_BASE_OBJECT_NAME, &env_value, &result_code);
```

Buffer

```
typedef struct
{
char *buffer;
long max_length;
long actual_length;
short value_truncated;
short index;
short source_or_target;
} env_value_def;
```

Input

`buffer`
A pointer to a buffer to accept the returned object name. The name is null-terminated.

`max_length`
The maximum length of your allocated buffer to accept the object name. This is returned as a `NULL` terminated string.

`source_or_target`
One of the following indicating whether to return the source or target object name.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

Output

`buffer`
The fully qualified, null-terminated object name, for example `schema.object` or `catalog.schema.object`, depending on the database platform.
If the character session of the user exit is set with `SET_SESSION_CHARSET` to a value other than the default character set of the operating system, as defined in `ULIB_CS_DEFAULT` in the `ucharset.h` file, the object name is interpreted in the session character set.

`actual length`
The string length of the returned object name. The actual length does not include the null terminator. The actual length is 0 if the object is a table.

`value_truncated`
A flag (`0` or `1`) indicating whether or not the value was truncated. Truncation occurs if the length of the object name plus the null terminator exceeds the maximum buffer length.

Return Values

```
EXIT_FN_RET_INVALID_COLUMN
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_OK
```

6.11 GET_BASE_OBJECT_NAME_ONLY

Valid For

Extract and Replicat

Description

Use the `GET_BASE_OBJECT_NAME_ONLY` function to retrieve the unqualified name (without the catalog, container, or schema) of the base object of a source or target object that is associated with the record that is being processed. This function is valid for tables and other objects in a DDL operation.

To return the fully qualified name of a base object, see the following:

GET_OBJECT_NAME

To return only the schema of the base object, see the following:

GET_BASE_SCHEMA_NAME_ONLY

Database object names are returned exactly as they are defined in the hosting database, including the letter case.

Syntax

```
#include "usrdecs.h"
short result_code;
env_value_def env_value;
ERCALLBACK (GET_BASE_OBJECT_NAME_ONLY, &env_value, &result_code);
```

Buffer

```
typedef struct
{
char *buffer;
long max_length;
long actual_length;
short value_truncated;
short index;
short source_or_target;
} env_value_def;
```

Input

`buffer`
A pointer to a buffer to accept the returned object name. The name is null-terminated.

`max_length`
The maximum length of your allocated buffer to accept the object name. This is returned as a `NULL` terminated string.

`source_or_target`
One of the following indicating whether to return the source or target object name.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

Output

`buffer`
The fully qualified, null-terminated object name, for example `schema.object` or `catalog.schema.object`, depending on the database platform.
If the character session of the user exit is set with `SET_SESSION_CHARSET` to a value other than the default character set of the operating system, as defined in `ULIB_CS_DEFAULT` in the `ucharset.h` file, the object name is interpreted in the session character set.

`actual length`
The string length of the returned object name. The actual length does not include the null terminator. The actual length is 0 if the object is a table.

`value_truncated`
A flag (`0` or `1`) indicating whether or not the value was truncated. Truncation occurs if the length of the object name plus the null terminator exceeds the maximum buffer length.

Return Values

```
EXIT_FN_RET_INVALID_COLUMN
EXIT_FN_RET_INVALID_CONTEXT
```

```
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_OK
```

6.12 GET_BASE_SCHEMA_NAME_ONLY

Description

Use the `GET_BASE_SCHEMA_NAME_ONLY` function to retrieve the name of the owner (such as schema), but not the name, of the base object of the source or target object associated with the record being processed. This function is valid for DDL operations.

To return the fully qualified name of a base object, see the following:

GET_BASE_OBJECT_NAME

To return only the unqualified base object name, see the following:

GET_BASE_OBJECT_NAME_ONLY

Database object names are returned exactly as they are defined in the hosting database, including the letter case.

Syntax

```
#include "usrdecs.h"
short result_code;
env_value_def env_value;
ERCALLBACK (GET_BASE_SCHEMA_NAME_ONLY, &env_value, &result_code);
```

Buffer

```
typedef struct
{
char *buffer;
long max_length;
long actual_length;
short value_truncated;
short index;
short source_or_target;
} env_value_def;
```

Input

`buffer`
A pointer to a buffer to accept the returned schema name. The name is null-terminated.

`max_length`
The maximum length of your allocated buffer to accept the schema name. This is returned as a `NULL` terminated string.

`source_or_target`
One of the following indicating whether to return the source or target schema name.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

Output

`buffer`
The fully qualified, null-terminated schema name.
If the character session of the user exit is set with `SET_SESSION_CHARSET` to a value other than the default character set of the operating system, as defined in `ULIB_CS_DEFAULT` in the `ucharset.h` file, the schema name is interpreted in the session character set.

`actual_length`
The string length of the returned name. The actual length does not include the null terminator.

`value_truncated`
A flag (`0` or `1`) indicating whether or not the value was truncated. Truncation occurs if the length of the schema name plus the null terminator exceeds the maximum buffer length.

Return Values

```
EXIT_FN_RET_INVALID_COLUMN
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_OK
```

6.13 GET_BEFORE_AFTER_IND

Valid For

Extract and Replicat

Description

Use the `GET_BEFORE_AFTER_IND` function to determine whether a record is a before image or an after image of the database operation. `INSERT`s are after images, `DELETE`s are before images, and `UPDATE`s can be either before or after images (see the Extract and Replicat parameters `GETUPDATEBEFORES` and `GETUPDATEAFTERS`). If the before images of `UPDATE` operations are being extracted, the before images precede the after images within the same update.

Syntax

```
#include "usrdecs.h"
short result_code;
record_def record;
ERCALLBACK (GET_BEFORE_AFTER_IND, &record, &result_code);
```

Buffer

```
typedef struct
{
char *table_name;
char *buffer;
long length;
char before_after_ind;
short io_type;
short record_type;
short transaction_ind;
int64_t timestamp;
exit_ts_str io_datetime;
short mapped;
short source_or_target;
/* Version 2 CALLBACK_STRUCT_VERSION   */
char requesting_before_after_ind;
} record_def;
```

Input

None

Output

`before_after_ind`
One of the following to indicate whether the record is a before or after image.

```
BEFORE_IMAGE_VAL
AFTER_IMAGE_VAL
```

Return Values

```
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_OK
```

6.14 GET_CATALOG_NAME_ONLY

Valid For

Extract and Replicat

Description

Use the `GET_CATALOG_NAME_ONLY` function to retrieve the name of the SQL/MX catalog or Oracle CDB container, but not the name of the owner (such as schema) or object, of the source or target object associated with the record being processed. This function is valid for DML and DDL operations.

To return the fully qualified name of a table, see the following:

GET_TABLE_NAME

To return the fully qualified name of a non-table object, such as a user, view or index, see the following:

GET_OBJECT_NAME

To return only the unqualified table or object name, see the following:

GET_TABLE_NAME_ONLY

GET_OBJECT_NAME_ONLY

To return other parts of the table or object name, see the following:

GET_SCHEMA_NAME_ONLY

Database object names are returned exactly as they are defined in the hosting database, including the letter case.

Syntax

```
#include "usrdecs.h"
short result_code;
env_value_def env_value;
ERCALLBACK (GET_CATALOG_NAME_ONLY, &env_value, &result_code);
```

Buffer

```
typedef struct
{
char *buffer;
long max_length;
long actual_length;
short value_truncated;
short index;
short source_or_target;
} env_value_def;
```

Input

`buffer`
A pointer to a buffer to accept the returned catalog name. The name is null-terminated.
If the character session of the user exit is set with `SET_SESSION_CHARSET` to a value other than the default character set of the operating system, as defined in `ULIB_CS_DEFAULT` in the `ucharset.h` file, the catalog name is interpreted in the session character set.

`max_length`
The maximum length of your allocated buffer to accept the name. This is returned as a `NULL` terminated string.

`source_or_target`
One of the following indicating whether to return the source or target table catalog.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

Output

`buffer`
The fully qualified, null-terminated catalog name.

`actual_length`
The string length of the returned name. The actual length does not include the null terminator.

`value_truncated`
A flag (`0` or `1`) indicating whether or not the value was truncated. Truncation occurs if the length of the catalog name plus the null terminator exceeds the maximum buffer length.

Return Values

```
EXIT_FN_RET_INVALID_COLUMN
EXIT_FN_RET_INVALID_CONTEXT
```

```
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_OK
```

6.15 GET_COL_METADATA_FROM_INDEX

Valid For

Extract and Replicat

Description

Use the `GET_COL_METADATA_FROM_INDEX` function to retrieve column metadata by specifying the index of the desired column.

Database object names are returned exactly as they are defined in the hosting database, including the letter case.

Syntax

```
#include "usrdecs.h"
short result_code;
col_metadata_def column_meta_rec;
ERCALLBACK (GET_COL_METADATA_FROM_INDEX, &column_meta_rec, &result_code);
```

Buffer

```
typedef struct
{
  short column_index;
  char *column_name;
  long max_name_length;
  short native_data_type;
  short gg_data_type;
  short gg_sub_data_type;
  short is_nullable;
  short is_part_of_key;
  short key_column_index;
  short length;
  short precision;
  short scale;
  short source_or_target;
} col_metadata_def;
```

Input

`column_index`
The column index of the column value to be returned.

`max_name_length`
The maximum length of the returned column name. Typically, the maximum length is the length of the name buffer. Since the returned name is null-terminated, the maximum length should equal the maximum length of the column name.

`source_or_target`
One of the following to indicate whether the source or target record is being compressed.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

Output

`column_name`
The column name of the column value to be returned.

`actual_name_length`
The actual length of the returned name.

`value_truncated`
A flag (`0` or `1`) to indicate whether or not the value was truncated. Truncation occurs if the length of the column name plus the null terminator exceeds the maximum buffer length.

`native_data_type`
The native (to the database) data type of the column. Either `native_data_type` or `dd_data_type` is returned, depending on the process, as follows:

- If Extract is making the callback request for a source column, `native_data_type` is returned. If Extract is requesting a mapped target column, `gg_data_type` is returned (assuming there is a target definitions file on the system).
- If an Extract data pump is making the callback request for a source column and there is a local database, `native_data_type` is returned. If there is no database, `gg_data_type` is returned (assuming there is a source definitions file on the system). If the pump is requesting the target column, `gg_data_type` is returned (assuming a target definitions file exists on the system).
- If Replicat is making the callback request for the source column, then `gg_data_type` is returned (assuming a source definitions file exists on the system). If Replicat is requesting the source column and `ASSUMETARGETDEFS` is being used in the parameter file, then `native_data_type` is returned. If Replicat is requesting the target column, `native_data_type` is returned.

`gg_data_type`
The Oracle GoldenGate data type of the column.

`gg_sub_data_type`
The Oracle GoldenGate sub-type of the column.

`is_nullable`
Flag indicating whether the column permits a null value (`TRUE` or `FALSE`).

`is_part_of_key`
Flag (`TRUE` or `FALSE`) indicating whether the column is part of the key that is being used by Oracle GoldenGate.

`key_column_index`
Indicates the order of the columns in the index. For example, the following table has two key columns that exist in a different order from the order in which they are declared in the primary key.

```
CREATE TABLE ABC
(
cust_code        VARCHAR2(4),
name              VARCHAR2(30),
city              VARCHAR2(20),
state             CHAR(2),
PRIMARY KEY (city, cust_code)
USING INDEX
);
```

Executing the callback function for each column in the logical column order returns the following:

- `cust_code` returns `1`
- `name` returns `-1`
- `city` returns `0`
- `state` returns `-1`

If the column is part of the key, the value returned is the order of the column within the key.
If the column is not part of the key, a value of `-1` is returned.

`length`
Returns the length of the column.

`precision`
If a numeric data type, returns the precision of the column.

`scale`
If a numeric data type, returns the scale.

Return Values

```
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_EXCEEDED_MAX_LENGTH
EXIT_FN_RET_INVALID_COLUMN
EXIT_FN_RET_OK
```

6.16 GET_COL_METADATA_FROM_NAME

Valid For

Extract and Replicat

Description

Use the `GET_COL_METADATA_FROM_NAME` function to retrieve column metadata by specifying the name of the desired column. If the character session of the user exit is set with `SET_SESSION_CHARSET` to a value other than the default character set of the operating system, as defined in `ULIB_CS_DEFAULT` in the `ucharset.h` file, the character data that is exchanged between the user exit and the process is interpreted in the session character set.

If the database is case-sensitive, object names must be specified in the same letter case as they are defined in the hosting database; otherwise, the case does not matter.

Syntax

```
#include "usrdecs.h"
short result_code;
col_metadata_def column_meta_rec;
ERCALLBACK (GET_COL_METADATA_FROM_NAME, &column_meta_rec, &result_code);
```

Buffer

```
typedef struct
{
  short column_index;
  char *column_name;
  long max_name_length;
  short native_data_type;
  short gg_data_type;
  short gg_sub_data_type;
  short is_nullable;
  short is_part_of_key;
  short key_column_index;
  short length;
  short precision;
  short scale;
  short source_or_target;
} col_metadata_def;
```

Input

`column_name`
The column name of the column value to be returned.

`max_name_length`
The maximum length of the returned column name. Typically, the maximum length is the length of the name buffer. Since the returned name is null-terminated, the maximum length should equal the maximum length of the column name.

`source_or_target`
One of the following to indicate whether the source or target record is being compressed.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

Output

`column_index`
The column index of the column value to be returned.

`actual_name_length`
The actual length of the returned name.

`source_or_target`
One of the following to indicate whether the source or target record is being compressed.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

`value_truncated`
A flag (`0` or `1`) to indicate whether or not the value was truncated. Truncation occurs if the length of the column name plus the null terminator exceeds the maximum buffer length.

`native_data_type`
The native (to the database) data type of the column.

`gg_data_type`
The Oracle GoldenGate data type of the column.

`gg_sub_data_type`
The Oracle GoldenGate sub-type of the column.

`is_nullable`
Flag indicating whether the column permits a null value (`TRUE` or `FALSE`).

`is_part_of_key`
Flag (`TRUE` or `FALSE`) indicating whether the column is part of the key that is being used by Oracle GoldenGate.

`key_column_index`
Indicates the order of the columns in the index. For example, the following table has two key columns that are defined in one order in the table and another in the index definition.

```
CREATE TABLE tcustmer
(
cust_code        VARCHAR2(4),
name             VARCHAR2(30),
city             VARCHAR2(20),
state            CHAR(2),
PRIMARY KEY (city, cust_code)
USING INDEX
);
```

The return is as follows:

- `cust_code` returns `1`
- `name` returns `-1`
- `city` returns `0`
- `state` returns `-1`

If the column is part of the key, its order in the index is returned as an integer.
If the column is not part of the key, a value of -1 is returned.

`length`
Returns the length of the column.

`precision`
If a numeric data type, returns the precision of the column.

`scale`
If a numeric data type, returns the scale.

Return Values

```
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_EXCEEDED_MAX_LENGTH
EXIT_FN_RET_INVALID_COLUMN
EXIT_FN_RET_OK
```

6.17 GET_COLUMN_INDEX_FROM_NAME

Valid For

Extract and Replicat

Description

Use the `GET_COLUMN_INDEX_FROM_NAME` function to determine the column index associated with a specified column name. If the character session of the user exit is set with `SET_SESSION_CHARSET` to a value other than the default character set of the operating system, as defined in `ULIB_CS_DEFAULT` in the `ucharset.h` file, the character data that is exchanged between the user exit and the process is interpreted in the session character set.

If the database is case-sensitive, object names must be specified in the same letter case as they are defined in the hosting database; otherwise, the case does not matter.

Syntax

```
#include "usrdecs.h"
short result_code;
env_value_def env_value;
ERCALLBACK (GET_COLUMN_INDEX_FROM_NAME, &env_value, &result_code);
```

Buffer

```
typedef struct
{
char *buffer;
long max_length;
long actual_length;
short value_truncated;
short index;
short source_or_target;
} env_value_def;
```

Input

`buffer`
A pointer to the column name

`actual_length`
The length of the column name within the buffer.

`source_or_target`
One of the following to indicate whether to use the source or target table to look up column information.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

Output

`index`
The returned column index for the specified column name.

Return Values

```
EXIT_FN_RET_INVALID_COLUMN
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_OK
```

6.18 GET_COLUMN_NAME_FROM_INDEX

Valid For

Extract and Replicat

Description

Use the `GET_COLUMN_NAME_FROM_INDEX` function to determine the column name associated with a specified column index. If the character session of the user exit is set with `SET_SESSION_CHARSET` to a value other than the default character set of the operating system, as defined in `ULIB_CS_DEFAULT` in the `ucharset.h` file, the character data that is exchanged between the user exit and the process is interpreted in the session character set.

Database object names are returned exactly as they are defined in the hosting database, including the letter case.

Syntax

```
#include "usrdecs.h"
short result_code;
env_value_def env_value;
ERCALLBACK (GET_COLUMN_NAME_FROM_INDEX, &env_value, &result_code);
```

Buffer

```
typedef struct
{
char *buffer;
long max_length;
long actual_length;
short value_truncated;
short index;
short source_or_target;
} env_value_def;
```

Input

`buffer`
A pointer to a buffer to accept the returned column name. The column name is null-terminated.

`max_length`
The maximum length of your allocated `buffer` to accept the resulting column name. This is returned as a `NULL` terminated string.

`index`
The column index of the column name to be returned.

`source_or_target`
One of the following to indicate whether to use the source or target table to look up column information.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

Output

`buffer`
The null-terminated column name.

`actual length`
The string length of the returned column name. The actual length does not include the null terminator.

`value_truncated`
A flag (`0` or `1`) to indicate whether or not the value was truncated. Truncation occurs if the length of the column name plus the null terminator exceeds the maximum buffer length.

Return Values

```
EXIT_FN_RET_INVALID_COLUMN
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_OK
```

6.19 GET_COLUMN_VALUE_FROM_INDEX

Valid For

Extract and Replicat

Description

Use the `GET_COLUMN_VALUE_FROM_INDEX` function to retrieve the column value from the data record using the specified column index. Column values are the basis for most logic within the user exit. You can base complex logic on the values of individual columns within the data record. You can specify the character format of the returned value.

If the character session of the user exit is set with `SET_SESSION_CHARSET` to a value other than the default character set of the operating system, as defined in `ULIB_CS_DEFAULT` in the `ucharset.h` file, the character data that is exchanged between the user exit and the process is interpreted in the session character set.

A column value is set to the session character set only if the following is true:

- The column value is a SQL character type (`CHAR/VARCHAR2/CLOB`, `NCHAR/NVARCHAR2/NCLOB`), a SQL date/timestamp/interval/number type)

- The `column_value_mode` indicator is set to `EXIT_FN_CNVTED_SESS_CHAR_FORMAT`.

Syntax

```
#include "usrdecs.h"
short result_code;
column_def column;
ERCALLBACK (GET_COLUMN_VALUE_FROM_INDEX, &column, &result_code);
```

Buffer

```
typedef struct
{
char *column_value;
unsigned short max_value_length;
unsigned short actual_value_length;
short null_value;
short remove_column;
short value_truncated;
short column_index;
char *column_name;
/* Version 3 CALLBACK_STRUCT_VERSION */
short column_value_mode;
short source_or_target;
/* Version 2 CALLBACK_STRUCT_VERSION */
char requesting_before_after_ind;
char more_lob_data;
/* Version 3 CALLBACK_STRUCT_VERSION  */
ULibCharSet column_charset;
} column_def;
```

Input

`column_value`
A pointer to a buffer to accept the returned column value.

`max_value_length`
The maximum length of the returned column value. Typically, the maximum length is the length of the column value buffer. If ASCII format is specified with `column_value_mode`, the column value is null-terminated and the maximum length should equal the maximum length of the column value.

`column_index`
The column index of the column value to be returned.

`column_value_mode`
Indicates the format of the column value.

> **`EXIT_FN_CHAR_FORMAT`**
> ASCII format: The value is a null-terminated ASCII (or EBCDIC) string (with a known exception for the sub-data type `UTF16_BE`, which is converted to UTF8.)

Note:

A column value might be truncated when presented to a user exit, because the value is interpreted as an ASCII string and is supposed to be null-terminated. The first value of `0` becomes the string terminator.

- Dates are in the format `CCYY-MM-DD HH:MI:SS.FFFFFF`, in which the fractional time is database-dependent.
- Numeric values are in their string format. For example, `123.45` is represented as `"123.45"`.
- Non-printable characters or binary values are converted to hexadecimal notation.
- Floating point types are output as null-terminated strings, to the first 14 significant digits.

`EXIT_FN_RAW_FORMAT`
Internal Oracle GoldenGate canonical format: This format includes a two-byte `NULL` indicator and a two-byte variable data length when applicable. No character-set conversion is performed by Oracle GoldenGate for this format for any character data type.

`EXIT_FN_CNVTED_SESS_CHAR_FORMAT`
User exit character set: This only applies if the column data type is:

- a character-based type, single or multi-byte
- a numeric type with a string representation

This format is not null-terminated.

`source_or_target`
One of the following to indicate whether to use the source or the target data record to retrieve the column value.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

`requesting_before_after_ind`
Set when processing an after image record and you want the before-image column value of either an update or a primary key update.
To get the "before" value of the column while processing an "after image" of a primary key update or a regular (non-key) update record, set the `requesting_before_after_ind` flag to `BEFORE_IMAGE_VAL`.

- To access the before image of the key columns of a primary key update, nothing else is necessary.
- To access non-key columns of a primary key update or any column of a regular update, the before image must be available.

The default setting is `AFTER_IMAGE_VAL` (get the after image of the column) when an explicit input for `requesting_before_after_ind` is not specified.
To make a before image available, you can use the `GETUPDATEBEFORES` parameter or you can use the `INCLUDEUPDATEBEFORES` option within the `CUSEREXIT` parameter statement.

Note that:

- `GETUPDATEBEFORES` causes an Extract process to write before-image records to the trail and also to make an `EXIT_CALL_PROCESS_RECORD` call to the user exit with the before images.
- `INCLUDEUPDATEBEFORES` does not cause an `EXIT_CALL_PROCESS_RECORD` call to the user exit nor, in the case of Extract, does it cause the process to write the before image to the trail.

`requesting_before_after_ind`
To get the before image of the column, set the `char requesting_before_after_ind` flag to `BEFORE_IMAGE_VAL`. To get the after image, set it to `AFTER_IMAGE_VAL`. The default is to always work with the after image unless the before is specified.
To make the before images available, you can use the `GETUPDATEBEFORES` parameter for the `TABLE` statement that contains the table, or you can use the `INCLUDEUPDATEBEFORES` option within the `CUSEREXIT` parameter statement. Both will cause the same callout to the user exit for `process_record`.

Output

`column_value`
A pointer to the returned column value. If `column_value_mode` is specified as `EXIT_FN_CHAR_FORMAT`, the column value is returned as a null-terminated ASCII string; otherwise, the column value is returned in the Oracle GoldenGate internal canonical format. In ASCII format, dates are returned in the following format:

```
YYYY-MM-DD HH:MI:SS.FFFFFF
```

The inclusion of fractional time is database-dependent.

`actual_value_length`
The string length of the returned column name, in bytes. The actual length does not include a null terminator when `column_value_mode` is specified as `EXIT_FN_CHAR_FORMAT`.

`null_value`
A flag (`0` or `1`) indicating whether or not the column value is null. If the `null_value` flag is `1`, then the column value buffer is filled with null bytes.

`value_truncated`
A flag (`0` or `1`) indicating whether or not the value was truncated. Truncation occurs if the length of the column value exceeds the maximum buffer length. If `column_value_mode` was specified as `EXIT_FN_CHAR_FORMAT`, the null terminator is included in the length of the column.

`char more_lob_data`
A flag that indicates if more LOB data is present beyond the initial 4K that can be stored in the base record. When a LOB is larger than the 4K limit, it is stored in LOB fragments.
You must allocate the appropriate amount of memory to contain the returned values. Oracle GoldenGate will access LOB columns up to 8K of data at all times, filling up the buffer to the amount that the user exit has allocated. If the LOB is larger than that which was allocated, subsequent callbacks are required to obtain the total column data, until all data has been sent to the user exit.
To determine the end of the data, evaluate `more_lob_data`. The user exit sets this flag to either `CHAR_NO_VAL` or `CHAR_YES_VAL` before accessing a new column. If this flag is still

initialized after first callback and is not set to either CHAR_YES_VAL or CAR_NO_VAL, then one of the following is true:

- Enough memory was allocated to handle the LOB.
- It is not a LOB.
- It was not over the 4K limit of the base trail record size.

It is recommended that you obtain the source table metadata to determine if a column might be a LOB.

Return Values

```
EXIT_FN_RET_BAD_COLUMN_DATA
EXIT_FN_RET_COLUMN_NOT_FOUND
EXIT_FN_RET_INVALID_COLUMN
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_OK
```

6.20 GET_COLUMN_VALUE_FROM_NAME

Valid For

Extract and Replicat

Description

Use the GET_COLUMN_VALUE_FROM_NAME function to retrieve the column value from the data record by using the specified column name. Column values are the basis for most logic within the user exit. You can base complex logic on the values of individual columns within the data record.

If the character session of the user exit is set with SET_SESSION_CHARSET to a value other than the default character set of the operating system, as defined in ULIB_CS_DEFAULT in the ucharset.h file, the character data that is exchanged between the user exit and the process is interpreted in the session character set.

A column value is set to the session character set only if the following is true:

- The column value is a SQL character type (CHAR/VARCHAR2/CLOB, NCHAR/NVARCHAR2/NCLOB), a SQL date/timestamp/interval/number type)
- The column_value_mode indicator is set to EXIT_FN_CNVTED_SESS_CHAR_FORMAT.

If the database is case-sensitive, object names must be specified in the same letter case as they are defined in the hosting database; otherwise, the case does not matter.

Syntax

```
#include "usrdecs.h"
short result_code;
column_def column;
ERCALLBACK (GET_COLUMN_VALUE_FROM_NAME, &column, &result_code);
```

Buffer

```
typedef struct
{
char *column_value;
unsigned short max_value_length;
unsigned short actual_value_length;
short null_value;
short remove_column;
short value_truncated;
short column_index;
char *column_name;
/* Version 3 CALLBACK_STRUCT_VERSION */
short column_value_mode;
short source_or_target;
/* Version 2 CALLBACK_STRUCT_VERSION */
char requesting_before_after_ind;
char more_lob_data;
/* Version 3 CALLBACK_STRUCT_VERSION  */
ULibCharSet column_charset;
} column_def;
```

Input

`column_value`
A pointer to a buffer to accept the returned column value.

`max_value_length`
The maximum length of the returned column value. Typically, the maximum length is the length of the column value buffer. If ASCII format is specified (see `column_value_mode`) the column value is null-terminated, and the maximum length should equal the maximum length of the column value.

`column_name`
The name of the column for the column value to be returned.

`column_value_mode`
Indicates the character set of the column value.

> **`EXIT_FN_CHAR_FORMAT`**
> ASCII format: The value is a null-terminated ASCII (or EBCDIC) string (with a known exception for the sub-data type `UTF16_BE`, which is converted to UTF8.)

> **Note:**
>
> A column value might be truncated when presented to a user exit, because the value is interpreted as an ASCII string and is supposed to be null-terminated. The first value of `0` becomes the string terminator.

- Dates are in the format `CCYY-MM-DD HH:MI:SS.FFFFFF`, in which the fractional time is database-dependent.
- Numeric values are in their string format. For example, `123.45` is represented as `"123.45"`.
- Non-printable characters or binary values are converted to hexadecimal notation.

- Floating point types are output as null-terminated strings, to the first 14 significant digits.

`EXIT_FN_RAW_FORMAT`
Internal Oracle GoldenGate canonical format: This format includes a two-byte null indicator and a two-byte variable data length when applicable. No character-set conversion is performed by Oracle GoldenGate for this format for any character data type.

`EXIT_FN_CNVTED_SESS_CHAR_FORMAT`
User exit character set: This only applies if the column data type is:

- a character-based type, single or multi-byte
- a numeric type with a string representation

This format is not null-terminated.

`source_or_target`
One of the following indicating whether to use the source or target data record to retrieve the column value.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

`requesting_before_after_ind`
Set when processing an after image record and you want the before columns of either an update or a primary key update.
To get the "before" value of the column while processing an "after image" of a primary key update or a regular (non-key) update record, set the `requesting_before_after_ind` flag to `BEFORE_IMAGE_VAL`.

- To access the before image of the key columns of a primary key update, nothing else is necessary.
- To access non-key columns of a primary key update or any column of a regular update, the before image must be available.

The default setting is `AFTER_IMAGE_VAL` (get the after image of the column) when an explicit input for `requesting_before_after_ind` is not specified.
To make a before image available, you can use the `GETUPDATEBEFORES` parameter or you can use the `INCLUDEUPDATEBEFORES` option within the `CUSEREXIT` parameter statement.
Note that:

- `GETUPDATEBEFORES` causes an Extract process to write before-image records to the trail and also to make an `EXIT_CALL_PROCESS_RECORD` call to the user exit with the before images.
- `INCLUDEUPDATEBEFORES` does not cause an `EXIT_CALL_PROCESS_RECORD` call to the user exit nor, in the case of Extract, does it cause the process to write the before image to the trail.

Output

`column_value`
A pointer to the returned column value. If `column_value_mode` is specified as `EXIT_FN_CHAR_FORMAT`, the column value is returned as a null-terminated ASCII string;

otherwise, the column value is returned in the Oracle GoldenGate internal canonical format. In ASCII format, dates are returned in the following format:

```
CCYY-MM-DD HH:MI:SS.FFFFFF
```

The inclusion of fractional time is database-dependent.

`actual length`
The string length of the returned column name. The actual length does not include a null terminator when `column_value_mode` is specified as `EXIT_FN_CHAR_FORMAT`.

`null_value`
A flag (`0` or `1`) indicating whether or not the column value is null. If the `null_value` flag is `1`, then the column value buffer is filled with null bytes.

`value_truncated`
A flag (`0` or `1`) indicating whether or not the value was truncated. Truncation occurs if the length of the column value exceeds the maximum buffer length. If `column_value_mode` was specified as `EXIT_FN_CHAR_FORMAT`, the null terminator is included in the length of the column.

`char more_lob_data`
A flag that indicates if more LOB data is present beyond the initial 4K that can be stored in the base record. When a LOB is larger than the 4K limit, it is stored in LOB fragments.
You must allocate the appropriate amount of memory to contain the returned values. Oracle GoldenGate will access LOB columns up to 8K of data at all times, filling up the buffer to the amount that the user exit has allocated. If the LOB is larger than that which was allocated, subsequent callbacks are required to obtain the total column data, until all data has been sent to the user exit.
To determine the end of the data, evaluate `more_lob_data`. The user exit sets this flag to either `CAR_NO_VAL` or `CHAR_YES_VAL` before accessing a new column. If this flag is still initialized after first callback and is not set to either `CHAR_YES_VAL` or `CAR_NO_VAL`, then one of the following is true:

- Enough memory was allocated to handle the LOB.
- It is not a LOB.
- It was not over the 4K limit of the base trail record size.

It is recommended that you obtain the source table metadata to determine if a column might be a LOB.

Return Values

```
EXIT_FN_RET_BAD_COLUMN_DATA
EXIT_FN_RET_COLUMN_NOT_FOUND
EXIT_FN_RET_INVALID_COLUMN
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_OK
```

Example

```
memset (&col_meta, 0, sizeof(col_meta));
if (record.mapped)
col_meta.source_or_target = EXIT_FN_TARGET_VAL;
else
col_meta.source_or_target = EXIT_FN_SOURCE_VAL;
col_meta.source_or_target = EXIT_FN_SOURCE_VAL;
col_meta.column_name = (char *)malloc(100);
col_meta.max_name_length = 100;
col_meta.column_index = 1;

call_callback (GET_COL_METADATA_FROM_NAME, &col_meta, &result_code);
```

6.21 GET_DATABASE_METADATA

Valid For

Extract and Replicat

Description

Use the `GET_DATABASE_METADATA` function to return the metadata of the database that is associated with a record.

Buffer

```
typedef struct
{
char*    dbName;
long      dbName_max_length;
long      dbName_actual_length;
unsigned char    dbNameMetadata[MAXDBOBJTYPE];
char*   locale;
long     locale_max_length;
long     locale_actual_length;
} database_def;
typedef struct
{
    database_def  source_db_def;
    database_def  target_db_def;
} database_defs;
```

Input

`dbname`
A pointer to a buffer to accept the database name.

`dbname_max_length`
The maximum length of the buffer to hold the name.

`dbname_actual_length`
The actual length of the database name.

`dbNameMetadata`
The name metadata for case-sensitivity, which is the same value that is written by Extract and the data pump to a trail. See *Administering Oracle GoldenGate for Windows and UNIX* for a list of macros that can be used by the user exit to check database object name metadata, given an object name type.

`locale`
A null-terminated character string specifying the locale of the database. This is returned as a conjunction of:

- ISO-639 two-letter language code
- ISO-3166 two-letter country code
- Variant code using '_' U+005F as separator.

Example: `"en_US", "ja_Japen"`

`locale_max_length`
The maximum length of the buffer to accept the locale.

`locale_actual_length`
The actual length of the locale.

`database_def source_db_def`
Directs the process to return metadata for the source database.

`database_def target_db_def`
Directs the process to return metadata for the target database.

6.22 GET_DDL_RECORD_PROPERTIES

Valid For

Extract and Replicat, for databases for which DDL replication is supported

Description

Use the `GET_DDL_RECORD_PROPERTIES` function to return a DDL operation, including information about the object on which the DDL was performed and also the text of the DDL statement itself. The Extract process can only get the source table layout. The Replicat process can get source or target layouts.

If the character session of the user exit is set with `SET_SESSION_CHARSET` to a value other than the default character set of the operating system, as defined in `ULIB_CS_DEFAULT` in the `ucharset.h` file, the character data that is exchanged between the user exit and the process is interpreted in the session character set. This includes the DDL type, the object type, the two- or three-part object name, the owner name and the DDL text itself.

```
#include "usrdecs.h"
short result_code;
ddl_record_def ddl_rec;
ERCALLBACK (GET_DDL_RECORD_PROPERTIES, &ddl_rec, &result_code);
```

Buffer

```
typedef struct
{
char *ddl_type;
long ddl_type_max_length; /* Maximum Description length PASSED IN BY USER */
long ddl_type_length; /* Actual length */

char *object_type;
long object_type_max_length; /* Maximum Description length PASSED IN BY USER */
long object_type_length; /* Actual length */

char *object_name; /* Fully qualified name of the object
  (3-part for CDB, 2-part for non-CDB) */
long object_max_length; /* Maximum Description length PASSED IN BY USER */
long object_length; /* Actual length */

char *owner_name;
long owner_max_length; /* Maximum Description length PASSED IN BY USER */
long owner_length; /* Actual length */

char *ddl_text;
long ddl_text_max_length; /* Maximum Description length PASSED IN BY USER */
long ddl_text_length; /* Actual length */

short ddl_text_truncated; /* Was value truncated? */
short source_or_target; /* Source or target value? */
} ddl_record_def;
```

Input

`ddl_type_length`
`object_type_length`
`object_length`
`owner_length`
`ddl_text_length`
A pointer to one buffer for each of these items to accept the returned column values. These items are as follows:

> **`ddl_type_length`**
> Contains the length of the type of DDL operation, for example a `CREATE` or `ALTER`.
>
> **`object_type_length`**
> Contains the length of type of database object that is affected by the DDL operation, for example `TABLE` or `INDEX`.
>
> **`object_length`**
> Contains the length of the name of the object.
>
> **`object_length`**
> Contains the length of the owner of the object (schema or database).
>
> **`ddl_text_length`**
> Contains the length of the actual DDL statement text.

`ddl_type_max_length`
The maximum length of the DDL operation type that is returned by `*ddl_type`. The DDL type is any DDL command that is valid for the database, such as `ALTER`.

`object_type_max_length`
The maximum length of the object type that is returned by `*object_type`. The object type is any object that is valid for the database, such as `TABLE`, `INDEX`, and `TRIGGER`.

`object_max_length`
The maximum length of the name of the object that is returned by `*object_name`.

`owner_max_length`
The maximum length of the name of the owner that is returned by `*owner_name`.

`ddl_text_max_length`
The maximum length of the text of the DDL statement that is returned by `*ddl_text`.

`source_or_target`
One of the following indicating whether to return the operation type for the source or the target data record.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

Output

`ddl_type_length`
`object_type_length`
`object_length`
`owner_length`
`ddl_text_length`
All of these fields return the actual length of the value that was requested. (See the input for descriptions.)

`ddl_text_truncated`
A flag (`0` or `1`) to indicate whether or not the DDL text was truncated. Truncation occurs if the length of the DDL text plus the null terminator exceeds the maximum buffer length.

Return Values

```
EXIT_FN_RET_OK
EXIT_FN_RET_NOT_SUPPORTED
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_INCOMPLETE_DDL_REC
```

6.23 GETENV

Use the `@GETENV` function to return information about the Oracle GoldenGate environment. You can use the information as input into the following:

- Stored procedures or queries (with `SQLEXEC`)
- Column maps (with the `COLMAP` option of `TABLE` or `MAP`)
- User tokens (defined with the `TOKENS` option of `TABLE` and mapped to target columns by means of the `@TOKEN` function)
- The `GET_ENV_VALUE` user exit function (see "GET_ENV_VALUE")

Note:

All syntax options must be enclosed within quotes as shown in the syntax descriptions.

Syntax

```
@GETENV (
'LAG' , 'unit' |
'LASTERR' , 'error_info' |
'JULIANTIMESTAMP' |
'JULIANTIMESTAMP_PRECISE' |
'RECSOUTPUT' |
{'STATS'|'DELTASTATS'}, ['TABLE', 'table'], 'statistic' |
'GGENVIRONMENT', 'environment_info' |
'GGFILEHEADER', 'header_info' |
'GGHEADER', 'header_info' |
'RECORD', 'location_info' |
'DBENVIRONMENT', 'database_info'
'TRANSACTION', 'transaction_info' |
'OSVARIABLE', 'variable' |
'TLFKEY', SYSKEY, unique_key
'RECORD_TIMESTAMP_PRECISE',
'TRANSACTION_TIMESTAMP_PRECISE',
'USERNAME',
'OSUSERNAME',
'MACHINENAME',
'PROGRAMNAME',
'CLIENTIDENTIFIER',
)
```

'LAG' , *'unit'*

Valid for Extract and Replicat.

Use the `LAG` option of `@GETENV` to return lag information. Lag is the difference between the time that a record was processed by Extract or Replicat and the timestamp of that record in the data source.

Syntax

```
@GETENV ('LAG', {'SEC'|'MSEC'|'MIN'})
```

'SEC'
Returns the lag in seconds. This is the default when a unit is not explicitly provided for `LAG`.

'MSEC'
Returns the lag in milliseconds.

'MIN'
Returns the lag in minutes.

'LASTERR' , *'error_info'*

Valid for Replicat.

Use the `LASTERR` option of `@GETENV` to return information about the last failed operation processed by Replicat.

Syntax

```
@GETENV ('LASTERR', {'DBERRNUM'|'DBERRMSG'|'OPTYPE'|'ERRTYPE'})
```

'DBERRNUM'
Returns the database error number associated with the failed operation.

'DBERRMSG'
Returns the database error message associated with the failed operation.

'OPTYPE'
Returns the operation type that was attempted. For a list of Oracle GoldenGate operation types, see *Administering Oracle GoldenGate for Windows and UNIX*.

'ERRTYPE'
Returns the type of error. Possible results are:

- `DB` (for database errors)
- `MAP` (for errors in mapping)

'JULIANTIMESTAMP' | 'JULIANTIMESTAMP_PRECISE'

Valid for Extract and Replicat.

Use the `JULIANTIMESTAMP` option of `@GETENV` to return the current time in Julian format. The unit is microseconds (one millionth of a second). On a Windows machine, the value is padded with zeros (0) because the granularity of the Windows timestamp is milliseconds (one thousandth of a second). For example, the following is a typical column mapping:

```
MAP dbo.tab8451, Target targ.tabjts, COLMAP (USEDEFAULTS, &
JTSS = @GETENV ('JULIANTIMESTAMP')
JTSFFFFFF = @date ('yyyy-mm-dd hh:mi:ss.ffffff', 'JTS', &
@getenv ('JULIANTIMESTAMP') ) )
;
```

Possible values that the `JTSS` and `JTSFFFFFF` columns can have are:

```
212096320960773000 2010-12-17:16:42:40.773000
212096321536540000 2010-12-17:16:52:16.540000
212096322856385000 2010-12-17:17:14:16.385000
212096323062919000 2010-12-17:17:17:42.919000
212096380852787000 2010-12-18:09:20:52.787000
```

The last three digits (the microseconds) of the number all contain the padding of 0s .

Optionally, you can use the `'JULIANTIMESTAMP_PRECISE'` option to obtain a timestamp with high precision though this may effect performance.

Syntax

```
@GETENV ('JULIANTIMESTAMP')
@GETENV ('JULIANTIMESTAMP_PRECISE')
```

'RECSOUTPUT'

Valid for Extract.

Use the `RECSOUTPUT` option of `@GETENV` to retrieve a current count of the number of records that Extract has written to the trail file since the process started. The returned value is not unique to a table or transaction, but instead for the Extract session itself. The count resets to 1 whenever Extract stops and then is started again.

Syntax

```
@GETENV ('RECSOUTPUT')
```

{'STATS'|'DELTASTATS'}, ['TABLE', '*table*'], '*statistic*'

Valid for Extract and Replicat.

Use the `STATS` and `DELTASTATS` options of `@GETENV` to return the number of operations that were processed per table for any or all of the following:

- `INSERT` operations

- `UPDATE` operations
- `DELETE` operations
- `TRUNCATE` operations
- Total DML operations
- Total DDL operations
- Number of conflicts that occurred, if the Conflict Detection and Resolution (CDR) feature is used.
- Number of CDR resolutions that succeeded
- Number of CDR resolutions that failed

Any errors in the processing of this function, such as an unresolved table entry or incorrect syntax, returns a zero (0) for the requested statistics value.

Understanding How Recurring Table Specifications Affect Operation Counts

An Extract that is processing the same source table to multiple output trails returns statistics based on each localized output trail to which the table linked to `@GETENV` is written. For example, if Extract captures 100 inserts for table `ABC` and writes table `ABC` to three trails, the result for the `@GETENV` is 300

```
EXTRACT ABC
...
EXTTRAIL c:\ogg\dirdat\aa;
TABLE TEST.ABC;
EXTTRAIL c:\ogg\dirdat\bb;
TABLE TEST.ABC;
TABLE EMI, TOKENS (TOKEN-CNT = @GETENV ('STATS', 'TABLE', 'ABC', 'DML'));
EXTTRAIL c:\ogg\dirdat\cc;
TABLE TEST.ABC;
```

In the case of an Extract that writes a source table multiple times to a single output trail, or in the case of a Replicat that has multiple `MAP` statements for the same `TARGET` table, the statistics results are based on all matching `TARGET` entries. For example, if Replicat filters 20 rows for `REGION 'WEST`,' 10 rows for `REGION 'EAST`,' 5 rows for `REGION 'NORTH`,' and 2 rows for `REGION 'SOUTH`' (all for table `ABC`) the result of the `@GETENV` is 37.

```
REPLICAT ABC
...
MAP TEST.ABC, TARGET TEST.ABC, FILTER (@STREQ (REGION, 'WEST'));
MAP TEST.ABC, TARGET TEST.ABC, FILTER (@STREQ (REGION, 'EAST'));
MAP TEST.ABC, TARGET TEST.ABC, FILTER (@STREQ (REGION, 'NORTH'));
MAP TEST.ABC, TARGET TEST.ABC, FILTER (@STREQ (REGION, 'SOUTH'));
MAP TEST.EMI, TARGET TEST.EMI, &
    COLMAP (CNT = @GETENV ('STATS', 'TABLE', 'ABC', 'DML'));
```

Capturing Multiple Statistics

You can execute multiple instances of `@GETENV` to get counts for different operation types.

This example returns statistics only for `INSERT` and `UPDATE` operations:

```
REPLICAT TEST
..
..
MAP TEST.ABC, TARGET TEST.ABC, COLMAP (USEDEFAULTS, IU = @COMPUTE (@GETENV &
    ('STATS', 'TABLE', 'ABC', 'DML') - (@GETENV ('STATS', 'TABLE', &
    'ABC', 'DELETE'));
```

This example returns statistics for DDL and `TRUNCATE` operations:

```
REPLICAT TEST2
..
..
MAP TEST.ABC, TARGET TEST.ABC, COLMAP (USEDEFAULTS, DDL = @COMPUTE &
(@GETENV ('STATS', 'DDL') + (@GETENV ('STATS', 'TRUNCATE'));
```

Example Use Case

In the following use case, if all DML from the source is applied successfully to the target, Replicat suspends by means of `EVENTACTIONS` with `SUSPEND`, until resumed from GGSCI with `SEND REPLICAT` with `RESUME`.

`GETENV` used in Extract parameter file:

```
TABLE HR1.HR*;
TABLE HR1.STAT, TOKENS ('env_stats' = @GETENV ('STATS', 'TABLE', &
    'HR1.HR*', 'DML'));
```

`GETENV` used in Replicat parameter file:

```
MAP HR1.HR*, TARGET HR2.*;
MAP HR1.STAT, TARGET HR2.STAT, filter (
    @if (
    @token ('stats') =
    @getenv ('STATS', 'TABLE', 'TSSCAT.TCUSTORD', 'DML'), 1, 0 )
    ),
    eventactions (suspend);
```

Using Statistics in FILTER Clauses

Statistics returned by `STATS` and `DELTASTATS` are dynamic values and are incremented after mapping is performed. Therefore, when using CDR statistics in a `FILTER` clause in each of multiple `MAP` statements, you need to order the `MAP` statements in descending order of the statistics values. If the order is not correct, Oracle GoldenGate returns error OGG-01921. For detailed information about this requirement, see Document 1556241.1 in the Knowledge base of My Oracle Support at `http://support.oracle.com`.

Example 6-1 MAP statements containing statistics in FILTER clauses

In the following example, the `MAP` statements containing the filter for the `CDR_CONFLICTS` statistic are ordered in descending order of the statistic: `>3`, then `=3`, then `<3`.

```
MAP TEST.GG_HEARTBEAT_TABLE, TARGET TEST.GG_HEARTBEAT_TABLE COMPARECOLS (ON UPDATE
ALL),RESOLVECONFLICT(UPDATEROWEXISTS,(DEFAULT, OVERWRITE)),FILTER (@GETENV ("STATS",
"CDR_CONFLICTS") > 3),EVENTACTIONS (LOG INFO);MAP TEST.GG_HEARTBEAT_TABLE, TARGET
TEST.GG_HEARTBEAT_TABLE COMPARECOLS (ON UPDATE ALL),RESOLVECONFLICT(UPDATEROWEXISTS,
(DEFAULT, OVERWRITE)),FILTER (@GETENV ("STATS", "CDR_CONFLICTS") = 3),EVENTACTIONS
(LOG WARNING);MAP TEST.GG_HEARTBEAT_TABLE, TARGET TEST.GG_HEARTBEAT_TABLE
COMPARECOLS (ON UPDATE ALL),RESOLVECONFLICT(UPDATEROWEXISTS,(DEFAULT,
OVERWRITE)),FILTER (@GETENV ("STATS", "CDR_CONFLICTS") < 3),EVENTACTIONS (LOG
WARNING);
```

Syntax

```
@GETENV ({'STATS' | 'DELTASTATS'}, ['TABLE', 'table'], 'statistic')
```

`{'STATS' | 'DELTASTATS'}`
`STATS` returns counts since process startup, whereas `DELTASTATS` returns counts since the last execution of a `DELTASTATS`.
The execution logic is as follows:

- When Extract processes a transaction record that satisfies `@GETENV` with `STATS` or `DELTASTATS`, the table name is matched against resolved source tables in the `TABLE` statement.
- When Replicat processes a trail record that satisfies `@GETENV` with `STATS` or `DELTASTATS`, the table name is matched against resolved target tables in the `TARGET` clause of the `MAP` statement.

`'TABLE'`, `'`*`table`*`'`
Executes the `STATS` or `DELTASTATS` only for the specified table or tables. Without this option, counts are returned for all tables that are specified in `TABLE` (Extract) or `MAP` (Replicat) parameters in the parameter file.
Valid *`table_name`* values are:

- '*`schema.table`*' specifies a table.
- *`'table'`* specifies a table of the default schema.
- '*`schema.*`*' specifies all tables of a schema.
- '`*`' specifies all tables of the default schema.

For example, the following counts DML operations only for tables in the `hr` schema:

```
MAP fin.*, TARGET fin.*;
MAP hr.*, TARGET hr.*;
MAP hq.rpt, TARGET hq.rpt, COLMAP (USEDEFAULTS, CNT = @GETENV ('STATS', 'TABLE',
'hr.*', 'DML'));
```

Likewise, the following counts DML operations only for the `emp` table in the `hr` schema:

```
MAP fin.*, TARGET fin.*;
MAP hr.*, TARGET hr.*;
MAP hq.rpt, TARGET hq.rpt, COLMAP (USEDEFAULTS, CNT = @GETENV ('STATS', 'TABLE',
'hr.emp', 'DML'));
```

By contrast, because there are no specific tables specified for `STATS` in the following example, the function counts all `INSERT`, `UPDATE`, and `DELETE` operations for all tables in all schemas that are represented in the `TARGET` clauses of `MAP` statements:

```
MAP fin.*, TARGET fin.*;
MAP hr.*, TARGET hr.*;
MAP hq.rpt, TARGET hq.rpt, COLMAP (USEDEFAULTS, CNT = &
@GETENV ('STATS', 'DML'));
```

`'statistic'`
The type of statistic to return. See Using Statistics in FILTER Clauses for important information when using statistics in `FILTER` clauses in multiple `TABLE` or `MAP` statements.

> **`'INSERT'`**
> Returns the number of `INSERT` operations that were processed.
>
> **`'UPDATE'`**
> Returns the number of `UPDATE` operations that were processed.

'DELETE'
Returns the number of `DELETE` operations that were processed.

'DML'
Returns the total of `INSERT`, `UPDATE`, and `DELETE` operations that were processed.

'TRUNCATE'
Returns the number of `TRUNCATE` operations that were processed. This variable returns a count only if Oracle GoldenGate DDL replication is not being used. If DDL replication is being used, this variable returns a zero.

'DDL'
Returns the number of DDL operations that were processed, including `TRUNCATE`s and DDL specified in `INCLUDE` and `EXCLUDE` clauses of the `DDL` parameter, all scopes (`MAPPED`, `UNMAPPED`, `OTHER`). This variable returns a count only if Oracle GoldenGate DDL replication is being used. This variable is not valid for `'DELTASTATS`'.

'CDR_CONFLICTS'
Returns the number of conflicts that Replicat detected when executing the Conflict Detection and Resolution (CDR) feature.
Example for a specific table:

```
@GETENV ('STATS','TABLE','HR.EMP','CDR_CONFLICTS')
```

Example for all tables processed by Replicat:

```
@GETENV ('STATS','CDR_CONFLICTS')
```

'CDR_RESOLUTIONS_SUCCEEDED'
Returns the number of conflicts that Replicat resolved when executing the Conflict Detection and Resolution (CDR) feature.
Example for a specific table:

```
@GETENV ('STATS','TABLE','HR.EMP', 'CDR_RESOLUTIONS_SUCCEEDED')
```

Example for all tables processed by Replicat:

```
@GETENV ('STATS','CDR_RESOLUTIONS_SUCCEEDED')
```

'CDR_RESOLUTIONS_FAILED'
Returns the number of conflicts that Replicat could not resolve when executing the Conflict Detection and Resolution (CDR) feature.
Example for a specific table:

```
@GETENV ('STATS','TABLE','HR.EMP', 'CDR_RESOLUTIONS_FAILED')
```

Example for all tables processed by Replicat:

```
@GETENV ('STATS','CDR_RESOLUTIONS_FAILED')
```

'GGENVIRONMENT' , **'*environment_info*'**

Valid for Extract and Replicat.

Use the `GGENVIRONMENT` option of `@GETENV` to return information about the Oracle GoldenGate environment.

Syntax

```
@GETENV ('GGENVIRONMENT', {'DOMAINNAME'|'GROUPDESCRIPTION'|'GROUPNAME'|

'GROUPTYPE'|'HOSTNAME'|'OSUSERNAME'|'PROCESSID'|'USERNAME'|'MACHINENAME'|'PROGRAMNAME
'|'CLIENTIDENTIFIER'})
```

`'DOMAINNAME'`
(Windows only) Returns the domain name associated with the user that started the process.

`'GROUPDESCRIPTION'`
Returns the description of the group, taken from the checkpoint file. Requires that a description was provided with the `DESCRIPTION` parameter when the group was created with the `ADD` command in GGSCI.

`'GROUPNAME'`
Returns the name of the process group.

`'GROUPTYPE'`
Returns the type of process, either `EXTRACT` or `REPLICAT`.

`'HOSTNAME'`
Returns the name of the system running the Extract or Replicat process.

`'OSUSERNAME'`
Returns the operating system user name that started the process.

`'PROCESSID'`
Returns the process ID that is assigned to the process by the operating system.

`‘USERNAME’`
Database login user name.

`‘MACHINENAME’`
Name of the host, machine, or server where database is running

`‘PROGRAMNAME’`
Name of the program or application that started the transaction or session.

`‘CLIENTIDENTIFIER’`
Value set by using `DBMS_SESSION_.set_identifier()`.

`'GGHEADER'` , **`'`*`header_info`*`'`**

Valid for Extract and Replicat.

Use the `GGHEADER` option of `@GETENV` to return information from the header portion of an Oracle GoldenGate trail record. The header describes the transaction environment of the record. For more information on record headers and record types, see *Administering Oracle GoldenGate for Windows and UNIX*.

Syntax

```
@GETENV ('GGHEADER', {'BEFOREAFTERINDICATOR'|'COMMITTIMESTAMP'|'LOGPOSITION'|
   'LOGRBA'|'OBJECTNAME'|'TABLENAME'|'OPTYPE'|'RECORDLENGTH'|
   'TRANSACTIONINDICATOR'})
```

`'BEFOREAFTERINDICATOR'`
Returns the before or after indicator showing whether the record is a before image or an after image. Possible results are:

- `BEFORE` (before image)
- `AFTER` (after image)

`'COMMITTIMESTAMP'`
Returns the transaction timestamp (the time when the transaction committed) expressed in the format of `YYYY-MM-DD HH:MI:SS.FFFFFF`, for example:

```
2011-01-24 17:08:59.000000
```

`'LOGPOSITION'`
Returns the position of the Extract process in the data source. (See the `LOGRBA` option.)

`'LOGRBA'`
`LOGRBA` and `LOGPOSITION` store details of the position in the data source of the record. For transactional log-based products, `LOGRBA` is the sequence number and `LOGPOSITION` is the relative byte address. However, these values will vary depending on the capture method and database type.

`'OBJECTNAME' | 'TABLENAME'`
Returns the table name or object name (if a non-table object).

`'OPTYPE'`
Returns the type of operation. Possible results are:

```
INSERT
UPDATE
DELETE
ENSCRIBE COMPUPDATE
SQL COMPUPDATE
PK UPDATE
TRUNCATE
```

If the operation is not one of the above types, then the function returns the word `TYPE` with the number assigned to the type.

`'RECORDLENGTH'`
Returns the record length in bytes.

`'TRANSACTIONINDICATOR'`
Returns the transaction indicator. The value corresponds to the `TransInd` field of the record header, which can be viewed with the Logdump utility.
Possible results are:

- `BEGIN` (represents `TransInD` of 0, the first record of a transaction.)
- `MIDDLE` (represents `TransInD` of 1, a record in the middle of a transaction.)
- `END` (represents `TransInD` of 2, the last record of a transaction.)
- `WHOLE` (represents `TransInD` of 3, the only record in a transaction.)

`'GGFILEHEADER' , '`*`header_info`*`'`

Valid for Replicat.

Use the GGFILEHEADER option of @GETENV to return attributes of an Oracle GoldenGate extract file or trail file. These attributes are stored as tokens in the file header.

Note:

If a given database, operating system, or Oracle GoldenGate version does not provide information that relates to a given token, a NULL value will be returned.

Syntax

```
@GETENV ('GGFILEHEADER', {'COMPATIBILITY'|'CHARSET'|'CREATETIMESTAMP'|
   'FILENAME'|'FILETYPE'|'FILESEQNO'|'FILESIZE'|'FIRSTRECCSN'|
   'LASTRECCSN'|'FIRSTRECIOTIME'|'LASTRECIOTIME'|'URI'|'URIHISTORY'|
   'GROUPNAME'|'DATASOURCE'|'GGMAJORVERSION'|'GGMINORVERSION'|
   'GGVERSIONSTRING'|'GGMAINTENANCELEVEL'|'GGBUGFIXLEVEL'|'GGBUILDNUMBER'|
   'HOSTNAME'|'OSVERSION'|'OSRELEASE'|'OSTYPE'|'HARDWARETYPE'|
   'DBNAME'|'DBINSTANCE'|'DBTYPE'|'DBCHARSET'|'DBMAJORVERSION'|
   'DBMINORVERSION'|'DBVERSIONSTRING'|'DBCLIENTCHARSET'|'DBCLIENTVERSIONSTRING'|
   'LASTCOMPLETECSN'|'LASTCOMPLETEXIDS'|'LASTCSN'|'LASTXID'|
   'LASTCSNTS'})
```

'COMPATIBILITY'
Returns the Oracle GoldenGate compatibility level of the trail file. The compatibility level of the current Oracle GoldenGate version must be greater than, or equal to, the compatibility level of the trail file to be able to read the data records in that file. Current valid values are 0 or 1.

- 1 means that the trail file is of Oracle GoldenGate version 10.0 or later, which supports file headers that contain file versioning information.
- 0 means that the trail file is of an Oracle GoldenGate version that is older than 10.0. File headers are not supported in those releases. The 0 value is used for backward compatibility to those Oracle GoldenGate versions.

'CHARSET'
Returns the global character set of the trail file. For example:
`WCP1252-1`

'CREATETIMESTAMP'
Returns the time that the trail was created, in local GMT Julian time in INT64.

'FILENAME'
Returns the name of the trail file. Can be an absolute or relative path, with a forward or backward slash depending on the file system.

'FILETYPE'
Returns a numerical value indicating whether the trail file is a single file (such as one created for a batch run) or a sequentially numbered file that is part of a trail for online, continuous processing. The valid values are:

- 0 - EXTFILE
- 1 - EXTTRAIL

- 2 - UNIFIED and EXTFILE
- 3 - UNIFIED and EXTTRAIL

`'FILESEQNO'`
Returns the sequence number of the trail file, without any leading zeros. For example, if a file sequence number is `aa000026`, `FILESEQNO` returns `26`.

`'FILESIZE'`
Returns the size of the trail file. It returns `NULL` on an active file and returns a size value when the file is full and the trail rolls over.

`'FIRSTRECCSN'`
Returns the commit sequence number (CSN) of the first record in the trail file.Value is `NULL` until the trail file is completed. For more information about the CSN, see *Administering Oracle GoldenGate for Windows and UNIX*.

`'LASTRECCSN'`
Returns the commit sequence number (CSN) of the last record in the trail file.Value is `NULL` until the trail file is completed. For more information about the CSN, see *Administering Oracle GoldenGate for Windows and UNIX*.

`'FIRSTRECIOTIME'`
Returns the time that the first record was written to the trail file. Value is `NULL` until the trail file is completed.

`'LASTRECIOTIME'`
Returns the time that the last record was written to the trail file. Value is `NULL` until the trail file is completed.

`'URI'`
Returns the universal resource identifier of the process that created the trail file, in the following format:

```
host_name:dir:[:dir][:dir_n]group_name
```

Where:

- `host_name` is the name of the server that hosts the process
- `dir` is a subdirectory of the Oracle GoldenGate installation path.
- `group_name` is the name of the process group that is linked with the process.

The following example shows where the trail was processed and by which process. This includes a history of previous runs.

```
sys1:home:oracle:v9.5:extora
```

`'URIHISTORY'`
Returns a list of the URIs of processes that wrote to the trail file before the current process.

- For a primary Extract, this field is empty.
- For a data pump, this field is `URIHistory + URI` of the input trail file.

'GROUPNAME'
Returns the name of the group that is associated with the Extract process that created the trail. The group name is the one that was supplied when the `ADD EXTRACT` command was issued.

'DATASOURCE'
Returns the data source that was read by the process. The return value can be one of the following:

- `DS_EXTRACT_TRAILS: The source was an Oracle GoldenGate extract file, populated with change data.`
- `DS_DATABASE:` The source was a direct select from database table written to a trail, used for `SOURCEISTABLE`-driven initial load.
- `DS_TRAN_LOGS: The source was the database transaction log.`
- `DS_INITIAL_DATA_LOAD: The source was a direct select from database tables for an initial load.`
- `DS_VAM_EXTRACT:` The source was a vendor access module (VAM).
- `DS_VAM_TWO_PHASE_COMMIT:` The source was a VAM trail.

'GGMAJORVERSION'
Returns the major version of the Extract process that created the trail, expressed as an integer. For example, if a version is 1.2.3, it returns 1.

'GGMINORVERSION'
Returns the minor version of the Extract process that created the trail, expressed as an integer. For example, if a version is 1.2.3, it returns 2.

'GGVERSIONSTRING'
Returns the maintenance (or patch) level of the Extract process that created the trail, expressed as an integer. For example, if a version is 1.2.3, it returns 3.

'GGMAINTENANCELEVEL'
Returns the maintenance version of the process (`xx.xx.xx`).

'GGBUGFIXLEVEL'
Returns the patch version of the process (`xx.xx.xx.xx`).

'GGBUILDNUMBER'
Returns the build number of the process.

'HOSTNAME'
Returns the DNS name of the machine where the Extract that wrote the trail is running. For example:

- `sysa`
- `sysb`
- `paris`
- `hq25`

'OSVERSION'
Returns the major version of the operating system of the machine where the Extract that wrote the trail is running. For example:

- `Version s10_69`
- `#1 SMP Fri Feb 24 16:56:28 EST 2006`
- `5.00.2195 Service Pack 4`

`'OSRELEASE'`
Returns the release version of the operating system of the machine where the Extract that wrote the trail is running. For example, release versions of the examples given for `OSVERSION` could be:

- `5.10`
- `2.6.9-34.ELsmp`

`'OSTYPE'`
Returns the type of operating system of the machine where the Extract that wrote the trail is running. For example:

- `SunOS`
- `Linux`
- `Microsoft Windows`

`'HARDWARETYPE'`
Returns the type of hardware of the machine where the Extract that wrote the trail is running. For example:

- `sun4u`
- `x86_64`
- `x86`

`'DBNAME'`
Returns the name of the database, for example `findb`.

`'DBINSTANCE'`
Returns the name of the database instance, if applicable to the database type, for example `ORA1022A`.

`'DBTYPE'`
Returns the type of database that produced the data in the trail file. Can be one of:

```
DB2 UDB
DB2 ZOS
CTREE
MSSQL
MYSQL
ORACLE
SQLMX
SYBASE
TERADATA
NONSTOP
ENSCRIBE
ODBC
```

`'DBCHARSET'`
Returns the character set that is used by the database that produced the data in the trail file. (For some databases, this will be empty.)

`'DBMAJORVERSION'`
Returns the major version of the database that produced the data in the trail file.

`'DBMINORVERSION'`
Returns the minor version of the database that produced the data in the trail file.

`'DBVERSIONSTRING'`
Returns the maintenance (patch) level of the database that produced the data in the trail file.

`'DBCLIENTCHARSET'`
Returns the character set that is used by the database client.

`'DBCLIENTVERSIONSTRING'`
Returns the maintenance (patch) level of the database client. (For some databases, this will be empty.)

`'LASTCOMPLETECSN'`
Returns recovery information for internal Oracle GoldenGate use.

`'LASTCOMPLETEXIDS'`
Returns recovery information for internal Oracle GoldenGate use.

`'LASTCSN'`
Returns recovery information for internal Oracle GoldenGate use.

`'LASTXID'`
Returns recovery information for internal Oracle GoldenGate use.

`'LASTCSNTS'`
Returns recovery information for internal Oracle GoldenGate use.

`'RECORD'` , **'*location_info*'**

Valid for a data-pump Extract or Replicat.

Use the `RECORD` option of `@GETENV` to return the location or Oracle rowid of a record in an Oracle GoldenGate trail file.

Syntax

```
@GETENV ('RECORD', {'FILESEQNO'|'FILERBA'|'ROWID'|'RSN'|'TIMESTAMP'})
```

`'FILESEQNO'`
Returns the sequence number of the trail file without any leading zeros.

`'FILERBA'`
Returns the relative byte address of the record within the `FILESEQNO` file.

`'ROWID'`
(Valid for Oracle) Returns the rowid of the record.

`'RSN'`
Returns the record sequence number within the transaction.

`'TIMESTAMP'`
Returns the timestamp of the record.

'RECORD_TIMESTAMP_PRECISE' , **'*location_info*'**

Valid for a data-pump Extract or Replicat.

Use the `RECORD_TIMESTAMP_PRECISE` option of `@GETENV` to return the location or Oracle rowid of a record in an Oracle GoldenGate trail file, with fraction precision.

This option returns the timestamp from YEAR to MICROSECONDS. However, depending on the database, the value can be in MILLISECONDS with zero MICROSECONDS.

Syntax

```
@GETENV ('RECORD_TIMESTAMP_PRECISE',
{'FILESEQNO'|'FILERBA'|'ROWID'|'RSN'|'TIMESTAMP'})
```

'FILESEQNO'
Returns the sequence number of the trail file without any leading zeros.

'FILERBA'
Returns the relative byte address of the record within the `FILESEQNO` file.

'ROWID'
(Valid for Oracle) Returns the rowid of the record.

'RSN'
Returns the record sequence number within the transaction.

'TIMESTAMP'
Returns the timestamp of the record in microseconds or milliseconds, depending on the database type.

'DBENVIRONMENT' , **'*database_info*'**

Valid for Extract and Replicat.

Use the `DBENVIRONMENT` option of `@GETENV` to return global environment information for a database.

Syntax

```
@GETENV ('DBENVIRONMENT', {'DBNAME'|'DBVERSION'|'DBUSER'|'SERVERNAME'})
```

'DBNAME'
Returns the database name.

'DBVERSION'
Returns the database version.

'DBUSER'
Returns the database login user. Note that SQL Server does not log the user ID.

'SERVERNAME'
Returns the name of the server.

'TRANSACTION' , **'*transaction_info*'**

Valid for Extract.

Use the `TRANSACTION` option of `@GETENV` to return information about a source transaction. This option is valid for the Extract process.

Syntax

```
@GETENV ('TRANSACTION', {'TRANSACTIONID'|'XID'|'CSN'|'TIMESTAMP'|'NAME'|
   'USERID'|'USERNAME'|'PLANNAME' | 'LOGBSN' | 'REDOTHREAD')
```

`'TRANSACTIONID' | 'XID'`
Returns the transaction ID number. Either `TRANSACTIONID` or `XID` can be used. The transaction ID and the CSN are associated with the first record of every transaction and are stored as tokens in the trail record. For each transaction ID, there is an associated CSN. Transaction ID tokens have no zero-padding on any platform, because they never get evaluated as relative values. They only get evaluated for whether they match or do not match. Note that in the trail, the transaction ID token is shown as `TRANID`.

`'CSN'`
Returns the commit sequence number (CSN). The CSN is not zero-padded when returned for these databases: Oracle, DB2 LUW, and DB2 z/OS. For all other supported databases, the CSN is zero-padded. In the case of the Sybase CSN, each substring that is delimited by a dot (.) will be padded to a length that does not change for that substring.
Note that in the trail, the CSN token is shown as `LOGCSN`. See the `TRANSACTIONID | XID` environment value for additional information about the CSN token.
For more information about the CSN, see *Administering Oracle GoldenGate for Windows and UNIX*.

`'TIMESTAMP'`
Returns the commit timestamp of the transaction.

`'NAME'`
Returns the transaction name, if available.

`'USERID'`
(Oracle) Returns the Oracle user ID of the database user that committed the last transaction.

`'USERNAME'`
(Oracle) Returns the Oracle user name of the database user that committed the last transaction.

`'PLANNAME'`
(DB2 on z/OS) Returns the plan name under which the current transaction was originally executed. The plan name is included in the begin unit of recovery log record.

`'LOGBSN'`
Returns the begin sequence number (BSN) in the transaction log. The BSN is the native sequence number that identifies the beginning of the oldest uncommitted transaction that is held in Extract memory. For example, given an Oracle database, the BSN would be expressed as a system change number (SCN). The BSN corresponds to the current I/O checkpoint value of Extract. This value can be obtained from the trail by Replicat when `@GETENV ('TRANSACTION', 'LOGBSN')` is used. This value also can be obtained by using the `INFO REPLICAT` command with the `DETAIL` option. The purpose of obtaining the BSN from Replicat is to get a recovery point for Extract in the event that a system failure or file system corruption makes the Extract checkpoint file

unusable. See *Administering Oracle GoldenGate for Windows and UNIX* for more information about recovering the Extract position.

`'REDOTHREAD'`
Returns the thread number of a RAC node extract; on non-RAC node extracts the value is always 1. For data pump and Replicat, the thread id used by Extract capture of a RAC node is returned; on non-RAC, `@GETENV()` returns an error. Logdump shows the token, `ORATHREADID`, in the token section if the transaction is captured by Extract on a RAC node.

`'TRANSACTION_TIMESTAMP_PRECISE' , '`*`transaction_info`*

Valid for Extract.

Use the `TRANSACTION_TIMESTAMP_PRECISE` option of `@GETENV` to return information about a source transaction, but with fraction precision. It returns the timestamp from YEAR to MICROSECONDS. This option is valid for the Extract process.

Syntax

```
@GETENV ('TRANSACTION_TIMESTAMP_PRECISE',
{'TRANSACTIONID'|'XID'|'CSN'|'TIMESTAMP'|'NAME'|
   'USERID'|'USERNAME'|'PLANNAME' | 'LOGBSN' | 'REDOTHREAD')
```

`'TRANSACTIONID' | 'XID'`
Returns the transaction ID number. Either `TRANSACTIONID` or `XID` can be used. The transaction ID and the CSN are associated with the first record of every transaction and are stored as tokens in the trail record. For each transaction ID, there is an associated CSN. Transaction ID tokens have no zero-padding on any platform, because they never get evaluated as relative values. They only get evaluated for whether they match or do not match. Note that in the trail, the transaction ID token is shown as `TRANID`.

`'CSN'`
Returns the commit sequence number (CSN). The CSN is not zero-padded when returned for these databases: Oracle, DB2 LUW, and DB2 z/OS. For all other supported databases, the CSN is zero-padded. In the case of the Sybase CSN, each substring that is delimited by a dot (.) will be padded to a length that does not change for that substring.
Note that in the trail, the CSN token is shown as `LOGCSN`. See the `TRANSACTIONID | XID` environment value for additional information about the CSN token.
For more information about the CSN, see *Administering Oracle GoldenGate for Windows and UNIX*.

`'TIMESTAMP'`
Returns the commit timestamp of the transaction.

`'NAME'`
Returns the transaction name, if available.

`'USERID'`
(Oracle) Returns the Oracle user ID of the database user that committed the last transaction.

`'USERNAME'`
(Oracle) Returns the Oracle user name of the database user that committed the last transaction.

'PLANNAME'
(DB2 on z/OS) Returns the plan name under which the current transaction was originally executed. The plan name is included in the begin unit of recovery log record.

'LOGBSN'
Returns the begin sequence number (BSN) in the transaction log. The BSN is the native sequence number that identifies the beginning of the oldest uncommitted transaction that is held in Extract memory. For example, given an Oracle database, the BSN would be expressed as a system change number (SCN). The BSN corresponds to the current I/O checkpoint value of Extract. This value can be obtained from the trail by Replicat when `@GETENV ('TRANSACTION', 'LOGBSN')` is used. This value also can be obtained by using the `INFO REPLICAT` command with the `DETAIL` option. The purpose of obtaining the BSN from Replicat is to get a recovery point for Extract in the event that a system failure or file system corruption makes the Extract checkpoint file unusable. See *Administering Oracle GoldenGate for Windows and UNIX* for more information about recovering the Extract position.

'REDOTHREAD'
Returns the thread number of a RAC node extract; on non-RAC node extracts the value is always 1. For data pump and Replicat, the thread id used by Extract capture of a RAC node is returned; on non-RAC, `@GETENV()` returns an error. Logdump shows the token, `ORATHREADID`, in the token section if the transaction is captured by Extract on a RAC node.

'OSVARIABLE' , '*variable*'

Valid for Extract and Replicat.

Use the `OSVARIABLE` option of `@GETENV` to return the string value of a specified operating-system environment variable.

Syntax

```
@GETENV ('OSVARIABLE', 'variable')
```

'variable'
The name of the variable. The search is an exact match of the supplied variable name. For example, the UNIX `grep` command would return all of the following variables, but `@GETENV ('OSVARIABLE', 'HOME')` would only return the value for `HOME`:

```
ANT_HOME=/usr/local/ant
JAVA_HOME=/usr/java/j2sdk1.4.2_10
HOME=/home/judyd
ORACLE_HOME=/rdbms/oracle/ora1022i/64
```

The search is case-sensitive if the operating system supports case-sensitivity.

'TLFKEY' , SYSKEY, '*unique_key*'

Valid for Extract and Replicat.

Use the `TLFKEY` option of `@GETENV` to associate a unique key with TLF/PTLF records in ACI's Base24 application. The 64-bit key is composed of the following concatenated items:

- The number of seconds since 2000.
- The block number of the record in the TLF/PTLF block multiplied by ten.

- The node specified by the user (must be between 0 and 255).

Syntax

```
@GETENV ('TLFKEY', SYSKEY, unique_key)
```

`SYSKEY, unique_key`
The NonStop node number of the source TLF/PTLF file. Do not enclose this syntax element in quotes.
Example:

```
GETENV ('TLFKEY', SYSKEY, 27)
```

`'USERNAME' ,`

Specifies the database login user name.

Syntax

```
@GETENV ('TLFKEY', SYSKEY, unique_key)
```

`SYSKEY, unique_key`
The NonStop node number of the source TLF/PTLF file. Do not enclose this syntax element in quotes.
Example:

```
GETENV ('TLFKEY', SYSKEY, 27)
```

6.24 GET_ENV_VALUE

Valid For

Extract and Replicat

Description

Use the `GET_ENV_VALUE` function to return information about the Oracle GoldenGate environment. The information that is supplied is the same as that of the `@GETENV` column-conversion function and is specified by using the same input values. For more information about the valid information types, environment variables, and return values, see "GETENV".

If the character session of the user exit is set with `SET_SESSION_CHARSET` to a value other than the default character set of the operating system, as defined in `ULIB_CS_DEFAULT` in the `ucharset.h` file, the character data that is exchanged between the user exit and the process is interpreted in the session character set.

Syntax

```
#include "usrdecs.h"
short result_code;
getenv_value_def env_ptr;
ERCALLBACK (GET_ENV_VALUE, &env_ptr, &result_code);
```

Buffer

```
typedef struct
{
char *information_type;
char *env_value_name;
char *return_value;
long max_return_length;
long actual_length;
short value_truncated;
} getenv_value_def;
```

Input

`information_type`
The information type that is to be returned, for example `'GGENVIRONMENT'` or `'GGHEADER'`. The information type must be supplied within double quotes. For a list of information types and subsequent detailed descriptions, see "GETENV".

`env_value_name`
The environment value that is wanted from the information type. The environment value must be supplied within double quotes. For valid values, see "GETENV". For example, if using the `'GGENVIRONMENT'` information type, a valid environment value would be `'GROUPNAME'`.

`max_return_length`
The maximum length of the buffer for this data.

Output

`return_value`
A valid return value for the supplied environment value.

`actual_length`
The actual length of the data in this buffer.

`value_truncated`
A flag (`0` or `1`) to indicate whether or not the value was truncated. Truncation occurs if the length of the value plus the null terminator exceeds the maximum buffer length.

Return Values

```
EXIT_FN_RET_OK
EXIT_FN_RET_ENV_NOT_FOUND
EXIT_FN_RET_INVALID_PARAM
```

6.25 GET_ERROR_INFO

Valid For

Extract and Replicat

Description

Use the `GET_ERROR_INFO` function to retrieve error information associated with a discard record. The user exit can use this information in custom error handling logic. For example, the user exit could send an e-mail message with detailed error information.

If the character session of the user exit is set with `SET_SESSION_CHARSET` to a value other than the default character set of the operating system, as defined in `ULIB_CS_DEFAULT` in the `ucharset.h` file, the message data that is exchanged between the user exit and the process is interpreted in the session character set.

Syntax

```
#include "usrdecs.h"
short result_code;
error_info_def error_info;
ERCALLBACK (GET_ERROR_INFO, &error_info, &result_code);
```

Buffer

```
typedef struct
{
long error_num;
char *error_msg;
long max_length;
long actual_length;
short msg_truncated;
} error_info_def;
```

Input

`error_msg`
A pointer to a buffer to accept the returned error message.

`max_length`
The maximum length of your allocated `error_msg` buffer to accept any resulting error message. This is returned as a `NULL` terminated string.

Output

`error_num`
The SQL or system error number associated with the discarded record.

`error_msg`
A pointer to the null-terminated error message string associated with the discarded record.

`actual_length`
The length of the error message, not including the null terminator.

`msg_truncated`
A flag (`0` or `1`) indicating whether or not the error message was truncated. Truncation occurs if the length of the error message plus a null terminator exceeds the maximum buffer length.

Return Values

```
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_OK
```

6.26 GET_GMT_TIMESTAMP

Valid For

Extract and Replicat

Description

Use the `GET_GMT_TIMESTAMP` function to retrieve the operation commit timestamp in GMT format. This function requires compiling with Version 2 `usrdecs.h` or later.

Syntax

```
#include "usrdecs.h"
short result_code;
record_def record;
ERCALLBACK (GET_GMT_TIMESTAMP, &record, &result_code);
```

Buffer

```
typedef struct
{
char *table_name;
char *buffer;
long length;
char before_after_ind;
short io_type;
short record_type;
short transaction_ind;
int64_t timestamp;
exit_ts_str io_datetime;
short mapped;
short source_or_target;
/* Version 2 CALLBACK_STRUCT_VERSION   */
char requesting_before_after_ind;
} record_def;
```

Input

None

Output

`timestamp`
The returned 64-bit I/O timestamp in GMT format.

`io_datetime`
A null-terminated string containing the local I/O date and time:
`YYYY-MM-DD HH:MI:SS.FFFFFF`
The format of the datetime string is in the session character set.

Return Values

```
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_OK
```

6.27 GET_MARKER_INFO

Valid For

Extract (data pump only) and Replicat

Description

Use the `GET_MARKER_INFO` function to retrieve marker information sent from a NonStop source system when Replicat is applying data. Use markers to trigger custom processing within a user exit.

If the character session of the user exit is set with `SET_SESSION_CHARSET` to a value other than the default character set of the operating system, as defined in `ULIB_CS_DEFAULT` in the `ucharset.h` file, all of the returned marker data is interpreted in the session character set.

Syntax

```
#include "usrdecs.h"
short result_code;
marker_info_def marker_info;
ERCALLBACK (GET_MARKER_INFO, &marker_info, &result_code);
```

Buffer

```
typedef struct
{
char *processed;
char *added;
char *text;
char *group;
char *program;
char *node;
} marker_info_def;
```

Input

`processed`
A pointer to a buffer to accept the `processed` return value.

`added`
A pointer to a buffer to accept the `added` return value.

`text`
A pointer to a buffer to accept the `text` return value.

`group`
A pointer to a buffer to accept the `group` return value.

`program`
A pointer to a buffer to accept the `program` return value.

`node`
A pointer to a buffer to accept the `node` return value.

Output

`processed`
A null-terminated string in the format of `YYYY-MM-DD HH:MI:SS` indicating the local date and time that the marker was processed.

`added`
A null-terminated string in the format of `YYYY-MM-DD HH:MI:SS` indicating the local date and time that the marker was added.

`text`
A null-terminated string containing the text associated with the marker.

`group`
A null-terminated string indicating the Replicat group that processed the marker.

`program`
A null-terminated string indicating the program that processed the marker.

`node`
A null-terminated string representing the Himalaya node on which the marker was originated.

Return Values

```
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_OK
```

6.28 GET_OBJECT_NAME

Valid For

Extract and Replicat

Description

Use the `GET_OBJECT_NAME` function to retrieve the fully qualified name of a source or target object that is associated with the record being processed. This function is valid tables and other objects in a DML or DDL operation.

To return only part of the object name, see the following:

GET_OBJECT_NAME_ONLY GET_SCHEMA_NAME_ONLY GET_CATALOG_NAME_ONLY

Database object names are returned exactly as they are defined in the hosting database, including the letter case.

Syntax

```
#include "usrdecs.h"
short result_code;
env_value_def env_value;
ERCALLBACK (GET_OBJECT_NAME, &env_value, &result_code);
```

Buffer

```
typedef struct
{
char *buffer;
long max_length;
long actual_length;
short value_truncated;
short index;
short source_or_target;
} env_value_def;
```

Input

`buffer`
A pointer to a buffer to accept the returned object name. The name is null-terminated.

`max_length`
The maximum length of your allocated buffer to accept the object name. This is returned as a `NULL` terminated string.

`source_or_target`
One of the following indicating whether to return the source or target object name.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

Output

`buffer`
The fully qualified, null-terminated object name, for example `schema.object` or `catalog.schema.object`, depending on the database platform.
If the character session of the user exit is set with `SET_SESSION_CHARSET` to a value other than the default character set of the operating system, as defined in `ULIB_CS_DEFAULT` in the `ucharset.h` file, the object name is interpreted in the session character set.

`actual length`
The string length of the returned object name. The actual length does not include the null terminator. The actual length is 0 if the object is a table.

`value_truncated`
A flag (`0` or `1`) indicating whether or not the value was truncated. Truncation occurs if the length of the object name plus the null terminator exceeds the maximum buffer length.

Return Values

```
EXIT_FN_RET_INVALID_COLUMN
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_OK
```

6.29 GET_OBJECT_NAME_ONLY

Valid For

Extract and Replicat

Description

Use the `GET_OBJECT_NAME_ONLY` function to retrieve the unqualified name (without the catalog, container, or schema) of a source or target object that is associated with the record that is being processed. This function is valid for tables and other objects in a DML or DDL operation.

To return the fully qualified name of an object, see the following:

GET_OBJECT_NAME

To return other parts of the object name, see the following:

GET_SCHEMA_NAME_ONLY GET_CATALOG_NAME_ONLY

Database object names are returned exactly as they are defined in the hosting database, including the letter case.

Syntax

```
#include "usrdecs.h"
short result_code;
env_value_def env_value;
ERCALLBACK (GET_OBJECT_NAME_ONLY, &env_value, &result_code);
```

Buffer

```
typedef struct
{
char *buffer;
long max_length;
long actual_length;
short value_truncated;
short index;
short source_or_target;
} env_value_def;
```

Input

`buffer`
A pointer to a buffer to accept the returned object name. The name is null-terminated.

`max_length`
The maximum length of your allocated buffer to accept the object name. This is returned as a `NULL` terminated string.

`source_or_target`
One of the following indicating whether to return the source or target object name.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

Output

`buffer`
The fully qualified, null-terminated object name, for example `schema.object` or `catalog.schema.object`, depending on the database platform.
If the character session of the user exit is set with `SET_SESSION_CHARSET` to a value other than the default character set of the operating system, as defined in `ULIB_CS_DEFAULT` in the `ucharset.h` file, the object name is interpreted in the session character set.

`actual length`
The string length of the returned object name. The actual length does not include the null terminator. The actual length is 0 if the object is a table.

`value_truncated`
A flag (`0` or `1`) indicating whether or not the value was truncated. Truncation occurs if the length of the object name plus the null terminator exceeds the maximum buffer length.

Return Values

```
EXIT_FN_RET_INVALID_COLUMN
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_OK
```

6.30 GET_OPERATION_TYPE

Valid For

Extract and Replicat

Description

Use the `GET_OPERATION_TYPE` function to determine the operation type associated with a record. Knowing the operation type can be useful in a user exit. For example, the user exit can perform complex validations any time a delete is encountered. It also is important to know when a compressed record is being processed if the user exit is manipulating the full data record.

As an alternative, you can use the `GET_RECORD_BUFFER` function to determine the operation type (see "GET_RECORD_BUFFER").

Syntax

```
#include "usrdecs.h"
short result_code;
record_def record;
ERCALLBACK (GET_OPERATION_TYPE, &record, &result_code);
```

Buffer

```
typedef struct
{
char *table_name;
char *buffer;
long length;
char before_after_ind;
short io_type;
short record_type;
short transaction_ind;
int64_t timestamp;
exit_ts_str io_datetime;
short mapped;
short source_or_target;
/* Version 2 CALLBACK_STRUCT_VERSION   */
char requesting_before_after_ind;
} record_def;
```

Input

`source_or_target`
One of the following indicating whether to return the operation type for the source or the target data record.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

Output

`io_type`
Returned as one of the following:

- **DDL type:**

  ```
  SQL_DDL_VAL
  ```

- **DML types:**

  ```
  DELETE_VAL
  INSERT_VAL
  UPDATE_VAL
  ```

- **Compressed Enscribe update:**

  ```
  UPDATE_COMP_ENSCRIBE_VAL
  ```

- **Compressed SQL update:**

  ```
  UPDATE_COMP_SQL_VAL
  UPDATE_COMP_PK_SQL_VAL
  ```

- **Other:**

  ```
  TRUNCATE_TABLE_VAL
  ```

Return Values

```
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_OK
```

6.31 GET_POSITION

Valid For

Extract (data pump only) and Replicat

Description

Use the `GET_POSITION` function is obtain a read position of an Extract data pump or Replicat in the Oracle GoldenGate trail.

Syntax

```
#include "usrdecs.h"
short result_code;
ERCALLBACK (GET_POSITION &position_def, &result_code);
```

Buffer

```
typedef struct
{
char *position;
long position_len;
short position_type;
short ascii_or_internal;
} position_def;
```

Input

`position_len`
Allocation length for the position length.

`position_type`
Can be one of the following:

> **`STARTUP_CHECKPOINT`**
> The start position in the trail.
>
> **`CURRENT_CHECKPOINT`**
> The position of the last read in the trail.

`column_value_mode`
An indicator for the format in which the column value was passed. Currently, only the default Oracle GoldenGate canonical format is supported, as represented by: `EXIT_FN_RAW_FORMAT`

Output

`*position`
A pointer to a buffer representing the position values. This buffer is declared in the `position_def` as two binary values (unsigned `int32t` and `int32t`) as `seqnorba` for eight bytes in a `char` field. The user exit must move the data to the correct data type. Using this function on a Little Endian platform will cause the process to "reverse bytes" on the two fields individually.

Return Values

```
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_NOT_SUPPORTED
EXIT_FN_RET_OK
```

6.32 GET_RECORD_BUFFER

Valid For

Extract and Replicat

Description

Use the `GET_RECORD_BUFFER` function to obtain information for custom column conversions. User exits can be used for data mapping between dissimilar source and target records when the `COLMAP` option of the `MAP` or `TABLE` parameter is not sufficient. For example, you can use a user exit to convert a proprietary date field (for example, YYDDD) in an Enscribe database to a standard SQL date in the target record, while other columns are mapped by the Extract process by means of the COLMAP option.

You can use the SET_RECORD_BUFFER function (see "SET_RECORD_BUFFER") to modify the data retrieved with GET_RECORD_BUFFER. However, it requires an understanding of the data record as written in the internal Oracle GoldenGate canonical format. As an alternative, you can set column values in the data record with the SET_COLUMN_VALUE_BY_INDEX function (see "SET_COLUMN_VALUE_BY_INDEX") or the SET_COLUMN_VALUE_BY_NAME function (see "STRNCMP").

Deletes, inserts and updates appear in the buffer as full record images.

Compressed SQL updates have the following format:

```
index length value [index length value ][...]
```

where:

- *index* is a two-byte index into the list of columns of the table (first column is zero).
- *length* is the two-byte length of the table.
- *value* is the actual column value, including one of the following two-byte null indicators when applicable. 0 is not null. -1 is null.

For SQL records, you can use the DECOMPRESS_RECORD function ("DECOMPRESS_RECORD") to decompress the record for possible manipulation and then use the COMPRESS_RECORD function ("COMPRESS_RECORD") to compress it again, as expected by the process.

Compressed Enscribe updates have the following format:

```
offset length value [offset length value ][...]
```

where:

- *offset* is the offset into the Enscribe record of the data fragment that changed.
- *length* is the length of the fragment.
- *value* is the data. Fragments can span field boundaries, so full fields are not always retrieved (unless compression is off or FETCHCOMPS is used).

Syntax

```
#include "usrdecs.h"
short result_code;
record_def record;
ERCALLBACK (GET_RECORD_BUFFER, &record, &result_code);
```

Buffer

```
typedef struct
{
char *table_name;
char *buffer;
long length;
char before_after_ind;
short io_type;
short record_type;
short transaction_ind;
int64_t timestamp;
exit_ts_str io_datetime;
short mapped;
short source_or_target;
/* Version 2 CALLBACK_STRUCT_VERSION   */
char requesting_before_after_ind;
} record_def;
```

Input

`source_or_target`
One of the following indicating whether to return the record buffer for the source or target data record.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

`requesting_before_after_ind`
Optional. Set when requesting a record buffer on a record io_type of `UPDATE_COMP_PK_SQL_VAL` (primary key update). Use one of the following to indicate which portion of the primary key update is to be accessed. The default is `AFTER_IMAGE_VAL`.

```
BEFORE_IMAGE_VAL
AFTER_IMAGE_VAL
```

Output

`buffer`
A pointer to the record buffer. Typically, buffer is a pointer to a buffer of type `exit_rec_buf_def`. The `exit_rec_buf_def` buffer contains the actual record about to be processed by Extract or Replicat. The buffer is supplied when the call type is `EXIT_CALL_DISCARD_RECORD`. Exit routines can change the contents of this buffer, for example, to perform custom mapping functions.
The content of the record buffer is not converted to or from the character set of the user exit. It is passed as-is.

`length`
The returned length of the record buffer.

`io_type`
Returned as one of the following:

- **DDL type:**

  ```
  SQL_DDL_VAL
  ```

- **DML types:**

  ```
  DELETE_VAL
  INSERT_VAL
  UPDATE_VAL
  ```

- **Compressed Enscribe update:**

  ```
  UPDATE_COMP_ENSCRIBE_VAL
  ```

- **Compressed SQL update:**

  ```
  UPDATE_COMP_SQL_VAL
  UPDATE_COMP_PK_SQL_VAL
  ```

- **Other:**

  `TRUNCATE_TABLE_VAL`

`mapped`
A flag (`0` or `1`) indicating whether or not this is a mapped record buffer.

`before_after_ind`
One of the following to indicate whether the record is a before or after image.

```
BEFORE_IMAGE_VAL
AFTER_IMAGE_VAL
```

Return Values

```
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_OK
```

6.33 GET_RECORD_LENGTH

Valid For

Extract and Replicat

Description

Use the `GET_RECORD_LENGTH` function to retrieve the length of the data record. As an alternative, you can use the `GET_RECORD_BUFFER` function to retrieve the length of the data record.

Syntax

```
#include "usrdecs.h"
short result_code;
record_def record;
ERCALLBACK (GET_RECORD_LENGTH, &record, &result_code);
```

Buffer

```
typedef struct
{
char *table_name;
char *buffer;
long length;
char before_after_ind;
short io_type;
short record_type;
short transaction_ind;
int64_t timestamp;
exit_ts_str io_datetime;
short mapped;
short source_or_target;
/* Version 2 CALLBACK_STRUCT_VERSION   */
char requesting_before_after_ind;
} record_def;
```

Input

`source_or_target`
One of the following indicating whether to return the record length for the source or target data record.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

Output

`length`
The returned length of the data record.

Return Values

```
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_OK
```

6.34 GET_RECORD_TYPE

Valid For

Extract and Replicat

Description

Use the `GET_RECORD_TYPE` function to retrieve the type of record being processed. The record can be either a SQL or Enscribe record. The record type is important when manipulating the record buffer, because each record type has a different format.

Syntax

```
#include "usrdecs.h"
short result_code;
record_def record;
ERCALLBACK (GET_RECORD_TYPE, &record, &result_code);
```

Buffer

```
typedef struct
{
char *table_name;
char *buffer;
long length;
char before_after_ind;
short io_type;
short record_type;
short transaction_ind;
int64_t timestamp;
exit_ts_str io_datetime;
short mapped;
short source_or_target;
/* Version 2 CALLBACK_STRUCT_VERSION   */
char requesting_before_after_ind;
} record_def;
```

Input

`source_or_target`
One of the following indicating whether or not to return the record type for the source or target data record.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

Output

`record_type`
The returned record type. Can be one of the following:

- For SQL records:

  `EXIT_REC_TYPE_SQL`

- For Enscribe records:

  `EXIT_REC_TYPE_ENSCRIBE`

Return Values

```
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_OK
```

6.35 GET_SCHEMA_NAME_ONLY

Valid For

Extract and Replicat

Description

Use the `GET_SCHEMA_NAME_ONLY` function to retrieve the name of the owner (such as schema), but not the name of the catalog or container (if applicable) or the object, of the source or target object associated with the record being processed. This function is valid for DML and DDL operations.

To return the fully qualified name of a table, see the following:

GET_TABLE_NAME

To return the fully qualified name of a non-table object, such as a user, view or index, see the following:

GET_OBJECT_NAME

To return only the unqualified table or object name, see the following:

GET_TABLE_NAME_ONLY

GET_OBJECT_NAME_ONLY

To return other parts of the table or object name, see the following:

GET_CATALOG_NAME_ONLY

Database object names are returned exactly as they are defined in the hosting database, including the letter case.

Syntax

```
#include "usrdecs.h"
short result_code;
env_value_def env_value;
ERCALLBACK (GET_SCHEMA_NAME_ONLY, &env_value, &result_code);
```

Buffer

```
typedef struct
{
char *buffer;
long max_length;
long actual_length;
short value_truncated;
short index;
short source_or_target;
} env_value_def;
```

Input

`buffer`
A pointer to a buffer to accept the returned schema name. The name is null-terminated.

`max_length`
The maximum length of your allocated buffer to accept the schema name. This is returned as a `NULL` terminated string.

`source_or_target`
One of the following indicating whether to return the source or target schema name.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

Output

`buffer`
The fully qualified, null-terminated schema name.
If the character session of the user exit is set with `SET_SESSION_CHARSET` to a value other than the default character set of the operating system, as defined in `ULIB_CS_DEFAULT` in the `ucharset.h` file, the schema name is interpreted in the session character set.

`actual_length`
The string length of the returned name. The actual length does not include the null terminator.

`value_truncated`
A flag (`0` or `1`) indicating whether or not the value was truncated. Truncation occurs if the length of the schema name plus the null terminator exceeds the maximum buffer length.

Return Values

```
EXIT_FN_RET_INVALID_COLUMN
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_OK
```

6.36 GET_SESSION_CHARSET

Valid For

Extract and Replicat

Description

Use `GET_SESSION_CHARSET` to get the current user exit session character set. This character set can be set through callback function `SET_SESSION_CHARSET`. The character set of the user exit session indicates the encoding of any character-based callback structure members that are used between the user exit and the caller process (Extract, data pump, Replicat), including metadata such as (but not limited to):

- database names and locales
- table and column names
- DDL text
- error messages
- character-type columns such as `CHAR` and `NCHAR`
- date-time and numeric columns that are represented in string form

The valid values of the session character set are defined in the header file `ucharset.h`. This function can be called at any time that the user exit has control.

For more information about globalization support, see Administering Oracle GoldenGate for Windows and UNIX.

Syntax

```
#include usrdecs.h
short result_code;
session_def session_charset_def;
ERCALLBACK (GET_SESSION_CHARSET, &session_charset_def, &result_code);
```

Buffer

```
typedef struct
{
ULibCharSet  session_charset;
} session_def;
```

Input

None

Output

```
session_charset_def.session_charset
```

Return Values

```
EXIT_FN_RET_OK
```

6.37 GET_STATISTICS

Valid For

Extract and Replicat

Description

Use the `GET_STATISTICS` function to retrieve the current processing statistics for the Extract or Replicat process. For example, the user exit can output statistics to a custom report should a fatal error occur during Extract or Replicat processing.

Statistics are automatically handled based on which process type has requested the data:

- The Extract process will always treat the request as a source table, counting that table once regardless of the number of times output.
- The Replicat process will always treat the request as a set of target tables. The set includes all counts to the target regardless of the number of source tables.

If the database is case-sensitive, object names must be specified in the same letter case as they are defined in the hosting database; otherwise, the case does not matter.

Syntax

```
#include "usrdecs.h"
short result_code;
statistics_def statistics;
ERCALLBACK (GET_STATISTICS, &statistics, &result_code);
```

Buffer

```
typedef struct
{
char *table_name;
short group;
exit_timestamp_string start_datetime;
long num_inserts;
long num_updates;
long num_befores;
long num_deletes;
long num_discards;
long num_ignores;
long total_db_operations;
long total_operations;
/* Version 2 CALLBACK_STRUCT_VERSION */
long num_truncates;
} statistics_def;
```

Input

`table_name`
A null-terminated string specifying the fully qualified name of the source table. Statistics are always recorded against the source records. If the character session of the user exit is set with `SET_SESSION_CHARSET` to a value other than the default character set of the operating system, as defined in `ULIB_CS_DEFAULT` in the `ucharset.h` file, the table name and the date are interpreted in the session character set.

`group`
Can be one of the following:

> **`EXIT_STAT_GROUP_STARTUP`**
> Retrieves statistics since the Oracle GoldenGate process was last started.
>
> **`EXIT_STAT_GROUP_DAILY`**
> Retrieves statistics since midnight of the current day.
>
> **`EXIT_STAT_GROUP_HOURLY`**
> Retrieves statistics since the start of the current hour.
>
> **`EXIT_STAT_GROUP_RECENT`**
> Retrieves statistics since the statistics were reset using GGSCI.
>
> **`EXIT_STAT_GROUP_REPORT`**
> Retrieves statistics since the last report was generated.
>
> **`EXIT_STAT_GROUP_USEREXIT`**
> Retrieves statistics since the last time the user exit reset the statistics with `RESET_USEREXIT_STATS`.

Output

`start_datetime`
A null-terminated string in the format of `YYYY-MM-DD HH:MI:SS` indicating the local date and time that statistics started to be recorded for the specified group.

`num_inserts`
The returned number of inserts processed by Extract or Replicat.

`num_updates`
The returned number of updates processed by Extract or Replicat.

`num_befores`
The returned number of update before images processed by Extract or Replicat.

`num_deletes`
The returned number of deletes processed by Extract or Replicat.

`num_discards`
The returned number of records discarded by Extract or Replicat.

`num_ignores`
The returned number of records ignored by Extract or Replicat.

`total_db_operations`
The returned number of total database operations processed by Extract or Replicat.

`total_operations`
The returned number of total operations processed by Extract or Replicat, including discards and ignores.

`num_truncates`
The returned number of truncates processed by Extract or Replicat.

Return Values

```
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_TABLE_NOT_FOUND
EXIT_FN_RET_OK
```

6.38 GET_TABLE_COLUMN_COUNT

Valid For

Extract and Replicat

Description

Use the `GET_TABLE_COLUMN_COUNT` function to retrieve the total number of columns in a table, including the number of key columns.

Syntax

```
#include "usrdecs.h"
short result_code;
table_def table;
ERCALLBACK (GET_TABLE_COLUMN_COUNT, &table, &result_code);
```

Buffer

```
typedef struct
{
short num_columns;
short source_or_target;
/* Version 2 CALLBACK_STRUCT_VERSION */
short num_key_columns;
} table_def;
```

Input

`source_or_target`
One of the following indicating whether to return the total number of columns for the source or target table.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

Output

`num_columns`
The returned total number of columns in the specified table.

`num_key_columns`
The returned total number of columns that are being used by Oracle GoldenGate as the key for the specified table.

Return Values

```
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_OK
```

6.39 GET_TABLE_METADATA

Valid For

Extract and Replicat

Description

Use the `GET_TABLE_METADATA` function to retrieve metadata about the table that associated with the record that is being processed.

Syntax

```
#include "usrdecs.h"
short result_code;
table_metadata_def tbl_meta_rec;
ERCALLBACK (GET_TABLE_METADATA, &tbl_meta_rec, &result_code);
```

Buffer

```
typedef struct
{
char *table_name;
short value_truncated;
long max_name_length;
long actual_name_length;
short num_columns;
short num_key_columns;
short *key_columns;
short num_keys_returned;
BOOL using_pseudo_key;
short source_or_target;
} table_metadata_def;
```

Input

`table_name`
A pointer to a buffer to accept the `table_name` return value

`key_columns`
A pointer to an array of `key_columns` indexes.

`max_name_length`
The maximum length of the returned table name. Typically, the maximum length is the length of the table name buffer. Since the returned table name is null-terminated, the maximum length should equal the maximum length of the table name.

`source_or_target`
One of the following indicating whether to return the source or target table name.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

Output

`table_name`
The name of the table associated with the record that is being processed. If the character session of the user exit is set with `SET_SESSION_CHARSET` to a value other than the default character set of the operating system, as defined in `ULIB_CS_DEFAULT` in the `ucharset.h` file, the table name is interpreted in the session character set.

`value_truncated`
A flag (`0` or `1`) indicating whether or not the value was truncated. Truncation occurs if the length of the table name plus the null terminator exceeds the maximum buffer length.

`actual_name_length`
The string length of the returned table name. The actual length does not include the null terminator.

`num_columns`
The number of columns in the table.

`num_key_columns`
The number of columns in the key that is being used by Oracle GoldenGate.

`key_columns`
The values for the key columns. You must know the expected number of keys multiplied by the length of the columns, and then allocate the appropriate amount of buffer.

`num_keys_returned`
The number of key columns that are requested.

`using_pseudo_key`
A flag that indicates whether or not `KEYCOLS`-specified columns are being used as a key. Returns `TRUE` or `FALSE`.

Return Values

```
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_EXCEEDED_MAX_LENGTH
EXIT_FN_RET_OK
```

6.40 GET_TABLE_NAME

Valid For

Extract and Replicat

Description

Use the GET_TABLE_NAME function to retrieve the fully qualified name of the source or target table associated with the record being processed. This function is valid only for tables in DML and DDL operations. To retrieve the fully qualified name of a non-table object, see the following:

GET_OBJECT_NAME

To return only part of the fully qualified name, see also the following:

GET_TABLE_NAME_ONLY GET_SCHEMA_NAME_ONLY GET_CATALOG_NAME_ONLY

Database object names are returned exactly as they are defined in the hosting database, including the letter case.

This function returns a value only if the object is a table. Otherwise, the `actual_length` of the `env_value_def` variable returns 0.

Syntax

```
#include "usrdecs.h"
short result_code;
env_value_def env_value;
ERCALLBACK (GET_TABLE_NAME, &env_value, &result_code);
```

Buffer

```
typedef struct
{
char *buffer;
long max_length;
long actual_length;
short value_truncated;
short index;
short source_or_target;
} env_value_def;
```

Input

`buffer`
A pointer to a buffer to accept the returned table name. The table name is null-terminated.

`max_length`
The maximum length of your allocated buffer to accept the table name. This is returned as a `NULL` terminated string.

`source_or_target`
One of the following indicating whether to return the source or target table name.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

Output

`buffer`
The fully qualified, null-terminated table name, for example `schema.table` or `catalog.schema.table`, depending on the database platform.
If the character session of the user exit is set with `SET_SESSION_CHARSET` to a value other than the default character set of the operating system, as defined in `ULIB_CS_DEFAULT` in the `ucharset.h` file, the table name is interpreted in the session character set.

`actual length`
The string length of the returned table name. The actual length does not include the null terminator. The actual length returned is 0 if the object is anything other than a table.

`value_truncated`
A flag (`0` or `1`) indicating whether or not the value was truncated. Truncation occurs if the length of the table name plus the null terminator exceeds the maximum buffer length.

Return Values

```
EXIT_FN_RET_INVALID_COLUMN
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_OK
```

6.41 GET_TABLE_NAME_ONLY

Valid For

Extract and Replicat

Description

Use the `GET_TABLE_NAME_ONLY` function to retrieve the unqualified name (without the catalog, container, or schema) of the source or target table associated with the record being processed. This function is valid only for tables in DML and DDL operations. To retrieve the unqualified name of a non-table object, see the following:

GET_OBJECT_NAME_ONLY

To return the fully qualified name of a table, see the following:

GET_TABLE_NAME

To return other parts of the table name, see the following:

GET_SCHEMA_NAME_ONLY GET_CATALOG_NAME_ONLY

Database object names are returned exactly as they are defined in the hosting database, including the letter case.

This function returns a value only if the object is a table. Otherwise, the `actual_length` of the `env_value_def` variable returns 0.

Syntax

```
#include "usrdecs.h"
short result_code;
env_value_def env_value;
ERCALLBACK (GET_TABLE_NAME_ONLY, &env_value, &result_code);
```

Buffer

```
typedef struct
{
char *buffer;
long max_length;
long actual_length;
short value_truncated;
short index;
short source_or_target;
} env_value_def;
```

Input

`buffer`
A pointer to a buffer to accept the returned table name. The table name is null-terminated.

`max_length`
The maximum length of your allocated buffer to accept the table name. This is returned as a `NULL` terminated string.

`source_or_target`
One of the following indicating whether to return the source or target table name.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

Output

`buffer`
The fully qualified, null-terminated table name, for example `schema.table` or `catalog.schema.table`, depending on the database platform.
If the character session of the user exit is set with `SET_SESSION_CHARSET` to a value other than the default character set of the operating system, as defined in `ULIB_CS_DEFAULT` in the `ucharset.h` file, the table name is interpreted in the session character set.

`actual length`
The string length of the returned table name. The actual length does not include the null terminator. The actual length returned is 0 if the object is anything other than a table.

`value_truncated`
A flag (`0` or `1`) indicating whether or not the value was truncated. Truncation occurs if the length of the table name plus the null terminator exceeds the maximum buffer length.

Return Values

```
EXIT_FN_RET_INVALID_COLUMN
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_OK
```

6.42 GET_TIMESTAMP

Valid For

Extract and Replicat

Description

Use the `GET_TIMESTAMP` function to retrieve the I/O timestamp associated with a source data record in ASCII datetime format. The timestamp is then converted to local time and approximates the time of the original database operation.

> **Note:**
>
> The ASCII commit timestamp can vary with the varying regional use of Daylight Savings Time. The user exit callback should return the ASCII datetime as a GMT time to avoid this variance. The Oracle GoldenGate trail uses GMT format. See "GET_GMT_TIMESTAMP".

Syntax

```
#include "usrdecs.h"
short result_code;
record_def record;
ERCALLBACK (GET_TIMESTAMP, &record, &result_code);
```

Buffer

```
typedef struct
{
char *table_name;
char *buffer;
long length;
char before_after_ind;
short io_type;
short record_type;
short transaction_ind;
int64_t timestamp;
exit_ts_str io_datetime;
short mapped;
short source_or_target;
/* Version 2 CALLBACK_STRUCT_VERSION   */
char requesting_before_after_ind;
} record_def;
```

Input

None

Output

`timestamp`
The returned 64-bit I/O timestamp in ASCII format.

`io_datetime`
A null-terminated string containing the local I/O date and time, in the format of: `YYYY-MM-DD HH:MI:SS.FFFFFF`

Return Values

```
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_OK
```

6.43 GET_TRANSACTION_IND

Valid For

Extract and Replicat

Description

Use the `GET_TRANSACTION_IND` function to determine whether a data record is the first, last or middle operation in a transaction. This can be useful when, for example, a user exit can compile the details of each transaction and output a special summary record.

Syntax

```
#include "usrdecs.h"
short result_code;
record_def record;
ERCALLBACK (GET_TRANSACTION_IND, &record, &result_code);
```

Buffer

```
typedef struct
{
char *table_name;
char *buffer;
long length;
char before_after_ind;
short io_type;
short record_type;
short transaction_ind;
int64_t timestamp;
exit_ts_str io_datetime;
short mapped;
short source_or_target;
/* Version 2 CALLBACK_STRUCT_VERSION   */
char requesting_before_after_ind;
} record_def;
```

Input

None

Output

`transaction_ind`
The returned transaction indicator, represented as one of the following:

> **`BEGIN_TRANS_VAL`**
> The record is the beginning of a transaction.
>
> **`MIDDLE_TRANS_VAL`**
> The record is in the middle of a transaction.
>
> **`END_TRANS_VAL`**
> The record is the end of a transaction.
>
> **`WHOLE_TRANS_VAL`**
> The record is the only one in the transaction.

Return Values

```
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_OK
```

6.44 GET_USER_TOKEN_VALUE

Valid For

Extract and Replicat

Description

Use the `GET_USER_TOKEN_VALUE` function to obtain the value of a user token from a trail record. No character-set conversion is performed on the token value.

Syntax

```
#include "usrdecs.h"
```

Buffer

```
typedef struct
{
char *token_name;
char *token_value;
long max_length;
long actual_length;
short value_truncated;
} token_value_def;
```

Input

`token_name`
A pointer to a buffer representing the name of a token. It is assumed that the token name is encoded in the default character set of the operating system that hosts the Extract `TABLE` statement where the token is configured. The user exit prepares the token name in the character set that is specified with `SET_SESSION_CHARSET`, but

converts it back to the operating system character set before retrieving the matching token value.

`max_length`
The maximum length of your allocated `token_name` buffer to accept any resulting token value. This is returned as a `NULL` terminated string.

Output

`token_value`
A pointer to a buffer representing the return value (if any) of a token. The token value is passed back to the user exit as-is, without any character-set conversion.

`actual_length`
The actual length of the token value that is returned. A value of `0` is returned if the token is found and there is no value present.

`value_truncated`
A flag of either `0` or `1` that indicates whether or not the token value was truncated. Truncation occurs if the length of the table name plus the null terminator exceeds the maximum buffer length.

Return Values

```
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_TOKEN_NOT_FOUND
EXIT_FN_RET_OK
```

6.45 OUTPUT_MESSAGE_TO_REPORT

Valid For

Extract and Replicat

Description

Use the `OUTPUT_MESSAGE_TO_REPORT` function to output a message to the report file. If a character session for the user exit is set with `SET_SESSION_CHARSET`, the message is interpreted in the session character set but is converted to the default character set of the operating system before being written to the report file.

Syntax

```
#include "usrdecs.h"
short result_code;
char  message[500];
ERCALLBACK (OUTPUT_MESSAGE_TO_REPORT, message, &result_code);
```

Buffer

None

Input

`message`
A null-terminated string.

Output

None

Return Values

`EXIT_FN_RET_OK`

6.46 RESET_USEREXIT_STATS

Valid For

Extract and Replicat

Description

Use the `RESET_USEREXIT_STATS` function to reset the `EXIT_STAT_GROUP_USEREXIT` statistics for the Oracle GoldenGate process since the last call to `GET_STATISTICS` was processed. This function enables the user exit to control when to reset the group statistics that are returned by the `GET_STATISTICS` function, but does not permit any of the other statistics to be reset.

Syntax

```
#include "usrdecs.h"
short result_code;
call_callback (RESET_USEREXIT_STATS, NULL, &result_code);
```

Input

None

Output

None

Return Values

None

6.47 SET_COLUMN_VALUE_BY_INDEX

Valid For

Extract and Replicat

Description

Use the `SET_COLUMN_VALUE_BY_INDEX` or `SET_COLUMN_VALUE_BY_NAME` function to modify a single column value without manipulating the entire data record. If the character session of the user exit is set with `SET_SESSION_CHARSET` to a value other than the default character set of the operating system, as defined in `ULIB_CS_DEFAULT` in the `ucharset.h` file, the character data that is exchanged between the user exit and the process is interpreted in the session character set.

A column value is set to the session character set only if the following is true:

- The column value is a SQL character type (`CHAR/VARCHAR2/CLOB`, `NCHAR/NVARCHAR2/NCLOB`), a SQL date/timestamp/interval/number type)
- The `column_value_mode` indicator is set to `EXIT_FN_CNVTED_SESS_CHAR_FORMAT`.

Syntax

```
#include "usrdecs.h"
short result_code;
column_def column;
ERCALLBACK (SET_COLUMN_VALUE_BY_INDEX, &column, &result_code);
```

Buffer

```
typedef struct
{
char *column_value;
unsigned short max_value_length;
unsigned short actual_value_length;
short null_value;
short remove_column;
short value_truncated;
short column_index;
char *column_name;
/* Version 3 CALLBACK_STRUCT_VERSION */
short column_value_mode;
short source_or_target;
/* Version 2 CALLBACK_STRUCT_VERSION */
char requesting_before_after_ind;
char more_lob_data;
/* Version 3 CALLBACK_STRUCT_VERSION  */
ULibCharSet column_charset;
} column_def;
```

Input

`column_value`
A pointer to a buffer representing the new column value.

`actual_value_length`
The length of the new column value, in bytes. The actual length should not include the null terminator if the new column value is in ASCII format.

`null_value`
A flag (`0` or `1`) indicating whether the new column value is null. If the `null_value` flag is set to `1`, the column value in the data record is set to null.

`remove_column`
A flag (`0` or `1`) indicating whether to remove the column from a compressed update if it exists. A compressed update is one in which only the changed column values are logged, not all of the column values. This flag should only be set if the operation type for the record is `UPDATE_COMP_SQL_VAL`, `PK_UPDATE_SQL_VAL`, or `UPDATE_COMP_ENSCRIBE_VAL`.

`column_index`
The column index of the new column value to be copied into the data record buffer. Column indexes start at zero.

`column_value_mode`
Indicates the format of the column value.

> **`EXIT_FN_CHAR_FORMAT`**
> ASCII format: The value is a null-terminated ASCII (or EBCDIC) string (with a known exception for the sub-data type UTF16_BE, which is converted to UTF8.)

> **Note:**
>
> A column value might be truncated when presented to a user exit, because the value is interpreted as an ASCII string and is supposed to be null-terminated. The first value of `0` becomes the string terminator.

- Dates are in the format `CCYY-MM-DD HH:MI:SS.FFFFFF`, in which the fractional time is database-dependent.
- Numeric values are in their string format. For example, `123.45` is represented as `'123.45'`.
- Non-printable characters or binary values are converted to hexadecimal notation.
- Floating point types are output as null-terminated strings, to the first 14 significant digits.

> **`EXIT_FN_RAW_FORMAT`**
> Internal Oracle GoldenGate canonical format: This format includes a two-byte null indicator and a two-byte variable data length when applicable. No character-set conversion is performed by Oracle GoldenGate for this format for any character data type.

> **`EXIT_FN_CNVTED_SESS_CHAR_FORMAT`**
> User exit character set: This only applies if the column data type is:

- a character-based type, single or multi-byte
- a numeric type with a string representation

> This format is not null-terminated.

`source_or_target`
One of the following indicating whether the source or target record is being modified.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

`requesting_before_after_ind`
Set when setting a column value on a record `io_type` of `UPDATE_COMP_PK_SQL_VAL` (primary key update). Use one of the following to indicate which portion of the primary key update is to be accessed. The default is `AFTER_IMAGE_VAL`.

- `BEFORE_IMAGE_VAL`

- `AFTER_IMAGE_VAL`

Output

None

Return Values

```
EXIT_FN_RET_BAD_COLUMN_DATA
EXIT_FN_RET_INVALID_COLUMN
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_OK
EXIT_FN_RET_NOT_SUPPORTED
EXIT_FN_RET_INVALID_COLUMN_TYPE
```

6.48 SET_COLUMN_VALUE_BY_NAME

Valid For

Extract and Replicat

Description

Use the `SET_COLUMN_VALUE_BY_NAME` or `SET_COLUMN_VALUE_BY_INDEX` function to modify a single column value without manipulating the entire data record.

If the character session of the user exit is set with `SET_SESSION_CHARSET` to a value other than the default character set of the operating system, as defined in `ULIB_CS_DEFAULT` in the `ucharset.h` file, the character data that is exchanged between the user exit and the process is interpreted in the session character set.

A column value is set to the session character set only if the following is true:

- The column value is a SQL character type (`CHAR/VARCHAR2/CLOB`, `NCHAR/NVARCHAR2/NCLOB`), a SQL date/timestamp/interval/number type)
- The `column_value_mode` indicator is set to `EXIT_FN_CNVTED_SESS_CHAR_FORMAT`.

If the database is case-sensitive, object names must be specified in the same letter case as they are defined in the hosting database; otherwise, the case does not matter.

Syntax

```
#include "usrdecs.h"
short result_code;
column_def column;
ERCALLBACK (SET_COLUMN_VALUE_BY_NAME, &column, &result_code);
```

Buffer

```
typedef struct
{
char *column_value;
unsigned short max_value_length;
unsigned short actual_value_length;
short null_value;
short remove_column;
short value_truncated;
short column_index;
char *column_name;
/* Version 3 CALLBACK_STRUCT_VERSION */
short column_value_mode;
short source_or_target;
/* Version 2 CALLBACK_STRUCT_VERSION */
char requesting_before_after_ind;
char more_lob_data;
/* Version 3 CALLBACK_STRUCT_VERSION  */
ULibCharSet column_charset;
} column_def;
```

Input

`column_value`
A pointer to a buffer representing the new column value.

`actual_value_length`
The length of the new column value, in bytes. The actual length should not include the null terminator if the new column value is in ASCII format.

`null_value`
A flag (`0` or `1`) indicating whether the new column value is null. If the `null_value` flag is set to `1`, the column value in the data record is set to null.

`remove_column`
A flag (`0` or `1`) indicating whether to remove the column from a compressed update if it exists. A compressed update is one where only the changed column values are logged, not all of the column values. This flag should only be set if the operation type for the record is `UPDATE_COMP_SQL_VAL`, `PK_UPDATE_SQL_VAL`, or `UPDATE_COMP_ENSCRIBE_VAL`.

`column_name`
The name of the column that corresponds to the new column value to be copied into the data record buffer.

`column_value_mode`
Indicates the format of the column value.

> **`EXIT_FN_CHAR_FORMAT`**
> ASCII format: The value is a null-terminated ASCII (or EBCDIC) string (with a known exception for the sub-data type `UTF16_BE`, which is converted to UTF8.)

> **Note:**
>
> A column value might be truncated when presented to a user exit, because the value is interpreted as an ASCII string and is supposed to be null-terminated. The first value of `0` becomes the string terminator.

- Dates are in the format `CCYY-MM-DD HH:MI:SS.FFFFFF`, in which the fractional time is database-dependent.
- Numeric values are in their string format. For example, `123.45` is represented as `'123.45'`.

- Non-printable characters or binary values are converted to hexadecimal notation.
- Floating point types are output as null-terminated strings, to the first 14 significant digits.

`EXIT_FN_RAW_FORMAT`
Internal Oracle GoldenGate canonical format: This format includes a two-byte null indicator and a two-byte variable data length when applicable. No character-set conversion is performed by Oracle GoldenGate for this format for any character data type.

`EXIT_FN_CNVTED_SESS_CHAR_FORMAT`
User exit character set: This only applies if the column data type is:

- a character-based type, single or multi-byte
- a numeric type with a string representation

This format is not null-terminated.

`source_or_target`
One of the following indicating whether the source or the target data record is being modified.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

`requesting_before_after_ind`
Set when setting a column value on a record `io_type` of `UPDATE_COMP_PK_SQL_VAL` (primary key update). Use one of the following to indicate which portion of the primary key update is to be accessed. The default is `AFTER_IMAGE_VAL`.

- `BEFORE_IMAGE_VAL`
- `AFTER_IMAGE_VAL`

Output

None

Return Values

```
EXIT_FN_RET_BAD_COLUMN_DATA
EXIT_FN_RET_INVALID_COLUMN
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_OK
EXIT_FN_RET_NOT_SUPPORTED
EXIT_FN_RET_INVALID_COLUMN_TYPE
```

6.49 SET_OPERATION_TYPE

Valid For

Extract and Replicat

Description

Use the `SET_OPERATION_TYPE` function to change the operation type associated with a data record. For example, a delete on a specified table can be turned into an insert into another table. The record header's before/after indicator is modified as appropriate for insert and delete operations.

Syntax

```
#include "usrdecs.h"
short result_code;
record_def record;
ERCALLBACK (SET_OPERATION_TYPE, &record, &result_code);
```

Buffer

```
typedef struct
{
char *table_name;
char *buffer;
long length;
char before_after_ind;
short io_type;
short record_type;
short transaction_ind;
int64_t timestamp;
exit_ts_str io_datetime;
short mapped;
short source_or_target;
/* Version 2 CALLBACK_STRUCT_VERSION   */
char requesting_before_after_ind;
} record_def;
```

Input

`io_type`
Returned as one of the following for deletes, inserts, and updates, respectively:

```
DELETE_VAL
INSERT_VAL
UPDATE_VAL
```

For a compressed Enscribe update, the following is returned:

```
UPDATE_COMP_ENSCRIBE_VAL
```

For a compressed SQL update, the following is returned:

```
UPDATE_COMP_SQL_VAL
```

If the new operation type is an insert or delete, the before/after indicator for the record is set to one of the following:
Insert: `AFTER_IMAGE_VAL` (after image)
Delete: `BEFORE_IMAGE_VAL` (before image)

`source_or_target`
One of the following indicating whether to set the operation type for the source or target data record.

```
EXIT_FN_SOURCE_VAL
EXIT_FN_TARGET_VAL
```

Output

None

Return Values

```
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_OK
```

6.50 SET_RECORD_BUFFER

Valid For

Extract and Replicat

Description

Use the `SET_RECORD_BUFFER` function for compatibility with user exits, and for complex data record manipulation. This function manipulates the entire record. It is best to modify individual column values, rather than the entire record, because the Oracle GoldenGate internal record formats must be known in order to accurately modify the data record buffer directly. To modify column values, use the `SET_COLUMN_VALUE_BY_INDEX` and `SET_COLUMN_VALUE_BY_NAME` functions. These functions are sufficient to handle most custom mapping within a user exit.

Syntax

```
#include "usrdecs.h"
short result_code;
record_def record;
ERCALLBACK (SET_RECORD_BUFFER, &record_def, &result_code);
```

Buffer

```
typedef struct
{
char *table_name;
char *buffer;
long length;
char before_after_ind;
short io_type;
short record_type;
short transaction_ind;
int64_t timestamp;
exit_ts_str io_datetime;
short mapped;
short source_or_target;
/* Version 2 CALLBACK_STRUCT_VERSION   */
char requesting_before_after_ind;
} record_def;
```

Input

`buffer`
A pointer to the new record buffer. Typically, `buffer` is a pointer to a buffer of type `exit_rec_buf_def`. The `exit_rec_buf_def` buffer contains the actual record about to be processed by Extract or Replicat. The buffer is supplied when the call type is `EXIT_CALL_DISCARD_RECORD`. Exit routines can change the contents of this buffer, for example to perform custom mapping functions.
The content of the record buffer is not converted to or from the character set of the user exit. It is passed as-is.

`length`
The new length of the record buffer.

Output

None

Return Values

```
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_OK
EXIT_FN_RET_NOT_SUPPORTED
```

6.51 SET_SESSION_CHARSET

Valid For

Extract and Replicat

Description

Use the `SET_SESSION_CHARSET` function to set the character set of the user exit. The character set of the user exit session indicates the encoding of any character-based callback structure members that are used between the user exit and the caller process (Extract, data pump, Replicat), including metadata such as (but not limited to):

- database names and locales
- table and column names
- DDL text
- error messages
- character-type columns such as `CHAR` and `NCHAR`
- date-time and numeric columns that are represented in string form

This function can be called at any time that the user exit has control. When the user exit sets the session character set, it takes effect immediately, and all character values start being converted to the specified set. The recommended place to call this function is with call type `EXIT_CALL_START`.

Note:

SET_SESSION_CHARSET is not thread-safe.

If SET_SESSION_CHARSET is not called, the session gets set to the default character set of the operating system, which is a predefined enumerated type value in ULIB_CS_DEFAULT in the ucharset.h file. When the session character set is a default from ULIB_CS_DEFAULT, no conversion is performed by Oracle GoldenGate for character-type values that are exchanged between the user exit and the caller process. In addition, the object-name metadata of the database are considered to be the default character set of the operating system. Keep in mind that the default may not be correct.

The character set of the user exit is printed to the report file when the user exit is loaded and when SET_SESSION_CHARSET is called. If the session character set is ULIB_CS_DEFAULT, there is a message stating that no column data character-set conversion is being performed.

For more information about globalization support, see Administering Oracle GoldenGate for Windows and UNIX.

Syntax

```
#include usrdecs.h
short result_code;
session_def session_charset_def;
ERCALLBACK (SET_SESSION_CHARSET, &session_charset_def, &result_code);
```

Buffer

```
typedef struct
{
ULibCharSet  session_charset;
} session_def;
```

Input

session_charset
The valid values of the session character set are defined in the header file ucharset.h.

Output

None

Return Values

EXIT_FN_RET_OK

6.52 SET_TABLE_NAME

Valid For

Extract and data pumps

Description

Use the `SET_TABLE_NAME` function to change the table name associated with a data record. For example, a delete on a specified table can be changed to an insert into a history table. You can change the table name only during Extract processing.

If the database is case-sensitive, object names must be specified in the same letter case as they are defined in the hosting database; otherwise, the case does not matter. Specify the full two-part or three-part table name.

Syntax

```
#include "usrdecs.h"
short result_code;
record_def record;
ERCALLBACK (SET_TABLE_NAME, &record_def, &result_code);
```

Buffer

```
typedef struct
{
char *table_name;
char *buffer;
long length;
char before_after_ind;
short io_type;
short record_type;
short transaction_ind;
int64_t timestamp;
exit_ts_str io_datetime;
short mapped;
short source_or_target;
/* Version 2 CALLBACK_STRUCT_VERSION   */
char requesting_before_after_ind;
} record_def;
```

Input

`table_name`
A null-terminated string specifying the new table name to be associated with the data record.
If the character session of the user exit is set with `SET_SESSION_CHARSET` to a value other than the default character set of the operating system, as defined in `ULIB_CS_DEFAULT` in the `ucharset.h` file, the table name is interpreted in the session character set.

Output

None

Return Values

```
EXIT_FN_RET_INVALID_CONTEXT
EXIT_FN_RET_INVALID_PARAM
EXIT_FN_RET_OK
```